THE STATE OF BIODIVERSITY IN LATIN AMERICA AND THE CARIBBEAN

A MID-TERM REVIEW OF PROGRESS TOWARDS THE AICHI BIODIVERSITY TARGETS

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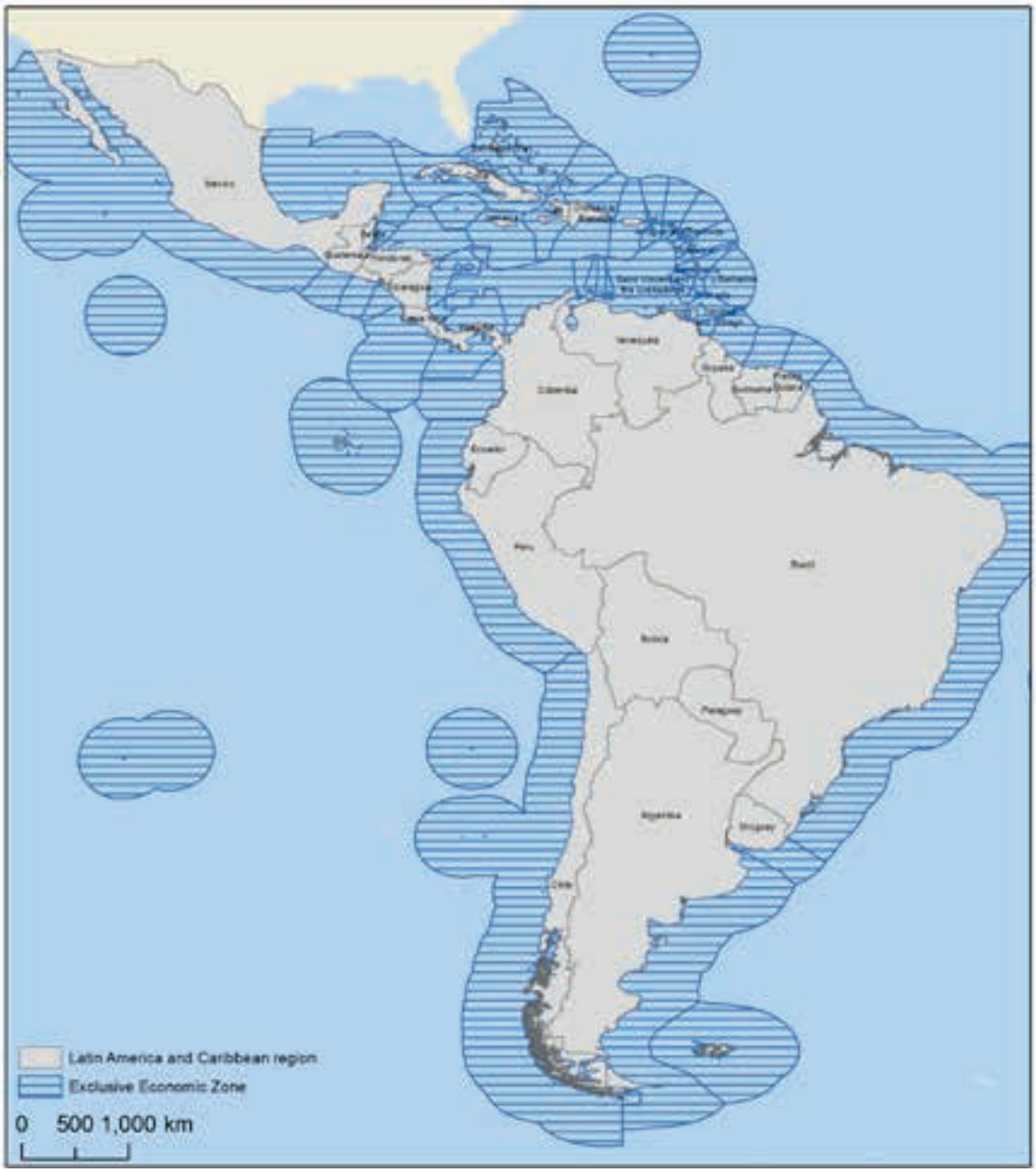

Map of countries and their Economic Exclusive Zone (EEZ) in the Latin America and Caribbean region, based on the UNEP Live regional classification (UNEP 2015a).

FOREWORD

The Latin America and Caribbean (LAC) region supports rich biological diversity, with around sixty per cent of global terrestrial life found within it, alongside diverse freshwater and marine flora and fauna. The LAC region's biomes extend from wetlands and coastal ecosystems to deserts, tropical forests, extensive savannah grasslands and high altitude Andean habitats. The lowland forests are amongst the most species-rich on Earth, and the mountain forests and moorlands (*páramos*) of the Andes host a wide range of endemic and narrow range species. This regional diversity is driven by a number of environmental factors, including a complex evolutionary history and highly variable geography, geology and climate. Large areas of LAC remain in a natural or semi-natural state, but there has also been considerable transformation of habitats to serve national, regional and global economies. Although these national economies have improved over recent decades, and the governance of many countries has been transformed, further progress is required to build more fair and equitable societies, while continuing to consider biodiversity and ecosystem services in decision-making. This is a challenge for the future development and conservation trajectories of the region.

In 2010, the Parties to the Convention on Biological Diversity (CBD) adopted the *Strategic Plan for Biodiversity 2011-2020* (the *Strategic Plan*), a global ten-year framework for action to conserve biodiversity and enhance its benefits for people. An assessment of the implementation of the plan, at the global scale, was published in the fourth edition of the *Global Biodiversity Outlook* (GBO-4) in 2014. This second edition of *The State of Biodiversity in Latin America and the Caribbean* complements the global GBO-4 by analysing and assessing the status and trends of the environment in this region, against the twenty Aichi Biodiversity Targets. This report is primarily a synthesis of existing material, although it does include some new analyses. It also forms a contribution towards the development of two other regional environmental assessments; the first, focusing on biodiversity and ecosystem services, was recently initiated by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and the second resulting from broader environmental concerns will feed into the Sixth Edition of the *Global Environment Outlook* (GEO-6).

This report identifies opportunities and challenges in implementing the *Strategic Plan for Biodiversity 2011-2020* in Latin America and the Caribbean and looks ahead to actions which need to be taken by national governments and other decision makers to enhance and accelerate progress towards its attainment. There are many examples of success and innovation in the conservation of LAC's biodiversity, yet the region is also experiencing high rates of urbanization and industrial and agricultural development. Balancing the promotion of human and economic development with the preservation and sustainable use of natural resources is a huge challenge in the LAC region.

Responding to and tackling the challenges presented in this assessment requires a collaborative effort across governments and many stakeholders within the LAC region. UNEP has a significant role to play in catalysing such action through stimulating trans-boundary action, South-South cooperation and joint efforts across the region, building capacity within governments and organisations to promote sustainable development, fostering innovation, piloting new ideas and encouraging the mobilisation of resources.

Leo Heileman

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Braulio Ferreira de Souza Dias

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1. EXECUTIVE SUMMARY

Global Biodiversity Outlook-4, the mid-term review of the *Strategic Plan for Biodiversity 2011-2020*, provided a global assessment of progress towards the attainment of the Plan's global biodiversity goals and associated Aichi Biodiversity Targets, but contained limited regional information. This report builds on and complements the global GBO-4 assessment. It is the second edition of the State of Biodiversity in the Latin America and the Caribbean report and serves as a near mid-term review of progress towards the *Strategic Plan for Biodiversity 2011-2020* for the Latin America and the Caribbean region.

This report draws on a set of regional indicators, information from fifth national reports to the Convention on Biological Diversity (CBD), other national and regional reports, case studies and published literature, to provide a target-by-target review of progress towards the twenty Aichi Biodiversity Targets. As much as possible, global indicators for Aichi Biodiversity Targets have been broken down to regional level and some additional analyses of existing global information have been undertaken with key national institutions in the region. However, limitations in data have meant that some datasets, which do not extend past 2011, have been included to illustrate that relevant information exists, but further efforts to update this information are needed.

Tracking regional progress can help identify where regional and national efforts are most needed to enhance and accelerate progress towards the attainment of the Aichi Biodiversity Targets. Responding to the opportunities and challenges requires a collaborative effort so this report has been produced to help inform regional and national dialogue across governments and many stakeholders throughout the Latin America and Caribbean region, and the promotion of co-operation and actions especially through legal and policy frameworks at different scales.

The key messages about the state of biodiversity in the Latin America and Caribbean region, and the pressures upon it, which have emerged from this assessment are:

- Declines in species abundance and high risks of species extinctions continue.
- Rates of habitat loss in Latin America and the Caribbean have slowed but remain high.
- Certain pressures associated with rapid economic growth and social inequities are impacting the region's natural resources.
- Agricultural expansion and intensification to increase both livestock, arable and commodities production continue.
- The region is undergoing major infrastructure development of dams and roads.
- The impacts on biodiversity of high concentrations of population in urban areas are particularly significant within the region.
- Country economies within the region are very highly dependent on natural resources.
- Resource extraction for minerals and hydrocarbons has, in some cases, led to locally devastating direct and indirect impacts on biodiversity such as vegetation removal, water and soil pollution and contamination.
- Transboundary and local air pollution is now recognised as an environmental factor in human health in the region.
- Climate change induced impacts on coral reefs and montane habitats within the region are now being observed.

Nonetheless, the report identifies a number of important responses that have taken place since 2010:

- The region has implemented a range of low carbon sustainable development approaches (Target 3, 5, 11, 15).
- Regional efforts continue to be made to control illegal trade in wildlife (Target 4).
- Protected area coverage has expanded significantly in recent years, including government managed, community managed and privately managed reserves (Target 11).
- Regional support for conserving migratory species has increased (Target 12).
- Implementation of targeted species management and recovery programmes has resulted in several success stories (Target 12).
- Sustainable financing mechanisms are improved but have faced set-backs in recent years (Target 20).

A dashboard of progress towards each of the Aichi Biodiversity Targets has been developed, based on consideration of regional analysis of global datasets (mainly from the Biodiversity Indicators Partnership, BIP), analyses of the fifth national reports to the CBD and relevant literature.

Overall progress towards the implementation of the Aichi Biodiversity Targets in the LAC region is similar to the global picture. However, in LAC, some countries lack information and reporting around progress towards specific targets, and some countries report that they are currently not on track to meet specific targets. The most positive trends in the region are seen in Target 11 (protected areas), Target 17 (adoption and implementation of policy instruments) and to a lesser extent Targets 18 (acknowledgement of traditional knowledge) and 19 (improved biodiversity information sharing).

Looking to the future, it is clear that attaining most of the Aichi Biodiversity Targets will require implementation of a package of actions, including legal, policy and institutional frameworks that are coherent across government ministries, and the mainstreaming of biodiversity into productive sectors, such as agriculture, fisheries, tourism and forestry. Furthermore, actions must be taken on the identification of applicable socio-economic incentives that engages all stakeholders, and a general strengthening of monitoring and enforcement. Finally, it is important to undertake measures to encourage active participation of other actors, local governments, the private sector, indigenous peoples and local communities, civil society and social movements, as well as new forms of social organization according to national realities.

Proposed actions in the short and longer term include:

- Mainstream biodiversity across governments and productive sectors (such as, agriculture, fisheries, tourism and forestry).
- Mainstream biodiversity into business practices.
- Build forest carbon conservation partnerships.
- Sharing expertise on water payment schemes in the region.
- Sustainably develop the water resources in the region.
- Link tourism to development planning in coastal nations.
- Invest in raising public awareness of biodiversity values.
- Strengthen the effectiveness of protected area networks and biological corridors.
- Enhance the implementation of biodiversity-related Conventions to build institutional capacity.
- Enhanced regulation and enforcement of environmental laws and policies.
- Increase available resources for biodiversity.
- Increase and promote multi-sectoral coordination, and South-South and Triangular cooperation.
- Promote the gathering of appropriate data to measure progress towards the Aichi Biodiversity Targets in the region, using regional and national datasets.

1. RESUMEN EJECUTIVO

La Perspectiva Mundial sobre la Diversidad Biológica 4, la evaluación de progreso del primer período del *Plan Estratégico para la Biodiversidad 2011-2020*, facilitó una perspectiva global del progreso para conseguir los objetivos del Plan y las Metas de Aichi para la Diversidad Biológica asociadas, pero contenía información regional limitada. Este reporte está basado y complementa 'La Perspectiva Mundial sobre la Diversidad Biológica 4'. Es la segunda edición del Reporte del Estado de la Biodiversidad en América Latina y el Caribe y sirve como una evaluación cercana a la mitad del término sobre el progreso hacia el *Plan Estratégico para la Biodiversidad 2011-2020* para la región de América Latina y el Caribe.

Este reporte utiliza información de diferentes indicadores regionales, información de los quintos informes nacionales para el Convenio sobre la Diversidad Biológica (CBD), otros reportes nacionales y regionales, casos de estudio y literatura publicada, para proveer una revisión meta-por-meta del progreso hacia las veinte Metas de Aichi de Biodiversidad. Los indicadores globales para las Metas de Aichi de biodiversidad fueron analizadas de manera regional lo más detalladamente posible y algunos análisis adicionales con información global fueron revisados con instituciones nacionales claves en la región. Sin embargo, limitaciones en la información disponible hizo necesario utilizar datos previos a 2011, para mostrar que la información relevante existe, pero se deben hacer esfuerzos para actualizar esta información.

Rastrear el progreso regional puede ayudar a identificar donde esfuerzos regionales y nacionales son más necesarios para incrementar y acelerar el progreso para alcanzar las Metas de Aichi de Biodiversidad. Responder a las oportunidades y a los desafíos requiere de esfuerzos colaborativos y, es por esto que este reporte ha sido producido para ayudar a informar el diálogo entre los gobiernos y las partes interesadas en la región de América Latina y el Caribe, y a la promoción de la cooperación y acciones especialmente a través de marcos legales y políticas en diferentes escalas.

- Los mensajes clave que han surgido de esta evaluación sobre el estado de la biodiversidad en la región de América Latina y el Caribe y las presiones a las que se enfrenta son:
- La disminución de la abundancia de especies y los altos riesgos de extinción continúan.
- El ritmo de pérdida de hábitats en América Latina y el Caribe ha disminuido, pero sigue alto.
- Algunas presiones asociadas con crecimientos económicos rápidos y desigualdades sociales están impactando los recursos naturales de la región.
- La expansión e intensificación de la agricultura para incrementar áreas para el ganado, tierras cultivables y para materias primas continúan.
- La región experimenta gran desarrollo de la infraestructura en rutas y diques.
- Los impactos en la biodiversidad de las grandes concentraciones de población en áreas urbanas son de particular importancia en la región.
- Las economías de los países dentro de la región son comprensiblemente dependientes de los recursos naturales.
- La extracción de recursos para minerales e hidrocarburos, en algunos casos, ha llevado a la devastación local con impactos directos e indirectos en la biodiversidad como la extracción de la vegetación, la contaminación de las aguas y de la tierra.
- La contaminación transfronteriza y local es ahora reconocida como un factor ambiental en la salud humana de la región.
- El cambio climático indujo impactos en los arrecifes de coral y hábitats montañosos dentro de la región que ahora están siendo observados.

Sin embargo, el reporte identifica un número de respuestas importantes que han ocurrido desde 2010:

- La región ha implementado varios abordajes de desarrollo sostenibles y bajos en carbón (Meta 3, 5, 11, 15).
- Esfuerzos regionales para controlar el tráfico ilegal de vida silvestre se siguen llevando a cabo (Meta 4).
- El área protegida se ha expandido de manera significativa recientemente, incluyendo reservas manejadas por gobiernos, por comunidades y de manera privada (Meta 11).
- El apoyo regional para la conservación de especies migratorias ha incrementado (Meta 12).
- La implementación del manejo y programas de recuperación de especies determinadas ha resultado en varias historias de éxito (Meta 12).
- Los mecanismos de financiamiento sostenible han mejorado, pero han visto un retroceso en los últimos años (Meta 20).

Un tablero del progreso hacia cada uno de las metas Aichi de Biodiversidad fue desarrollado, basado en la consideración de análisis regionales del conjunto de datos globales (mayormente de la Asociación de Indicadores sobre Biodiversidad, BIP, por sus siglas en inglés), análisis del quinto reporte para la CBD y literatura relevante.

En general el progreso hacia la implementación de las Metas de Biodiversidad de Aichi en la región de América Latina y el Caribe es similar al retrato global. Sin embargo, en América Latina y el Caribe, algunos países no tienen información ni reportes sobre metas específicas y algunos países reportan que no están encaminados para cumplir con determinadas metas. Las tendencias más positivas en la región se ven en la Meta 11 (áreas protegidas), Meta 17 (adopción e implementación de instrumentos políticos) y, en menor medida, Metas 18 (reconocimiento a los conocimientos tradicionales) y 19 (mejora en el compartir de la información sobre biodiversidad).

Mirando hacia el futuro, está claro que el cumplimiento con la mayoría de las Metas de Aichi de Biodiversidad va a requerir la implementación de un paquete de acciones, incluyendo legales, políticas y marcos institucionales que sean coherentes en los diferentes ministerios de gobierno e integración de la biodiversidad en los sectores productores como la agricultura, pescadería, turismo y de bosque. Adicionalmente, se deberán tomar acciones en la identificación de incentivos socio-económicos aplicables que involucren a todos los accionistas, y un fortalecimiento del monitoreo y de la ejecución. Finalmente, es importante tomar medidas para incentivar la participación activa de otros actores, gobiernos locales, el sector privado, comunidades indígenas y locales, la sociedad civil y movimientos sociales, como también las nuevas formas de organización social de acuerdo con las realidades nacionales.

Acciones propuestas a corto y largo plazo incluyen:

- Integrar la biodiversidad en los gobiernos y sectores productivos (como agricultura, pescadería, turismo y bosques).
- Integrar la biodiversidad en las prácticas de negocios.
- Construir alianzas para la conservación de bosques como sumideros de carbono.
- Compartir buenas prácticas sobre esquemas de pago del agua en la región.
- Desarrollar usos sostenibles de los recursos hídricos en la región.
- Asociar el turismo con los planes de desarrollo en las naciones costeras.
- Invertir en incrementar la conciencia del público en general sobre los valores de la biodiversidad.
- Fortalecer la efectividad de los corredores de áreas protegidas y de las redes.
- Incrementar la implementación de convenciones relacionadas a la biodiversidad para construir capacidad institucional.
- Fortalecer el derecho ambiental y reforzar las regulaciones.
- Aumentar los recursos disponibles para la biodiversidad.
- Promover la cooperación Sur-Sur y Triangular.
- Promover la recopilación de información apropiada para medir el progreso hacia las metas de Biodiversidad en la región, usando bases de datos regionales y nacionales.

1. RÉSUMÉ

Les *Perspectives mondiales de la diversité biologique 4*, évaluation à mi-parcours du *Plan stratégique pour la diversité biologique 2011-2020*, constituent une évaluation globale des progrès accomplis vers la réalisation des objectifs mondiaux Plan stratégique pour la diversité biologique et les Objectifs d'Aichi qui y sont associés; elles ne contiennent toutefois que des informations limitées au niveau régional. Le présent rapport s'appuie sur l'évaluation des *Perspectives mondiales de la diversité biologique 4* et la complète. Il s'agit de la seconde édition du rapport intitulé *L'état de la biodiversité en Amérique Latine et dans les Caraïbes*, qui sert d'évaluation presque à mi-parcours des progrès accomplis vers la réalisation du *Plan stratégique pour la diversité biologique 2011-2020* au sein de la région Amérique latine et Caraïbes.

Le présent rapport s'appuie sur un ensemble d'indicateurs régionaux, d'informations tirées des cinquièmes rapports nationaux publiés dans le cadre de la Convention sur la diversité biologique, d'autres rapports nationaux et régionaux, d'études de cas et autres publications, en vue d'examiner, objectif par objectif, les progrès accomplis vers la réalisation des 20 objectifs d'Aichi pour la biodiversité. Dans la mesure du possible, les indicateurs mondiaux de ces objectifs ont été ventilés au niveau régional, et les informations disponibles au niveau international ont fait l'objet d'analyses complémentaires en collaboration avec d'importantes institutions nationales de la région. En revanche, l'existence de données limitées signifie que des ensembles de données n'allant pas au-delà de 2011 ont été utilisés afin de montrer que des informations pertinentes existent, mais qu'il est nécessaire de les actualiser.

Le suivi des progrès à l'échelle régionale peut permettre d'identifier dans quelle région ou dans quel pays il est indispensable de déployer des efforts visant à renforcer et à accélérer les progrès vers la réalisation des objectifs d'Aichi. Seule une collaboration permettra de tirer profit des opportunités et de faire face aux difficultés rencontrées, aussi le présent rapport a été rédigé de manière à éclairer le dialogue qu'entretiennent, au niveau régional et national, les gouvernements et un grand nombre de parties prenantes de l'ensemble de la région Amérique latine et Caraïbes, et à encourager la coopération et les efforts à différentes échelles, en particulier à l'aide de cadres législatif et politique.

Les principaux enseignements relatifs à l'état de la biodiversité en Amérique latine et dans les Caraïbes, et aux pressions qu'elle subit, qui ressortent de cette évaluation sont les suivants :

- On observe toujours une diminution de l'abondance des espèces et un risque élevé d'extinction.
- Le rythme de la destruction des habitats naturels en Amérique latine et dans les Caraïbes a ralenti, mais il reste élevé.
- Une certaine pression, liée à une croissance économique rapide et aux inégalités sociales, fait sentir ses effets sur les ressources naturelles de la région.
- L'extension et l'intensification de l'agriculture se poursuivent, afin d'accroître le cheptel, les terres arables et la production agricole.
- La région voit la construction d'infrastructures majeures, telles que des barrages et des routes.
- Les conséquences pour la biodiversité des fortes concentrations de population en zone urbaine sont particulièrement importantes dans la région.
- L'économie des pays de la région dépend entièrement des ressources naturelles.
- L'extraction des minerais et des hydrocarbures a parfois eu des conséquences directes et indirectes dévastatrices pour la biodiversité locale, telles que l'enlèvement de la végétation, la contamination et la pollution des eaux et des sols.
- La pollution de l'air, au niveau local et international, est à présent reconnue comme une menace environnementale pour la santé des populations de la région.
- On peut désormais constater les effets des changements climatiques sur les récifs coralliens et les habitats montagnards de la région.

Le présent rapport décrit néanmoins un certain nombre de mesures importantes qui ont été prises depuis 2010 pour pallier ces problèmes :

- La région a mis en place différentes méthodes de développement durable à faible émission de carbone (objectifs 3, 5, 11, 15).
- Les efforts se poursuivent dans la région afin de contrôler le commerce illicite d'espèces sauvages protégées (objectif 4).
- Ces dernières années, les zones protégées ont été étendues de manière notable, aussi bien celles gérées par les États, les collectivités ou le secteur privé (objectif 11).
- La conservation des espèces migratrices a fait l'objet d'un engagement plus marqué à l'échelle de la région (objectif 12).
- La mise en œuvre de programmes de gestion et de rétablissement d'espèces ciblées a abouti à plusieurs réussites (objectif 12).
- Les dispositifs de financement durable se sont améliorés, mais ils ont subi des contretemps ces dernières années (objectif 20).

Un tableau de bord destiné à mesurer les progrès accomplis vers la réalisation de chaque objectif d'Aichi a été élaboré à partir de l'analyse régionale des ensembles de données mondiaux (provenant principalement du Partenariat relatif aux indicateurs de biodiversité), des analyses présentées dans les cinquièmes rapports nationaux élaborés dans au titre de la Convention sur la diversité biologique et de publications à ce sujet.

La progression de l'Amérique latine et des Caraïbes vers la réalisation des objectifs d'Aichi est de même ordre que les avancées observées à l'échelle internationale. Certains pays de cette région ne documentent toutefois pas les progrès concernant des objectifs spécifiques et n'en rendent pas compte, et d'autres pays signalent qu'ils sont actuellement loin de les atteindre. Les évolutions les plus positives observées dans la région concernent la objectif 11 (zones protégées), la objectif 17 (adoption et mise en œuvre d'instruments de politique générale), et dans une moindre mesure les objectifs 18 (reconnaissance des savoirs traditionnels) et 19 (amélioration du partage des informations relatives à la biodiversité).

À l'avenir, il est évident que la réalisation de la plupart des objectifs d'Aichi nécessitera la mise en œuvre d'un ensemble de mesures, y compris de cadres législatif, politique et institutionnel, qui soient cohérentes d'un ministère à l'autre, et la prise en compte de la biodiversité par les secteurs productifs, en particulier l'agriculture, la pêche, le tourisme et la sylviculture. Des mesures doivent par ailleurs être prises en vue d'identifier les incitations socio-économiques à même de garantir l'engagement des parties prenantes et de renforcer, de manière générale, le contrôle et l'application de la loi. Il faut enfin prendre des mesures visant à encourager la participation active d'autres acteurs (administrations locales, secteur privé, peuples autochtones et communautés locales, société civile et mouvements sociaux), et les nouvelles formes d'organisation sociale, en fonction des réalités de chaque pays.

Figurent au nombre des mesures envisagées à court et à long terme les éléments suivants :

- Sensibiliser les administrations et les secteurs productifs (tels que l'agriculture, la pêche, le tourisme et la sylviculture) à la biodiversité ;
- Intégrer la biodiversité aux pratiques des entreprises ;
- Établir des partenariats en faveur de la conservation du carbone forestier ;
- Diffuser dans la région l'expertise en matière de régimes de paiement de l'eau ;
- Développer durablement les ressources en eau de la région ;
- Associer tourisme et planification du développement dans les pays côtiers ;
- Investir dans les activités de sensibilisation à l'importance de la biodiversité ;
- Renforcer l'efficacité des réseaux de zones protégées et des couloirs biologiques ;
- Améliorer l'application des conventions relatives à la biodiversité afin de renforcer les capacités institutionnelles ;
- Durcir la législation et renforcer le respect des politiques et des lois environnementales ;
- Augmenter les ressources disponibles jouant en faveur de la biodiversité ;
- Développer la coordination multisectorielle ;
- Encourager la collecte de données pertinentes afin de mesurer les progrès accomplis vers la réalisation des objectifs d'Aichi dans la région, en utilisant des ensembles de données régionaux et nationaux ;
- Favoriser la coopération Sud-Sud et triangulaire.

1. РЕЗЮМЕ

В четвертом издании «Глобальной перспективы в области биоразнообразия», промежуточном обзоре *Стратегического плана по биоразнообразию на 2011-2020 годы,* приводилась глобальная оценка прогресса в достижении предусмотренных Планом глобальных целей в области биоразнообразия и выполнении соответствующих Айтинских задач в области биоразнообразия, однако региональная информация содержалась там в ограниченном объеме. Настоящий доклад основывается на глобальной оценке, приведенной в ГПОБ-4, и дополняет ее. Это второе издание доклада «Состояние биоразнообразия в Латинской Америке и Карибском бассейне», выступающее в качестве промежуточного обзора прогресса в осуществлении *Стратегического плана по биоразнообразию на 2011-2020 годы для* региона Латинской Америки и Карибского бассейна.

В настоящем докладе приводится обзор прогресса в выполнении каждой из двадцати Айтинских задач в области биоразнообразия. С этой целью используются набор региональных индикаторов, информация из пятых национальных докладов в рамках Конвенции о биологическом разнообразии (КБР), других национальных и региональных докладов, тематических исследований и опубликованных материалов. По мере возможности глобальные индикаторы по Айтинским задачам в области биоразнообразия приводятся в разбивке по регионам, при этом был проведен определенный дополнительный анализ существующей глобальной информации совместно с основными национальными учреждениями в регионе. Вместе с тем, ограниченный характер данных означал, что были включены некоторые массивы данных, не охватывающие период после 2011 года, чтобы показать, что соответствующая информация существует, но для ее обновления необходимы дополнительные усилия.

Отслеживание прогресса на региональном уровне может способствовать выявлению тех областей, в которых наиболее востребованы региональные и национальные меры по активизации и ускорению хода работы по выполнению Айтинских задач в области биоразнообразия. Реагирование на открывающиеся возможности и актуальные проблемы требует совместных усилий, в связи с чем был подготовлен настоящий доклад в целях обеспечения информационной поддержки регионального и национального диалога между правительственными органами и различными заинтересованными сторонами во всех странах Латинской Америки и Карибского бассейна, а также содействия сотрудничеству и практическим действиям, особенно посредством установления правовых и политических рамок на различных уровнях.

Ниже приводятся основные выводы о состоянии биоразнообразия в регионе Латинской Америки и Карибского бассейна и воздействующих на него нагрузках, которые были получены в результате этой оценки.

- Продолжается сокращение относительной численности видов и сохраняются высокие риски их исчезновения.
- Темпы утраты мест обитания в Латинской Америке и Карибском бассейне замедлились, но остаются высокими.
- На природные ресурсы региона оказывают воздействие определенные нагрузки, связанные со стремительным экономическим ростом, и проявления социального неравенства.
- Продолжаются расширение сельскохозяйственных угодий и интенсификация сельского хозяйства с целью увеличения поголовья скота, пахотных площадей и товарного производства.
- В регионе осуществляются крупные проекты по развитию инфраструктуры, например строительству плотин и дорог.
- В этом регионе особенно заметное воздействие на биоразнообразие оказывает высокая степень концентрации населения в городских районах.
- Экономика стран региона во всех аспектах зависит от природных ресурсов.
- Добыча минерального и углеводородного сырья в некоторых случаях оказала опустошительное прямое и косвенное воздействие на биоразнообразие на местном уровне, выражающееся, в частности, в удалении растительности, загрязнении и отравлении воды и почвы.
- Трансграничное и локальное загрязнение воздуха в настоящее время признается в качестве одного из экологических факторов, влияющих на здоровье людей в регионе.
- В настоящее время наблюдается воздействие изменения климата на коралловые рифы и горные места обитания в регионе.

Несмотря на это, в докладе определен ряд важных мер реагирования, которые принимались с 2010 года:

- В регионе реализован ряд подходов к устойчивому развитию, обеспечивающих низкий уровень углеродосодержащих выбросов (Целевые задачи 3, 5, 11, 15).
- Продолжается принятие мер на региональном уровне по борьбе с незаконной торговлей дикими видами флоры и фауны (Целевая задача 4).
- За последние годы значительно расширился охват охраняемыми природными территориями, в том числе заповедниками, находящимися под управлением государства, общин и частных организаций (Целевая задача 11).
- Усилилась поддержка мер по сохранению мигрирующих видов на региональном уровне (Целевая задача 12).
- Реализация целевых программ регулирования и восстановления численности видов в ряде случаев увенчалась успехом (Целевая задача 12).
- Совершенствовались механизмы устойчивого финансирования, однако в последние годы в их работе наблюдался определенный регресс (Целевая задача 20).

Была разработана информационная панель, показывающая прогресс в выполнении каждой из Айтинских задач в области биоразнообразия и созданная на основе анализа глобальных массивов данных в разбивке по регионам (главным образом, полученных от Партнерства по индикаторам биоразнообразия), анализа пятых национальных докладов в рамках КБР и соответствующих опубликованных материалов.

Общий прогресс в выполнении Айтинских задач в области биоразнообразия в регионе Латинской Америки и Карибского бассейна аналогичен общемировой картине. Вместе с тем, в некоторых странах ЛАК отсутствуют информация и отчетность в части прогресса в выполнении конкретных целевых задач, а некоторые страны сообщают, что они в настоящее время не обеспечивают выполнение конкретных целевых задач. Наиболее положительные тенденции в регионе наблюдаются по Целевой задаче 11 (охраняемые природные территории), Целевой задаче 17 (принятие и реализация политических инструментов) и, в меньшей степени, по Целевым задачам 18 (признание традиционных знаний) и 19 (совершенствование обмена информацией о биоразнообразии).

Если заглянуть в будущее, становится ясно, что для выполнения большинства Айтинских задач в области биоразнообразия потребуется реализация комплекса мер, включающего правовые, политические и организационные рамки, согласованные между правительственными ведомствами, а также включение вопросов биоразнообразия в основную деятельность производственных секторов, таких как сельское хозяйство, рыбный промысел, туризм и лесное хозяйство. Кроме того, необходимо принять меры по определению применимых социально-экономических стимулов, обеспечивающих вовлечение в проводимую работу всех заинтересованных сторон, и общему укреплению функций мониторинга и обеспечения выполнения. Наконец, важно принять меры по стимулированию активного участия других субъектов деятельности, органов местного самоуправления, частного сектора, коренных народов и местных общин, гражданского общества и общественных движений, а также новых форм общественных организаций в соответствии с национальными реалиями.

Предлагаемые меры в кратко- и долгосрочной перспективе включают:
- Учет вопросов биоразнообразия в основной деятельности правительственных органов и производственных секторов (таких как сельское хозяйство, рыбный промысел, туризм и лесное хозяйство).
- Учет вопросов биоразнообразия в хозяйственной практике.
- Создание партнерских отношений в области сохранения запасов углерода, накопленных в лесах.
- Обмен опытом применения системы платежей за воду в регионе.
- Устойчивое развитие водных ресурсов в регионе.
- Увязывание туризма с планированием развития в прибрежных государствах.
- Инвестиции в повышение осведомленности общественности о стоимостной ценности биоразнообразия.
- Повышение эффективности сетей охраняемых природных территорий и биологических коридоров.
- Совершенствование реализации конвенций, касающихся биоразнообразия, с целью укрепления институционального потенциала.
- Совершенствование регулирования и обеспечения выполнения экологических законов и политических установок.
- Увеличение доступных ресурсов для сохранения биоразнообразия.
- Совершенствование межсекторальной координации.
- Содействие сбору соответствующих данных для количественной оценки прогресса в выполнении Айтинских задач в области биоразнообразия в регионе с использованием региональных и национальных массивов данных.
- Содействие сотрудничеству по линии Юг-Юг и трехстороннему сотрудничеству.

وعلاوة على ذلك، يجب أن يتم اتخاذ الاجراءات بُغية تحديد المحفّزات الاجتماعية والاقتصادية السارية والتي تضمن مشاركة كل الأطراف ذات الصلة، وتعزيزعام للمراقبة والتنفيذ. وأخيراً، من المهم اتخاذ التدابير لتشجيع المشاركة الفعالة للقطاعات الأخرى والحكومات المحلية والقطاع الخاص والسكان الأصليين والمجتمعات المحلية والمجتمع المدني والحركات الاجتماعية بالإضافة إلى الأشكال الجديدة من المنظمات الاجتماعية وفقاً للحقائق الوطنية.

وتتضمن الإجراءات المقترحة على المدى القصير والبعيد ما يلي:

- تعميم التنوع البيولوجي عبر الحكومات والقطاعات الإنتاجة مثل: الزراعة والثروة السمكية والسياحة والغابات).
- تعميم التنوع البيولوجي في الممارسات التجارية.
- بناء شراكات لصون كربون الغابات.
- المشاركة بتجربة خطة مدفوعات المياه في المنطقة.
- التنمية المستدامة للموارد المائية في المنطقة.
- ربط السياحة بالتطوير المُمنهَج في الدول الساحلية.
- الاستثمار في رفع مستوى الوعي العام لقيم التنوع البيولوجي.
- تعزيز فاعليّة شبكات المناطق المحمية والممرات البيولوجية.
- تعزيز تنفيذ الاتفاقيات المتعلقة بالتنوع البيولوجي من أجل بناء القدرات المؤسسية.
- تعزيز ضبط القوانين والسياسات البيئية وتنفيذها.
- زيادة الموارد المتاحة للتنوع البيولوجي.
- زيادة التنسيق المتعدد القطاعات.
- الحث على جمع البيانات المناسبة لقياس تقدم سير العمل نحو أهداف أيشي للتنوع البيولوجي في المنطقة مستخدمين مجموعات البيانات الإقليمية والوطنية.
- تعزيز التعاون ما بين مبادرتي الدول الثلاثية والجنوب-جنوب.

ومع ذلك فإن هذا التقرير يشير إلى عدد من حالات الاستجابة الهامة التي حدثت منذ عام 2010:

- قامت المنطقة بتنفيذ مجموعة من منهجيات التنمية المستدامة المنخفضة الكربون (الأهداف 3، 5، 11، 15).
- استمرار بذل الجهود الإقليمية لضبط التجارة الغير قانونية للحياة الفطرية (الهدف 4).
- توسيع نطاق المناطق المحمية بشكل كبير في السنوات الراهنة بما يتضمن المحميات التي يتم إدارتها من قبل الجهات الحكومية والمجتمع والتي تُدار بشكل فردي أيضاً (الهدف 11).
- ازدياد الدعم الإقليمي بُغية صون وحماية الأنواع المهاجرة (الهدف 12).
- إن تنفيذ كل من إدارة الأنواع المستهدفة وبرامج الإنعاش نتج عنها حالات نجاح عديدة (الهدف 12).
- تتطور آليات التمويل المستدامة إلا أنها تعرضت لانتكاسات في السنوات الأخيرة (الهدف 20).

وقد تم تطوير منظومة قياس تقدم سير العمل نحو كل هدف من أهداف أيشي للتنوع البيولوجي اعتماداً على أهمية التحليل الإقليمي لمجموعة البيانات العالمية (وبشكل رئيسي من شراكة مؤشرات التنوع البيولوجي-BIP)، وعلى تحليلات التقارير الوطنية الخامسة للاتفاقية المتعلقة بالتنوع البيولوجي (CBD)، وعلى الكتابات المنشورة ذات الصلة.

ويُعتبر تقدم سير العمل الكلي نحو تنفيذ أهداف أيشي للتنوع البيولوجي في أمريكا اللاتينية ومنطقة الكاريبي مشابه للصورة العالمية. ومع ذلك فإن بعض الدول في أمريكا اللاتينية ومنطقة الكاريبي تعاني من نقص في المعلومات وفي تقديم التقارير حول تقدم سير العمل إزاء أهداف محددة، وتقدم بعضها أيضاً تقارير بأنها حالياً ليست على المسار الصحيح لتحقيق الأهداف المحددة. وقد لُوحِظت معظم الاتجاهات الإيجابية في المنطقة في الهدف 11 (المناطق المحميّة)، والهدف 17 (تبني وتنفيذ الأدوات السياسية)، وإلى حد أقل في الهدفين 18 (التسليم بالمعرفة التقليدية) و19 (تحسين مبدأ تبادل المعرفة حول التنوع البيولوجي).

وبالنظر إلى المستقبل، فإنه يبدو جليّاً أن تحقيق معظم أهداف أيشي للتنوع البيولوجي يتطلّب تنفيذ حزمة من الإجراءات والتي تتضمّن الأطر القانونية والسياسية والمؤسساتية المتعارف عليها عبر الوزارات الحكومية، ويتطلب أيضاً تعميم التنوع البيولوجي على القطاعات المُنتِجة مثل: الزراعة والثروة السمكية والسياحة والغابات.

1. ملخص تنفيذي

1نشرة التوقعات للتنوع الإحيائي - الإصدار الرابع، تُقدّم المراجعة النصف سنوية للخطة الاستراتيجية للتنوع البيولوجي للفترة 2011 – 2020 تقييم عالمي لسير العمل نحو تحقيق أهداف الخطة للتنوع البيولوجي العالمي المرتبطة مع أهداف أيشي العشرين للتنوع البيولوجي، ولكنها تتضمن معلومات إقليمية محدودة. ويستند هذا التقرير على التقييم العالمي لنشرة التوقعات للتنوع البيولوجي العالمي - الإصدار الرابع ويتممه، وهذا التقرير هو النسخة الثانية من تقرير وضع التنوع البيولوجي في أمريكا اللاتينية ومنطقة الكاريبي، حيث يُعتَبر بمثابة مراجعة نصف سنوية لتقدّم سير العمل نحو الخطة الاستراتيجية للتنوع البيولوجي 2011 – 2020 في أمريكا اللاتينية ومنطقة الكاريبي.

إن العبر الرئيسية المستوحاة حول وضع التنوع البيولوجي في أمريكا اللاتينية ومنطقة الكاريبي والضغوطات التي يتعرض لها والمستخلصة من هذا التقييم هي:

- الانخفاض في وفرة الأنواع وازدياد خطر انقراضها بشكل كبير.
- إن معدل خسارة الموائل الطبيعية في أمريكا اللاتينية ومنطقة الكاريبي قد انخفضت حدته ولكنه ما زال مرتفعاً.
- تؤثر الضغوط المعينة المرتبطة بالنمو الاقتصادي السريع والظلم الاجتماعي على الموارد الطبيعية للمنطقة.
- استمرار التوسع الزراعي وتكثيف الجهود من أجل زيادة أعداد المواشي والأراضي الصالحة للزراعة وإنتاج السلع.
- تخضع المنطقة لتطوير البنى التحتية الرئيسية من سدود وطرقات.
- إن آثار الازدياد السكاني الكبير على التنوع البيولوجي في المناطق المدنية ذات حدة شديدة في هذه المنطقة.
- تعتمد اقتصاديات الدولة في هذه المنطقة بشكل شامل على الموارد الطبيعية.
- إن استخراج الموارد من أجل الحصول على المعادن والنفط والغاز قد أدى في بعض الحالات إلى آثار محلية مدمرة مباشرة وغير مباشرة على التنوع البيولوجي مثل: إزالة الغطاء النباتي وتلوث الماء والتربة.
- في الوقت الراهن تم اعتبار تلوث الهواء المحلي والعابر للحدود على أنه عامل بيئي مضر بالصحة البشرية في المنطقة.
- إن الآثار الناجمة عن التغير المناخي والتي تؤثر على الشعاب المرجانية والموائل الجبلية في المنطقة قد تم ملاحظتها وأخذها بعين الاعتبار.

يعتمد هذا التقرير على مجموعة من المؤشرات الإقليمية وعلى المعلومات الواردة في التقارير الوطنية الخامسة حول الاتفاقية المتعلقة بالتنوع البيولوجي (CBD) والتقارير الحكومية الأخرى والحالات القيد الدراسة والكتابات المنشورة، وذلك بُغية تأمين مراجعة لكل هدف على حدى لتقدّم سير العمل نحو تحقيق أهداف أيشي العشرين للتنوع البيولوجي. ولقد تمّ قدر المستطاع تقسيم المؤشرات العالمية لأهداف أيشي إلى المستوى الإقليمي، كما تمّ إجراء بعض التحليلات الإضافية للمعلومات العالمية المتاحة مع مؤسسات وطنية رئيسية في المنطقة. ومع ذلك، فإن محدودية البيانات تعني أنه قد تم تضمين بعض من مجموعات البيانات، والتي لا تتعدّى سنة 2011 الماضية، وذلك من أجل تبيان أن المعلومات ذات الصلة موجودة ولكنها بحاجة إلى جهود إضافية لتحديثها.

إن تتبّع تقدم سير الأعمال الإقليمي يساعد على تحديد المواضع التي تحتاج أكثر من غيرها إلى جهود إقليمية ووطنية إضافية لتعزيز وتسريع تقدم سير العمل نحو تحقيق أهداف أيشي للتنوع البيولوجي. إن الاستجابة للفرص والتحديات تتطلب جهوداً جماعية، لذا فقد تم إعداد هذا التقرير للمساعدة في تأمين المعلومات للنقاش الإقليمي والوطني الدائر بين الحكومات والأطراف ذات المصلحة في جميع أنحاء أمريكا اللاتينية ومنطقة الكاريبي، وأيضاً لتشجيع التعاون والعمل المشترك وبالأخص عبر الأطر الرسمية والسياسية على مستويات مختلفة.

1. 执行摘要

第四版《全球生物多样性展望》是对执行《2011-2020年生物多样性战略计划》所取得进展的中期评估，提供了对实现该计划中的全球生物多样性目标和与之相关的“爱知生物多样性目标”所取得进展的全球评估，但包含的区域信息有限。本报告建立在全球第四版《全球生物多样性展望》评估的基础之上，并对其进行了补充。这是第二版《拉丁美洲和加勒比地区生物多样性状况》报告，也是对实现拉丁美洲和加勒比地区的《2011-2020年生物多样性战略计划》目标所取得进展的中期评估。

本报告借鉴了来自《生物多样性公约》（CBD）第五次国家报告、其他国家和区域报告、案例研究和已发表文献的一套区域指标和信息，逐个审查了实现20个“爱知生物多样性目标”取得的进展。本报告尽可能地把“爱知生物多样性目标”的全球性指标分解到区域层面，并与区域的主要国家机构一起对现有的全球信息进行了一些额外分析。然而，数据的局限性意味着为了说明相关信息的存在，已将2011年以前的某些数据集列入报告，但更新此类信息还需进一步努力。

跟踪区域进展有助于确定为促进并加速“爱知生物多样性目标”的实现而最需要区域和国家付出努力的方面。应对机遇和挑战需要协同努力，而编制本报告有助于为拉丁美洲和加勒比地区各国政府和众多利益相关方的区域对话提供依据，特别是通过不同规模的法律和政策框架促进合作和行动。

本次评估得出的有关拉丁美洲和加勒比地区的生物多样性状况及其所面临压力的关键信息是：

- 物种丰富度持续下降，物种灭绝的高风险继续增加。
- 在拉丁美洲和加勒比地区，栖息地丧失的速度已经放缓，但丧失的数量仍然很大。
- 与经济快速增长和社会不平等有关的某些压力正在影响该地区的自然资源。
- 农业扩张和增加家畜、耕地和商品生产的集约化仍在继续。
- 该地区正在修建大坝和公路等重要基础设施。
- 该地区密集的城镇人口对生物多样性的影响尤为显著。
- 该区域内的国家经济体全面依赖自然资源。
- 在某些情况下，为提取矿物和碳氢化合物而进行的资源开采对该地区的生物多样性造成了毁灭性的直接和间接影响，例如植被丧失、水污染和土壤污染。
- 跨境空气污染和本地空气污染目前被公认为该地区影响人类健康的环境因素。
- 人们现在正观察到气候变化对该区域内的珊瑚礁和山地栖息地产生的影响。

尽管如此，本报告梳理出了一些自2010年以来已经采取的重要对策：

- 该地区已经实施了一系列低碳可持续发展的方法（目标3、5、1、15）。
- 区域继续努力控制野生动物的非法贸易（目标4）。
- 保护区覆盖面积近年来显著扩大，包括政府管理的、社区管理的和私人管理的保护区（目标11）。
- 区域为保护迁徙物种提供的支持有所增加（目标12）。
- 目标物种管理和恢复方案的实施产生了一些成功案例（目标12）。
- 可持续的融资机制有所改善，但近年来面临着挫折（目标20）。

在考虑了对全球数据集（主要来自于生物多样性指标伙伴，BIP）进行的区域分析，并对CBD的第五次国家报告和相关文献进行了分析的基础上，开发了实现每一个“爱知生物多样性目标”所取得的进展仪表板。

在拉丁美洲和加勒比地区，实现“爱知生物多样性目标”的总体进展情况和全球的情况类似。然而，在拉丁美洲和加勒比地区，一些国家缺乏围绕着实现具体目标取得进展的信息和报告，还有一些些国家报告说它们目前没有步入实现特定目标的正轨。该地区最积极的趋势出现在目标11（保护区）和目标17（通过和实施政策工具）中，并在较小范围出现在了目标18（传统知识的确认）和目标19（改进的生物多样性信息共享）中。

展望未来，实现大部分“爱知生物多样性目标”显然将需要实施一揽子行动，包括在各政府部门的协调一致的法律、政策和制度性框架、并使生物多样性被生产部门，如农业、渔业、旅游业和林业的多数人所接受。此外，必须采取行动确定适用的使所有利益相关方参与的社会经济激励，以及普遍加强监督和执法。最后，重要的是要采取措施鼓励其他行动者、地方政府、私营部门、土著居民和当地社区、民间团体和社会运动的积极参与，并根据各国国情鼓励社会组织的新形式。

建议采取的短期和长期行动包括：

- 使生物多样性被各政府部门和生产部门（如农业、渔业、旅游业和林业）的多数人接受。
- 使生物多样性成为商业行为的主流。
- 建立森林碳储量合作伙伴关系。
- 在该地区分享关于水支付方案的专业知识。
- 可持续地开发该区域的水资源。
- 在沿海国家把旅游和发展计划联系起来。
- 对提高公众对生物多样性价值的认识进行投资。
- 加强保护区网络和生物走廊的有效性。
- 加强与生物多样性有关公约的执行，以建设制度能力。
- 加强环境法律和政策的监管和执法。
- 增加可用的生物多样性资源。
- 加强多部门协调。
- 利用地区和国家数据集，促进适当数据的收集以衡量该地区实现“爱知生物多样性目”标取得的进展。
- 促进南南合作和三方合作。

2. KEY MESSAGES ABOUT THE STATE OF BIODIVERSITY IN LATIN AMERICA AND THE CARIBBEAN

This report presents a mid-term review of progress towards the implementation of the *Strategic Plan for Biodiversity 2011-2020* and the achievement of the Aichi Biodiversity Targets by countries in the Latin America and the Caribbean region, as defined by UNEP Live (UNEP 2016c). It builds on and complements the assessment undertaken in the fourth edition of the Global Biodiversity Outlook (GBO-4) (SCBD 2014). For this report the UNEP definition of the Latin America and Caribbean (LAC) region (Figure 1) is applied, which includes 33 countries in four sub-regions: Mesoamerica, the Caribbean, the Andean region and the Southern Cone (UNEP 2016b).

For many of the analyses, global datasets and indicators brought together by the Biodiversity Indicators Partnership (BIP) have been disaggregated to the regional or national scale and used to illustrate status and trends in the LAC region. Where post-2010 data are lacking, the most recent data have been used, generally ending in the 2008-2009 period. Where data are available after 2010, these provide a better representation of progress towards the 2020 end point for the Aichi Biodiversity Targets.

This report also synthesises the national information contained in the fifth national reports from countries in the Latin America and the Caribbean region that were submitted to the Convention on Biological Diversity by November 2015 (CBD 2015). It uses case study material derived from these reports to illustrate progress towards specific Aichi Biodiversity Targets in different countries. Other case studies, used to further enrich the text, are based on the work of UNEP and other regionally and nationally based organisations such as the 'Comisión Nacional para el Conocimiento y Uso de la Biodiversidad' (National Commission for the Knowledge and Use of Biodiversity, CONABIO) in Mexico, the Caribbean Natural Resources Institute (CANARI) and Fundação Oswaldo Cruz from Brazil.

The report recognises that Latin America and the Caribbean is large and diverse politically, geographically, economically and in terms of biodiversity. Information is summarised in a balanced way, and highlights the main trends in the region, but also uses examples that illustrate the variation in habitats, ecosystems and demographic characteristics of different countries and areas.

The following section presents summary messages for policy makers, arranged under the broad headings of the state of biodiversity, pressures on biodiversity and societal responses to the crisis of biodiversity loss.

Figure 1: Global distribution of UNEP regions showing the location of the LAC region in bright green (map produced by UNEP-WCMC using data from Brooks et al. 2016).

STATE

Rates of habitat loss in Latin America and the Caribbean have slowed but remain high

Latin America and the Caribbean (LAC) currently retains much of its biodiversity. Six of the world's most biodiverse countries are within this region; Brazil, Colombia, Ecuador, Mexico, Peru and Venezuela. It is also home to the world's most biodiverse habitat, the Amazon rainforest (UNEP 2012). Over 40 per cent of the Earth's biodiversity is held within the South American continent, as well as over a quarter of its forests (UNEP 2010). Tropical forests, savannahs, grasslands and xeric communities originally covered vast areas of the LAC region (Olson et al. 2001), but there has been considerable loss of some habitats. Habitat loss due to agriculture and pasture for livestock is the most important threat to biodiversity in the region, and even though the rate of loss has decreased during the past decade, the total area transformed per year remains high (Aguiar et al. 2016).

Forest loss is continuing globally, however rates of forest loss for some countries in the LAC region are declining; Peru currently has the lowest national loss rate (0.08 per cent/year) within the three regions evaluated by Han et al. (2014) (the Tropical Andes, the African Great Lakes and the Greater Mekong) and rates of forest loss in Brazil have also declined significantly. In other areas of the region, forest cover is declining more rapidly, and forest habitats and natural savannahs have particularly seen an increase in loss rates in recent years (García et al. 2014).

The Atlantic coastal forest ecosystems of tropical South America are highly diverse; they hold around 20,000 plant species, of which 40 per cent are endemic, as well as around 24 critically endangered vertebrate species and almost 950 bird species (CEPF 2004). However, this region is fast becoming deforested due to the growth in plantations, such as sugarcane and coffee, with only 10 per cent of the forest remaining. The forest of Central America are also highly diverse, especially within the Mesoamerican hotspot which covers parts of Mexico, Panama and all of Costa Rica, Belize, El Salvador, Guatemala, Honduras and Nicaragua (CEPF 2004). These forests have lost more than 70 per cent of their original area. In the Andes region, the *Polylepis* forests that are confined to the high altitude Andean habitats are also a highly diverse ecosystem, holding some of the most threatened Neotropical vegetation and biodiversity on Earth (Kessler 1995; Jameson and Ramsay 2007; Gareca et al. 2010a; Gareca et al. 2010b).

Twelve per cent (22,000 km^2) of the world's mangrove forests are found in the Caribbean (Spalding et al. 2010). Extensive mangrove forests are also found on the Pacific and Atlantic coasts of Latin America, including mangrove ecoregions extending 3,400 km^2 between Ecuador and Peru, 2,500 km^2 in northern Colombia, and 2,200 km^2 in north-western Venezuela (WWF 2016b). Some datasets suggest that mangrove extent had been in decline in many countries in the LAC region in the past decades (Valiela et al. 2001). However, more recent datasets point out that mangrove extent has increased in some parts of the region in recent years after extensive earlier declines (FAO, 2015c). The Atlantic and Pacific coasts of Central America are particular areas of concern, with as many as 40 per cent of the mangroves species present listed on the IUCN Red List as 'threatened with extinction' (Polidoro et al. 2010).

Latin America and the Caribbean is the wettest continent on Earth, and contains the world's most extensive wetlands (e.g. the Pantanal in Brazil), with wetlands accounting for around 20 per cent of its area (Wittmann et al. 2015). These wetlands are some of the most biologically diverse on Earth, home to endemic species and essential for providing water-related ecosystem services: clean drinking water; water for the agricultural and energy sectors; flood regulation; erosion control; sediment transport and storm protection. Wetland habitats also have an important role in sustaining cultural practices (Finlayson and Van der Valk 1995).

The LAC region also supports large areas of temperate grasslands. The Rio de la Plata grasslands are the largest complex of temperate grasslands ecosystems in South America, covering approximately 750,000 km^2 within the Pampas of Argentina and the Campos of Uruguay, northeastern Argentina and southern Brazil. The highest rates of endemism in the grasslands of the region are found in the *páramo* and *puna* systems, covering the upper parts of the tropical Andes from southern Venezuela to northern Peru CEPF 2015; WWF 2016a). The Patagonian steppes occupy a vast area in the southern tip of the continent, covering more than 800,000 km^2 of Chile and Argentina (Michelson 2008).

In the marine realm, the coral reefs of the Caribbean are diverse and important on the global scale: 10 per cent (26,000 km^2) of the world's coral reefs are found in the western Atlantic Ocean, primarily in the Caribbean, and 90 per cent of the species there are endemic to the region (Burke et al. 2011). However, they are being damaged by sea temperature rise and the combined effects of sediment run off, alien

species, human population increase, land-based pollution and destructive unsustainable fishing practices (Mumby et al. 2014b; Jackson et al. 2014). Changes in the health and distribution of coral reefs in the LAC region are most noticeable in the Caribbean, where average coral cover declined from 34.8 per cent in 1970 to 16.3 per cent in 2011 for 88 sample points, with the greatest changes overall occurring between 1984 and 1998 (Jackson et al. 2014).

Biodiversity declines continue

The LAC region as a whole presents a rising trend in all major pressures on biodiversity: land degradation and land use change; climate change; land-based pollution; unsustainable use of natural resources and invasive alien species (UNEP 2010). Regional biodiversity declines are most dramatic in the tropics. A recent analysis by Brooks et al. (2016), using the UNEP regional and sub-regional classification as employed in this report and the IUCN global red list database, found that 13,835 species occur within the LAC region, and that 12 per cent of these are threatened with extinction. At the more local scale, within the Tropical Andes sub-region, encompassing the eastern slope of the Andes and containing eight watersheds of headwater rivers across Venezuela, Colombia, Ecuador, Bolivia and Peru, Han et al. (2014), found high species extinction risk when compared to the baseline Red List Index for all regional taxa (0.89). In addition, in Mexico, a megadiverse country, at least 127 plants and animals have gone extinct (Sarukhán et al. 2015). Numerous threatened species have also been assessed in Colombia, but these are not yet in the global IUCN red list database. This illustrates the high pressure on endemic and threatened species in this highly diverse region, and the importance of recording and documenting these trends.

Across the planet, the tropical Living Planet Index (LPI) shows a 56 per cent decrease across 3,811 populations of more than 1,000 different species (WWF 2014). This same report, using a weighted index, estimated a reduction of 83 per cent in populations in the Neotropical realm between 1970 and 2010. The main factors causing this decline were identified as pollution, invasive alien species, habitat loss and climate change (WWF 2014).

PRESSURES

Rapid economic growth and social inequity have created certain associated pressures on the region's natural resources

The natural resources of the LAC region are facing a number of pressures, often associated with economic growth of countries such as Brazil, Chile, Colombia and Panama, which are among the most rapidly developing countries on Earth (Magrin et al. 2014). As a result, urban development and economic growth, together with social and economic inequity, threaten the region's biodiversity in many areas (Pauchard and Barbosa 2013). Correlations have been found between poverty and biodiversity decline in tropical regions (WWF 2014), and in the LAC region, over 25 per cent of the urban population lives in extreme poverty, with the richest 20 per cent earning 20 times more than the poorest 20 per cent (UN-HABITAT 2012).

Agricultural intensification and expansion of arable land for commodity production continues

Latin America has seen rapid agricultural growth in recent decades and these trends look set to continue. LAC is regarded as second only to sub-Saharan Africa in terms of the potential for further arable expansion (Lambin et al. 2013), and despite droughts and water scarcity in some parts, it also holds the highest share of global renewable water resources (UNEP 2010). Growth in sugarcane and coffee plantations as well as expansion of livestock production continues, often leading to deforestation, fragmentation, and overgrazing of the converted pasturelands (Michelson 2008). In particular, the Atlantic coastal forests, as well as tropical savannahs, for example in the Cerrado, are the most rapidly changing biomes in the region, threatened by advancing agricultural frontiers and rapidly growing cattle production (Magrin et al. 2014). This expansion and intensification of agriculture and pastureland is resulting in the decline in area and quality of habitats and associated pollution of water courses and loss of biodiversity. Small scale agriculture expansion is also affecting natural habitats in other regions, including in the biodiversity hotspots of the Andes and Mesoamerica, with evidence of agriculture moving into protected areas (PAs) in some places (CEPD 2015; CPEF 2005).

The region is undergoing major infrastructure development

The region contains one of the world's most biodiverse river basins, the Amazon, which is undergoing major infrastructure development with 416 dams operational or under construction, and a further 334 dams planned or proposed (Winemiller et al. 2015). Within the LAC region, Brazil, Chile and Ecuador are the countries with the highest density of new dam projects being developed in the past decade (Kereiva 2012). New road expansion, into areas of the Amazon that previously remained a wilderness, is driven by the development of infrastructure for trade and transportation, as well as the search for valuable materials, including timber, minerals and oil, for extraction. The development of roads into wilderness areas is known to be a major driver of environmental degradation, including loss and fragmentation of habitats, and an increase in wildfires (Laurance et al. 2014).

Other major pressures on habitats in the region include land cover change (forest and savannah conversion to large scale agriculture) (Piquer-Rodríguez 2015), land-based pollution and sediment runoff from industrial agriculture and cities into major water courses and ultimately the ocean, infill of wetlands for urbanisation, and logging of high value timber species (Pauchard and Barbosa 2013). Underlying some of these pressures is an expanding human population and the development of an export economy providing agricultural, livestock, timber and mineral products to other parts of the world (UNEP 2010).

High concentrations of population in urban areas continue to impact biodiversity

The LAC region has an estimated 640 million people, with around 38 million living on the Caribbean islands and the rest on the mainland, with an annual growth rate for the region of around 1.15 per cent (Pauchard and Barbosa 2013). Over 75 per cent of LAC's population is found in cities, the highest proportion anywhere on Earth (World Bank 2016), and the impacts of urbanisation on biodiversity are especially significant due to the high proportion of cities located in or around areas with high species richness and/or endemism (Liu et al. 2003).

On the mainland, around 80 per cent of the population lives in urban areas (UNEP 2012). This includes 62 cities with more than a million inhabitants, and two megacities – Mexico City and Sao Paulo – with around 20 million people each. Central Chile has the highest national population density and agricultural expansion within the region (Tognelli et al 2008; Patricio and Fuentes-Castillo 2011; Duran et al. 2013). On Latin American and Caribbean islands, over 65 per cent of the population lives in towns. Around 30 per cent of the population lives in coastal areas in countries such as El Salvador, Ecuador, Costa Rica, Nicaragua and Panama (Magrin et al. 2014) (Figure 2).

Although population growth continues in the region, the growth rate on the mainland has slowed in recent years, and the population is expected to stabilize at 800 million people by 2050 (World Bank 2016). However, some of the small islands and Island Nations in the Caribbean are experiencing high rates of population growth and increased economic activity, which can cause strains on the natural resource management of these areas (CEPF 2011).

Alongside this increase in urbanisation, linguistic diversity has been declining steeply across the LAC region since the 1970s (Loh and Harmon 2014), indicating an accompanying loss of the traditional knowledge that would have been passed down the generations orally in the mother tongue (Larsen et al. 2012).

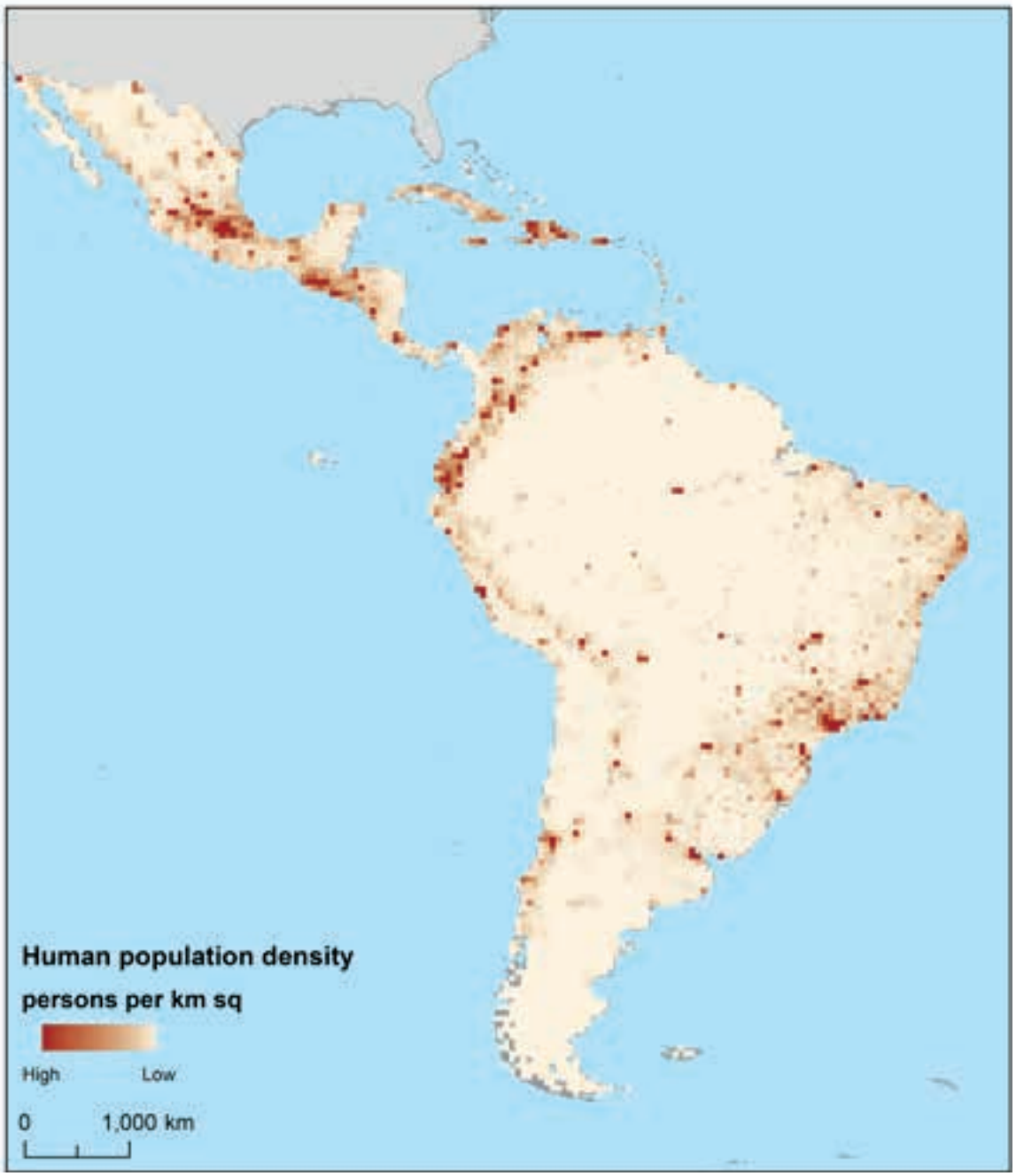


Figure 2: Human population density in the Latin America and Caribbean region (map produced by UNEP-WCMC using data from WorldPop 2010).

Country economies within the region are very highly dependent on their natural resources

Countries in the LAC region are dependent on natural resources to provide the basis of much of their economies, with significant resources being obtained from natural habitats (Magrin et al. 2014). For example, hydropower accounts for over two-thirds of Brazil's energy supply, and this will increase as new dams have been proposed in the Amazon basin (Zarfl et al. 2015). Oil extraction is also helping the development of many countries in the region. In the past decade, Ecuador's economy has grown to become the seventh largest on the South American continent, partly due to the government's policies and investment in natural resources, but also due to the country's large oil reserves (World Finance 2012).

Logging is also a major industry in the LAC region (Finer et al. 2014), exploiting the large timber resources, especially those with a high value on the global market. For example, Big Leaf Mahogany or Brazilian Mahogany (*Swietenia macrophylla)* faces severe threats, with a population reduction of over 70 per cent since 1950 in El Salvador, Costa Rica and other tropical forest areas such as Mato Grosso in Brazil and Beni in Bolivia; deforestation has reduced the species' range by over 60 per cent in Central America and 20 per cent in South America (WWF 2015). The region's forests also provide clear socio-economic benefits, both in terms of consumption and production (Table 1).

Table 1. Summary of socio-economic benefits received from forests in 2011 in the LAC region (FAO 2014).

PRODUCTION BENEFITS	LAC	WORLD
Income generation (billion USD)		
All formal sector activities	49.4	606.0
All informal sector activities	9.0	33.3
Medicinal plants	NA	0.7
Plant-based NWFPS(*)	3.0	76.8
Animal-based NFWPS	0.6	10.5
Payments for ecosystem services (PES)	0.2	2.4
Total (as % of GDP)	62.2 (1.2)	729.6 (1.1)
Consumption benefits (billion USD)		
Total food supply from forests	15.7	16.5
Energy supply (forests and forest process)	108.8	772.4
Human benefits (millions of people)		
Use of wood-fuel to boil and sterilize water	38.6	765.0
Use of forest products for house walls	68.5	1,026.1
Use of forest products for house floors	25.3	268.3
Use of forest products for house roofs	43.6	481.8
Number of people using charcoal to cook	5.4	169.1
Energy supply (forests and forest process)	108.8	772.4

(*) Non wood forest products.

Throughout the region, tourism and eco-tourism in particular are of considerable importance to national and local economies. Latin America and the Caribbean offer a wide range of ecotourism activities and wilderness areas, such as coastal tourism and tropical forest activities in Central America, biodiversity-related tourism in the Amazon Basin, cultural tourism in the Andes and adventure tourism in Patagonia. Although there is a lack of quantitative evidence to assess the profitability of the tourism sector, Kirkby et al. (2011) estimated that the annual revenue flow from ecotourism to developing countries globally could be as high as USD 29 billion, and in areas of the LAC region such as the Tambopata province (Peruvian Amazon) ecotourism was responsible for USD 11.6 million in spending in 2005. The LAC region benefits greatly from its protected area network and national parks; Balmford et al. (2015) estimated 4,000 visits per year (median rate averaged over countries) per protected area. However, these average figures mask the fact that many reserves receive no tourists and have no management plans in place, which is a significant challenge for their sustainable management (Guerrero and Sguerra 2009).

In Central American and Caribbean countries, eco-tourism benefits are largely linked to marine and coastal ecosystems, with a significant eco-tourism industry in the Caribbean islands focussing on diving, snorkelling, and additional Caribbean cruise tourism (Wood 2000). The Florida-Caribbean Cruise Association (2013) highlighted the success of this industry in the Caribbean, ranked as the dominant cruise destination and accounting for 37.3 per cent of all global itineraries in 2013.

The region has 134 properties inscribed in the World Heritage List, of which 36 are UNESCO Natural World Heritage sites, 93 are Cultural Heritage sites, most in historical centres, and five are mixed properties recognized for the outstanding value and contribution to the local economy (UNESCO 2016). In the Andes region, the impact from tourism in coastal areas of Patagonia is also high, particularly in the UNESCO World Heritage site, Valdés Peninsula, and its biggest city, Puerto Madryn (Schlüter 2001).

Finally, although the mining industry is severely detrimental to many natural habitats in the region, it can also provide benefits in terms of socio-economic development. In Chile, the mining sector provides 12 per cent of gross domestic product (GDP) and contributes to 60 per cent of the country's total exports. Renewable natural resources such as from the forestry, aquaculture and tourism sectors also contribute to GDP (around 10 per cent) and provide an estimated 1 million jobs (Banco Central del Chile, 2015).

Resource extraction for minerals and hydrocarbons has led, in some cases, to locally devastating direct and indirect impacts on biodiversity

Mining and oil and gas production can create significant pollution that affects biodiversity (Bebbington and Bury 2013). Almost all countries in the region have small-scale mining activities, which extract minerals such as gold, copper, silver and zinc (Finer et al. 2008; Veiga 2002). The LAC region currently provides 45 per cent of global copper production and 50 per cent of global silver production, attracting 25 per cent of global investments in mining (UNEP 2016a). Impacts on biodiversity and habitats from mining activities range from direct impacts, such as removal of vegetation, to indirect but equally devastating impacts, such as acid drainage, high metal concentrations in rivers and soil pollution, which in turn affects species structure and composition (Miranda et al. 2003). Mining activities and industrial accidents can have devastating effects on habitats; since November 2015, Brazil has been facing the consequences of a serious environmental disaster that took place in the State of Minas Gerais (Southeast region). The disruption of two dams of the Samarco mining company released a torrent of mud that caused great destruction in the district of Mariana, with waves of sludge carrying pollutants such as silica and iron traveling up to 850 km, and affecting the coast of the Espirito Santo district of Brazil (Generation Transition 2015).

In the past decade, large reserves of oil and gas have been discovered in the region, with the extraction of oil from the interior of the Amazon basin posing particular environmental challenges and regularly resulting in pollution events (Finer et al. 2013; Mulligan et al. 2013). The western Amazon continues to be a hotspot for hydrocarbon exploration and production (Finer et al. 2015; Finer et al. 2013), and international bids to develop new oil and gas blocks in Colombia, Ecuador and Peru demonstrate the region's continued interest in exploration activities which expand deeper into some of the world's most biodiverse habitats, putting ecosystems at risk of industrial accidents and pollution. In the Loreto region of Brazil, all three active oil producing blocks have had recent major leaks and spills, and evidence of contamination in many mining sites throughout the Amazon has been found, with toxic production waters dumped into local waterways for decades before indigenous communities forced the practice to be halted in 2009 (Finer et al. 2013).

Natural habitats are being affected by mining activity, with illegal gold mining being a particular threat to biodiversity in many countries. Across the tropical moist forests of South America, around 1,680 km2 habitat was lost due to mining between 2001 and 2013 (Alvarez-Berríos and Aide 2015). Forest loss was concentrated in four major biodiversity hotpots: the Guianan moist forest ecoregion (41 per cent), Southwest Amazon moist forest ecoregion (28 per cent), Tapajós–Xingú moist forest ecoregion (11 per cent), and the Magdalena Valley montane forest and Magdalena–Urabá moist forest ecoregions (9 per cent) (Alvarez-Berríos and Aide 2015).

Another example is the challenge of overlapping mining concessions and designated Natural Protected Areas, put in place to conserve ecosystems and habitats. Even before extraction takes place, seismic lines, straight paths of one to 12 metres wide, are cleared of vegetation and used for surveying during exploration for fossil fuels. These are thought to be the most significant driver of habitat fragmentation caused by the petroleum sector, with examples of more than 104,000 km seismic lines cut in the Peruvian Amazon between 1970 and 2010 (Harfoot et al. 2016).

Transboundary and local air pollution is recognised as an environmental factor in human health in the region

Recent reports from the Global Monitoring Plan of the Stockholm Convention help to better understand and address transboundary pollution and impacts from intercontinental transport of dust, such as African dust clouds (UNEP 2016a). In Trinidad, links between African dust clouds and childhood asthma have already been documented (Gyan et al 2005). In addition to consequences for human health, Saharan dust has a range of impacts on ecosystems downwind, and an estimated 40 million tonnes of dust are delivered to the Amazon River Basin every year (UNEP 2016a). Another source of air pollution is indoor air pollution caused by the burning of solid fossil fuels. In the LAC region, typical levels of PM10 (particulate matter 10 micrometres or less in diameter) in homes which use biomass for fuel are 300-3,000 mg/m^3, and can be as high as 10,000 mg/m^3 during cooking times (UNEP 2016a). The US Environment Protection Agency (EPA) standard for annual mean PM10 levels in outdoor areas is 50 mg/m^3.

Within the LAC region, Santiago de Chile (Chile) is one of the cities most affected by air pollution and smog due to a combination of its geographic location within a high Andean valley and its topographic and meteorological patterns which restrict ventilation and dispersion of pollutants (Molina and Molina 2004). Various studies have found links between presence of particulate matter (PM) and premature mortality amongst the population (Sanhuenza et al. 1991; Cifuentes et al. 2000; Ochoa-Acuña and Roberts 2003). The growing economy and urban expansion within the city and the high density of diesel fuelled vehicles means air pollution levels are still very high (Molina and Molina 2004).

Finally, population growth and its associated effects on pollution remains another major risk in the region. For example the clearance of vegetation for infrastructure development on hillsides during construction of informal settlements causes pollution and run-off, affecting ground water and aquifers (Miller and Spoolman 2013).

Climate change induced impacts on coral reefs and montane habitats within the region are intensifying

The consequences of rising ocean temperatures and ocean acidification, caused by climate change, pose a serious threat to coral reefs, their biodiversity and the people who depend on them (Burke et al. 2011). Bleaching events and a higher incidence of disease in corals across the Caribbean have been observed. The IPCC reported a warming of the upper layer of the ocean of 0.11 °C per decade globally (Stocker et al. 2013). Both of these climate change impacts can slow down coral growth as well as cause damage to existing corals by reducing their ability to produce calcium carbonate skeletons. Higher temperatures are linked to an increased frequency of coral bleaching events, with mass coral bleaching events in 1998 and 2005 (Mumby et al. 2014b). In addition, an increase in hurricane frequency and intensity can cause severe damage to corals (IPCC 2013; Gardner et al. 2003). The impact still varies throughout the Caribbean, however, as temperature increases are not uniform, and some coral species appear to be better able to adapt to increasing temperatures than others (Gardner et al. 2003).

In addition to effects on coral reefs, other habitats and other biodiversity components in the LAC region are vulnerable to climate change. The melting of Andean glaciers and changes in rainfall patterns in the Amazon basin and surrounding areas may have massive effects on the region's ecosystems (Malhi et al. 2009; Betts et al. 2008), and also on local farming and agricultural practices which are key sources of income and food security for local communities. A study, which integrated historical and current biodiversity data at a coarse spatial resolution in Mexico, found that historical temperature change in the twentieth century had significant impacts on endemic avifaunal turnover (Peterson et al. 2015).

RESPONSES

Low carbon sustainable development approaches (Target 3, 5, 11, 15)

In recent years there has been a considerable growth in interest in developing payment for ecosystem service (PES) schemes to finance conservation (Pagiola et al. 2005), with initiatives underway or in development in many LAC countries. Costa Rica has been leading in the implementation of PES schemes in the LAC region, establishing the first nationalised PES programme in 1996 (the "*Pago por Servicios Ambientales*" programme operated by the National Fund for Forest Financing, FONAFIFO) (FONAFIFO 2000), and is seen globally as a pioneer of this type of programme. Four ecosystem services are explicitly recognised by the programme: capturing and storing atmospheric carbon, protecting water sources, conserving biodiversity and conserving scenic beauty (Porras et al. 2013). The scheme included measures for the protection of water for rural, urban and hydroelectric use; greenhouse gas mitigation; and biodiversity protection for conservation scientific and pharmaceutical uses (UNEP ROLAC 2012).

Nearly 45 per cent of the LAC region currently has forest cover (FAO 2010). However, significant threats to forests exist throughout the region due to factors such as agricultural and population expansion. PES mechanisms, such as REDD+, which is based on forest carbon, have the potential to conserve forests and provide opportunities for biodiversity conservation, amongst other social and environmental benefits. In some countries in the region considerable progress has been made on low carbon initiatives. There are numerous initiatives underway to create a financial value for the carbon stored in forests within the REDD+ framework, which offers incentives for developing countries to reduce emissions from deforestation and forest degradation, as well as to conserve forest carbon stocks, sustainably manage forests and enhance forest carbon stocks (Forest Carbon Partnership Facility 2015; the REDD desk 2016a; UN-REDD 2016).

Most other PES schemes in the region focus on water services. For example, in the Andes region of Chile, water payment schemes have been established using fog capture systems to help provide reliable water supplies to the drier lowland cities (Goldman et al. 2010). In Brazil, state governments such as São Paulo have established regulations for the payment for ecosystem services and have been implementing PES schemes relating to water and to the ecosystem services provided by Private Reserves of the Natural Heritage (RPPNs – Reservas Particulares do Patrimônio Natural) (UNEP ROLAC 2012). Mexico also created a Payment for Hydrological Environmental Services programme (Pago por Servicios Ambientales Hidrológicos, PSAH) in 2003, as a way to finance forest conservation which lies within hydrologically critical watersheds, using revenue from a water tax (The World Bank 2005).

Regional efforts continue to be made to control illegal trade in wildlife (Target 4)

Wildlife trade is the second biggest threat to species survival, after habitat destruction, around the world (WWF 2016c). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has been very active in the region in trying to control the causes of legal and illegal wildlife trade. CITES has certainly helped control the trade in wildlife but challenges remain. Over the past 10 years there has also been a major trade route from countries in the region to Mexico, and there are known illegal trade routes into the USA from Mexico (Defenders of Wildlife 2016), and into Europe mainly from the Central American sub-region (Engler and Parry-Jones 2007). Much of the illegal trade is in skins of reptiles and mammals, but there is also considerable trade in live birds, reptiles and other species. Illegal trade in species such as jaguar, sea cucumber, sea turtle eggs and shark fins continues in the region (Scherer 2015). Efforts are being made to control this illegal trade, mainly through enhanced enforcement of CITES regulations, and different initiatives that are aimed at building on the region's environmental rule of law, including building the capacities of prosecutors to address environmental crimes.

In addition to illegal wildlife trade of animal species, the illegal trade in timber is worth around 30 billion dollars per year globally (TRAFFIC 2016), with around 13 million ha of natural forest logged illegally every year (The Nature Conservancy 2016). In the LAC region illegal trade in timber and wood is widespread. Mexico's Ministry of Environment and Natural Resources estimated that over half of the country's industrial timber production was through illegal activity (WRI 2012). Considerable effort is being made to control the illegal trade in timber, with certification schemes helping to ensure that timber on global markets comes from well managed and sustainable sources. Illegal trade in animal species is also a major threat to biodiversity. In the Caribbean there is a high demand for wildlife to serve international markets in the United States, Europe and within the Caribbean islands. This includes species of parrot, macaws and spider monkeys which are sold as pets, as well as reptile meat from green and black iguanas (Humane Society International 2009).

Protected Area coverage has expanded significantly in recent years especially on government managed and community managed forest reserves (Target 11) Overall, good progress has been made towards the development of a network of reserves of different types that encompass the diversity of biomes, habitats and species (Butchart et al. 2015). The Andes is a particularly challenging region to develop protected area networks, simply because the biodiversity of this region is so high that many, often small, reserves are required to cover all species living here (Swenson et al. 2012).

Government managed protected areas have expanded significantly in the region over the past two decades (Figure 11.6) (UNEP-WCMC 2015) with 23 per cent of the region protected by 2010. In addition to government managed areas, there are also large numbers of community managed reserves and traditional lands that can provide effective protection to habitats and species (e.g. Ricketts et al. 2010). When comparing the effectiveness of different categories of protected areas in the Brazilian Amazon, "indigenous lands" was one of the most effective category for inhibiting deforestation (Soares-Filho et al. 2010), which is supported by a meta-analysis that found that in general "community managed forests presented lower and less variable annual deforestation rates than protected forests" (Porter-Bolland et al. 2012). A successful community forest example from Mexico shows how gains in social and economic justice stemming from Community Forest Enterprises (CFEs) can result in sustainable forest management practices and biodiversity protection (Bray et al. 2003). These CFEs use social capital and invest it to implement community timber management initiatives. In contrast, however, Vuohelainen et al. (2012) found in a similar study in Peru that "native community areas" were the least effective type of protected area for forests, suggesting that a mix of different management strategies is desirable.

In southern parts of the region private protected area networks have also developed, for example in Argentina, Brazil and Chile. In some LAC countries these privately owned protected areas benefit conservation activities, as they do not experience the same pressures or challenges faced by other forms of protected areas and can act as a beneficial supplement (not a substitute) for state owned protected areas in the region (Holmes 2013). The Brazil private reserve network is especially strong, with hundreds of Private Natural Heritage Reserves (RPPN) spanning over nearly 480,000 ha. These private protected areas serve to raise awareness within communities to realise the potential benefits of partaking in biodiversity conservation schemes within their property, and the Brazilian government is actively supporting the creation of more of these private reserves (ICMBio 2016; de Souza et al. 2015). Reviews of the effectiveness of protected areas in Mexico have found mixed results. Figueroa and Sánchez-Cordero (2008) found that over 54 per cent of Natural Protected Areas were effective, but that 23 per cent were regarded as not effective. Furthermore, Rayn and Sutherland (2011) found that the size and design of protected areas in Mexico was important, with the centre of large protected areas showing a lower rate of forest loss than elsewhere, although forest cover did decline both inside and outside the designated protected areas.

Within the Atlantic Forest biodiversity hotspot, Argentina, Brazil and Paraguay all contain both public and private protected areas. Both Argentina and Paraguay have more protected areas under private ownership according to Galindo-Leal and Camara (2003).

In Bolivia, detailed studies have looked at protected area impacts on levels of poverty in the surrounding communities (Canavire-Bacarreza and Hanauer 2012). This study found no evidence to suggest that the implementation of protected areas had any negative impacts on poverty levels in the affected communities but rather, that in general, such communities experienced poverty reduction.

Regional support for conserving migratory species has increased (Target 12)

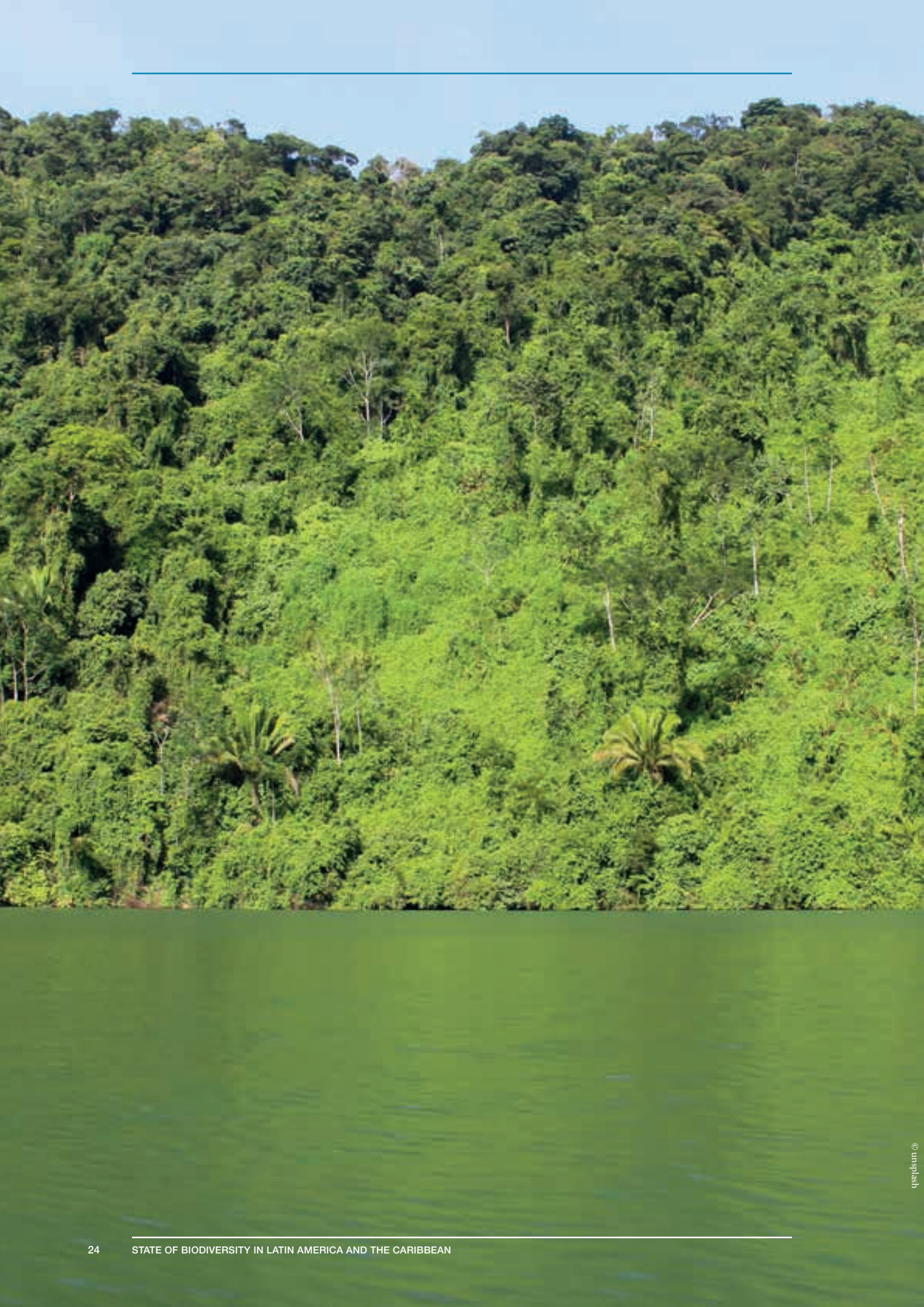
Migratory species are an important element of biological diversity in the LAC region. As well as their intrinsic value, migratory species provide many benefits and services to people and ecosystems. Many are essential for subsistence and for the cultures of numerous human populations and they form the basis of activities of economic, cultural and social value. The Convention on Migratory Species (CMS) has the sole objective of conserving, protecting and ensuring sustainable use of terrestrial, aquatic and avian migratory species, and provides the means necessary to achieve this. Since its entry into force on 1 November 1983, the number of Parties to it has risen steadily and has now reached 122 countries from Africa, Latin America and the Caribbean, Asia, Europe and Oceania (with the accession of Brazil on 1st February 2015). Migratory species most in need of international cooperation or which could benefit greatly from such cooperation are listed on Appendix II of the Convention. CMS instruments have direct effects on local populations by promoting access to benefits arising from the use of natural resources.

Implementation of targeted species management programmes has resulted in several success stories (Target 12)

The region supports many iconic species, including many exotic and endemic species of birds such as parrots and parakeets which have become highly threatened due to over-collection in species trade and habitat loss. However, examples exist of some species being brought back from the brink of extinction due to targeted – species-specific – conservation programmes in the region, particularly in the Caribbean islands. These include the Echo Parakeet (*Psittacula eques*), the Imperial Amazon parrot (*Amazona imperialis*) and the Puerto Rican Amazon Parrot (*Amazona vittata*), the White-capped Tanager (*Loro orejimarillo*) or the Californian Condor (*Gymnogyps californianus*) (BirdLife International 2016a). Similar trade related issues have affected southern American camelid populations, for example the vicuña, and these have required targeted conservation interventions to reverse negative population trends such as the CONACS programme in Peru which implements "Módulos de Uso Sustentable de la Vicuña" (Modules for the Sustainable use of Vicuña) within community managed farmlands of up to 1,000 ha (Lichtenstein et al. 2002). Legislation in Mexico allows landowners and managers to benefit from the exploitation of wildlife as an incentive for the conservation of biodiversity while meeting the needs of local communities. This market-driven approach has proved popular, but in some cases has led to unintended and undesirable consequences (Sisk et al. 2007). Though challenges remain, Mexico also has successful examples of wildlife recovery for the bighorn sheep (*Ovis canadensis*), pronghorn (*Antilocapra americana*) and the Texas white-tailed deer (*Odocoileus virginianus texanus*).

As a national example of the development of targeted action plans – in December 2014, the Chico Mendes Institute for Biodiversity Conservation (ICMBio) finalised a national assessment of the risk of extinction of Brazilian fauna. In four years they evaluated 12,256 taxa of fauna, using the criteria of the IUCN, including all vertebrates described for the country (Nascimento and Campos 2011). A total of 8,924 vertebrate species were assessed, including 732 mammals, 1,980 birds, 732 reptiles, 973 amphibians and 4,507 fish. In addition, 3,332 invertebrates were evaluated, including crustaceans, molluscs, insects, porifera, and millipedes, among others. The results were used in the development of 54 National Action Plans for the conservation of threatened fauna or areas of occurrence of multiple endangered species. For plants, the Red Book of Brazilian Flora was published in 2013 by the Botanical Garden of Rio de Janeiro (Martinelli and Moraes, 2013) and the official list of endangered species, launched in 2014, includes 4,617 species of flora and 323 National Action Plans for plant conservation. The National Centre of Flora Conservation and the Biodiversity Portal by Brazil Ministry of the Environment provides online information (Centro Nacional de Conservação da Flora 2016; Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) 2016b).

Other countries in the region have also improved conservation efforts, achieving progress in promoting national biodiversity assessment. In 2010, Chile incorporated the IUCN criteria in national legislation, thus incorporating international standards for future assessments (Squeo et al. 2010). Similarly, as part of the National Environmental System, Colombia has enacted legislation that calls for the production of an annual report on the state of biodiversity.



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3. THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020 AND ITS REVIEW

The *Strategic Plan for Biodiversity 2011-2020* was adopted at the tenth meeting of the Conference of the Parties (COP-10) to the Convention on Biological Diversity (CBD) in Nagoya, Japan, in October 2010. The Strategic Plan is comprised of a shared vision, a mission, strategic goals and twenty ambitious yet achievable targets, collectively known as the Aichi Biodiversity Targets. It serves as a flexible framework for the establishment of national and regional targets with the overall aim of saving biodiversity and enhancing its benefits for people.

The strategic plan contains five independent Strategic Goals (CBD 2010):

- Addressing underlying causes or direct drivers of biodiversity change.
- Pressures or direct drivers.
- Safeguarding ecosystems, species and genetic diversity.
- Safeguarding and enhancing the benefits of biodiversity and ecosystem services.
- Providing the means to enhance the implementation of other goals through relevant national strategies.

The GBO-4 report, its underlying reports (SCBD 2014; Leadley et al. 2014), and an associated paper in the Journal *Science* (Tittensor et al. 2014), provided a mid-term review of process towards the Aichi Biodiversity Targets, with a detailed assessment of trends, status, and projections of biodiversity worldwide. Some other biodiversity conventions, such as the Convention on the Conservation of Migratory Species of Wild Animals (CMS), have also used the targets as a basis to develop their own strategic plans, thus ensuring that actions under such conventions also support the Aichi Biodiversity Targets.

SUMMARY OF THE FINDINGS OF THE GBO-4

GBO-4 brought together multiple lines of evidence derived from a wide range of sources. It drew upon targets, commitments and activities of countries as reported in National Biodiversity Strategies and Action Plans (NBSAPs) and national reports, as well as Parties' own assessments of progress towards the Aichi Biodiversity Targets. It took into account information on the status and trends of biodiversity reported by Parties and in the scientific literature, and made use of indicator based statistical extrapolations to 2020 (Figure 3) as well as longer term model based scenarios.

Statistical extrapolations for a range of indicators suggest that, based on current trends, pressures on biodiversity will continue to increase until 2020 at least, and that the status of biodiversity will continue to decline. This decline is despite the fact that society's responses to the loss of biodiversity are increasing, based on national plans and commitments, and are expected to continue to increase for the remainder of this decade. This disparity may be partly due to time lags between positive actions and discernible positive outcomes, but it could also be that responses may be insufficient relative to pressures, such that they may not overcome the growing impacts of the drivers of biodiversity loss.

The overall conclusion from GBO-4 was that, while there has been significant progress towards meeting some components of the majority of the Aichi Biodiversity Targets, for example, conserving at least seventeen per cent of terrestrial and inland water areas, in most cases progress was not sufficient to achieve the targets set for 2020. Additional action by governments and others is required to keep the *Strategic Plan for Biodiversity 2011–2020* on course and deliver the Aichi Biodiversity Targets. These efforts are also relevant to achievement of the new Sustainable Development Goals (SDGs), which were agreed at the end of 2015 and will be in place until 2030.

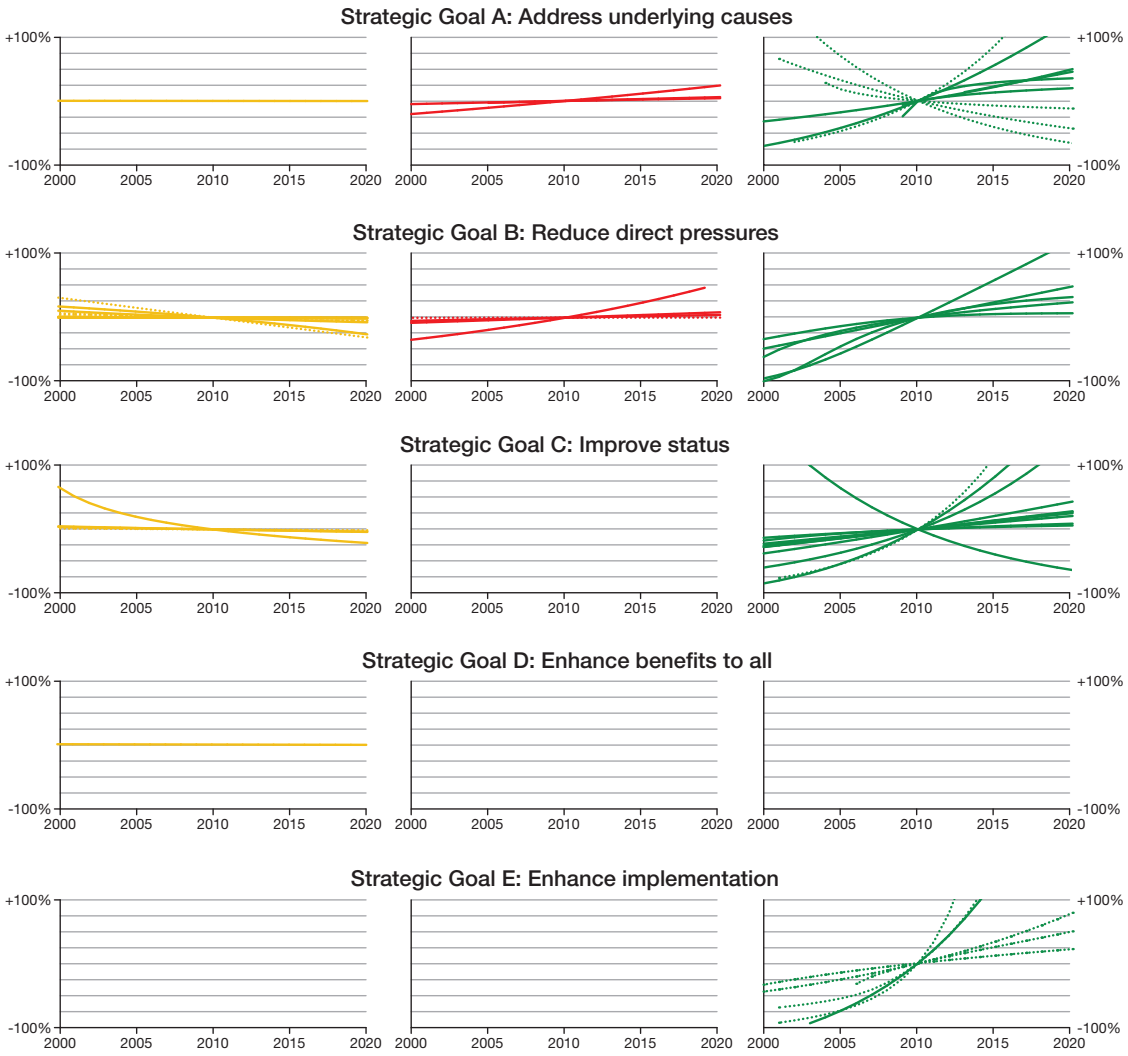

Figure 3: Trends in normalized indicators from 2000 and projected to 2020 for the five different Strategic Plan for Biodiversity 2011-2020 goals (Tittensor et al. 2014).

State measures are coloured orange, Pressure measures are coloured red, and Response measures are coloured green. The horizontal dotted line represents the modelled indicator value in 2010. For state and response indicators, a decline over time represents an unfavourable trend (falling biodiversity, declining response) whereas for the pressure indicators a decrease over time represents a favourable trend (reducing pressure). A dashed coloured line represents no significant trend, whereas a solid coloured line represents a significant projected change between 2010 and 2020. Values are normalized by subtracting the modelled mean then dividing by the modelled standard deviation. For individual extrapolations on their original scale see target by target chapter in GBO-4 (SCBD 2014). Note that many time series continue prior to the year 2000; the x-axis has been limited to this date.

4. OVERVIEW OF PROGRESS ACROSS THE LATIN AMERICA AND CARIBBEAN REGION

While the global assessment and data provided by GBO-4 give an overall picture of the world's biodiversity status, it does not contain regional breakdowns of this information. Here we provide a more specific and detailed assessment of the changes in the state of biodiversity, pressures and human responses to the biodiversity crisis in Latin America and the Caribbean.

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The overall progress towards the achievement of the twenty Aichi Biodiversity Targets in the Latin America and Caribbean region, in comparison with the global progress, has been determined from the fifth national reports to the CBD. Of the 33 countries in the region, 26 had submitted their fifth national reports as of January 2016, and reports from 24 countries are included in this assessment (SCBD unpublished data) (Figure 4).

Overall progress towards the Aichi Biodiversity Targets in the LAC region is similar to the global picture. However, in LAC, some countries are reporting "no information" around progress towards specific targets, and a trend across many targets shows countries reporting that they are not currently on track to meet specific targets. The most positive trends in the region are seen in Target 11 (protected areas), Target 17 (adoption and implementation of policy instruments) and to a lesser extent Targets 18 (acknowledgement of traditional knowledge) and 19 (improved biodiversity information sharing).

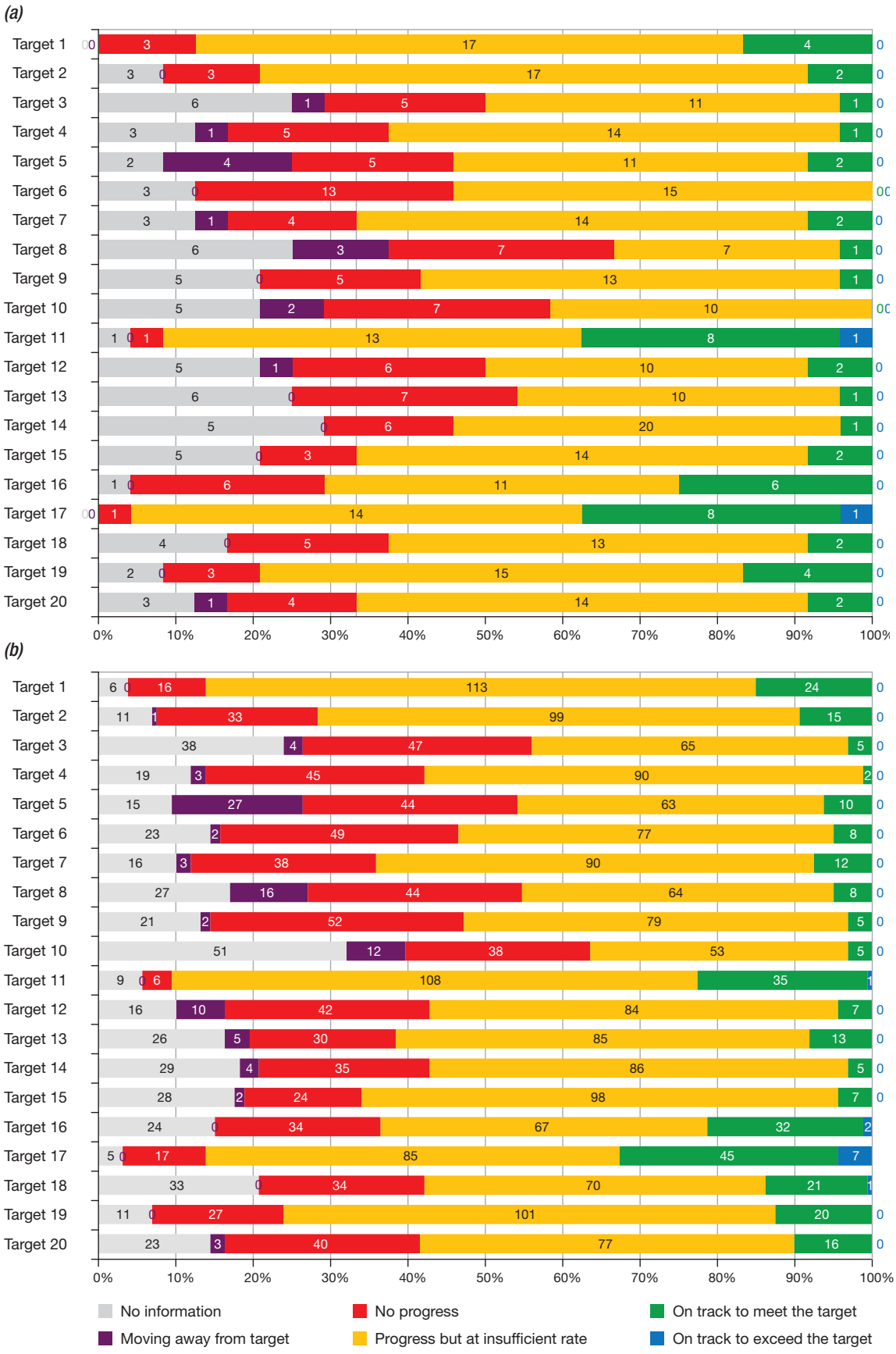


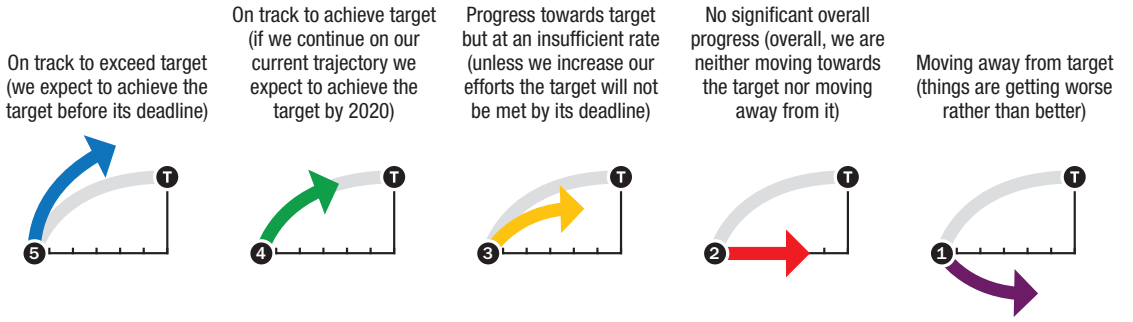
Figure 4: Synthesis of progress towards the achievement of the twenty Aichi Biodiversity Targets a) in the Latin America and Caribbean region (n=24) and b) globally (n=159). Numbers in the columns indicate the number of country reports within each category, of the 24 country reports analysed for each Target.

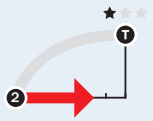
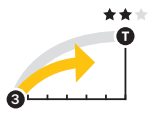
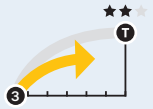
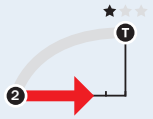
AICHI BIODIVERSITY TARGET DASHBOARD

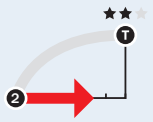
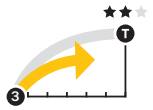
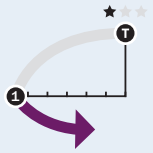
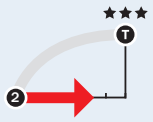
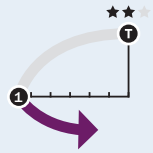
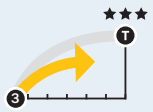
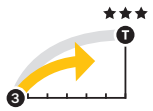
A dashboard of progress towards each of the Aichi Biodiversity Targets has been developed, based on consideration of regional analysis of global datasets (mainly from the Biodiversity Indicators Partnership, BIP), analyses of the fifth national reports to the CBD and relevant literature.

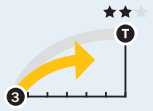
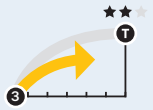
Table 2: A dashboard of progress towards the Aichi Biodiversity Targets in Latin America and the Caribbean.

The table below provides an assessment of progress made towards each of the Aichi Biodiversity Targets as well as the level of confidence (***) based on the available evidence. It aims to provide summary information on whether or not we are on track to achieve the targets. The assessment uses a five-point scale.



Target	Notes	Progress
Target 1 - Awareness increased	Available information in the region is not sufficient to make a definitive analysis of progress towards this target. However, it is known that there is significant effort in some countries; for example about half of the country reports analysed by the CBD show evidence of implementing environmental education programmes.	
Target 2 - Biodiversity values integrated	The integration of biodiversity values in decision making is variable in the region. Although countries do report some progress and environmental impact assessment (EIA) legislation is widely developed, the reality on the ground is often favouring development decisions. Data to accurately measure progress are, however, often lacking.	
Target 3 - Incentives reformed	Some countries are involved in payment for ecosystem services (PES) schemes such as REDD+ and water PES, and are developing "green economy" or natural resource accounting initiatives which aim to provide positive incentives for conservation. There is less evidence of reforms of negative incentives for conservation in the region. It seems unlikely that this target will be fully achieved unless additional actions are taken.	
Target 4 - Sustainable production and consumption	There are few available data on the progress towards sustainable consumption and production in the region, although around half of the countries report they are making progress. However, it seems unlikely that progress is sufficient to meet the target.	
Target 5 - Habitat loss halved or reduced	Within the region there has been significant progress in terms of reducing the rates of forest loss, for example rates of tropical forest loss have been falling in Brazil and Peru. However, rates of habitat loss in other biomes are still high. In comparison, mangrove cover has increased in the region.	
Target 6 - Sustainable management of marine living resources	There are very few data to track this target in the region. The total catch from certified fisheries increased up to 2012, but has declined in recent years. There is also evidence of significant illegal fishing in the marine areas in the region. Although data are poor it seems that this target is not currently on track to be met.	

Target	Notes	Progress
Target 7 - Sustainable agriculture, aquaculture and forestry	The development of schemes for sustainable agriculture, aquaculture and forestry have been progressing, although slowly, in the region. Forest certification increased up to 2010, but has been stable since that time. For agriculture and aquaculture information is not available across the whole region.	
Target 8 - Pollution reduced	The region faces challenges to meet this target in large urban areas where pollution is severe and also impacts on local rivers and downstream marine areas. Water treatment facilities are often inadequate to cope with the scale of the challenge. Nutrient loading is also causing damage in agricultural areas of the region.	
Target 9 - Invasive alien species prevented and controlled	Invasive alien species are an issue in the region; with plants invading some offshore islands and introductions of mussels and fish. Considerable programmes of eradication of invasive aliens are taking place, but prevention and control is hard to achieve.	
Target 10 - Pressures on vulnerable ecosystems reduced	Coral reefs are vulnerable to climate change and the other pressures have not been mitigated in the region. Given the multiple threats to coral reefs and the ongoing climate change in the region, it seems that the region is probably moving away from the target.	
Target 11 - Protected areas increased and improved	The region has developed an extensive protected area network, consisting of state and community and private reserves. This protected area network is also increasing in effectiveness in many countries in the region.	
Target 12 - Extinction prevented	The IUCN Red List Index shows that species are moving towards extinction in the region, with a worrying increase between 2008 and 2012. This is despite considerable effort being made by countries to improve the conservation status of threatened species, and a number of local successes – especially on islands.	
Target 13 - Genetic diversity maintained	There are important centres of crop and animal diversity in the region (especially in areas of ancient human civilisation). This diversity is somewhat threatened by modernisation of agriculture, but there are many actions underway to safeguard the genetic diversity of domesticated species in the region.	
Target 14 - Ecosystems and essential services safeguarded	Although rates of forest carbon loss are being reduced, the region is still losing natural capital and the service of climate stabilisation. Water services from the major rivers are highly valued, but extensive plans for dams will affect some of the natural regulating ecosystem services provided by rivers, and water resources are declining. There has been a general increase in agricultural area, a decrease in undernourished people, driven by the replacement of natural capital by anthropomorphic capitals.	
Target 15 - Ecosystems restored and resilience enhanced	There is very little information from the region to allow this target to be tracked. As such we are not able to say if progress is being made and we have left the target progress blank.	Insufficient data to assess progress
Target 16 - Nagoya Protocol in force and operational	Countries in the region are making good progress towards the ratification and implementation of national legislation around the Nagoya protocol. Although not every country in the region will meet the target, many will.	
Target 17 - NBSAPs adopted as policy instrument	Some countries in the region produced their NBSAPs within the 2015 deadline. However, the majority did not, although they are expected to complete them in the coming years.	

Target	Notes	Progress
Target 18 - Traditional knowledge respected	This region contains numerous indigenous people's groups with considerable traditional knowledge. There is legal protection of many of these indigenous groups and their knowledge. However, many indigenous languages – the main transmission mechanism for traditional knowledge – are threatened with extinction due to the dominance of teaching and use of Spanish, English and Portuguese.	
Target 19 - Knowledge improved, shared and applied	The region has an increasing capacity for creating and sharing knowledge on biodiversity and applying it in the field. Various data sharing platforms have been created and these are being incorporated into the global GBIF platform.	
Target 20 - Financial resources from all sources increased	The region receives considerable funding from the international community based on its very high rates of biodiversity and expanding protected area network, although this has declined in recent years. In addition the countries in the region also provide significant conservation finance, although this is harder to track. Overall there is progress towards this target, although additional funding is always required.	

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5. TARGET BY TARGET ANALYSIS OF PROGRESS TOWARDS AICHI BIODIVERSITY TARGETS IN LATIN AMERICA AND THE CARIBBEAN (LAC)

This section provides a mid-term assessment of progress towards the Aichi Biodiversity Targets in the LAC region. Where possible, we have used the most up to date information and data, from 2010 onwards as this best reflects the objectives of the Aichi Biodiversity Targets. However, in many cases, such data are lacking and hence we have used the most recent available data to suggest trends in the likely achievement of the relevant Aichi Biodiversity Target.

TARGET 1: AWARENESS OF BIODIVERSITY INCREASED

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

"Addressing the direct and underlying drivers of biodiversity loss will ultimately require behavioural change by individuals, organizations and governments. Understanding, awareness and appreciation of the diverse values of biodiversity underpin the willingness of individuals to make the necessary changes and actions and to create the "political will" for governments to act. Given this, actions taken towards this target will greatly facilitate the implementation of the *Strategic Plan* and the fulfilment of the other nineteen Aichi Biodiversity Targets, particularly Target 2." (CBD 2016c)

Global trends suggest that people are aware of biodiversity values, but do not "view biodiversity protection as an important contribution to human well-being" (SCBD 2014). Improving awareness of the values of biodiversity and enhancing the knowledge of what people can do to conserve and use it sustainably are vital to reduce biodiversity loss in all regions, including LAC.

The fifth national reports to the CBD indicate that although progress has been made towards meeting Target 1 in all but three countries in the LAC region, this will not be sufficient to meet the target by 2020. The information reported highlights actions being taken to improve awareness of biodiversity, with 50 per cent of countries reporting implementation of an environmental education program. Awareness events, online resources and information disseminated through the media are also used to increase knowledge of biodiversity. Only four countries (Belize, Brazil, Dominican Republic, and Guatemala) are using indicators to measure environmental awareness, therefore, little is known about the impacts of the initiatives implemented. The only quantitative information provided is from Brazil, where polls indicate that 50 per cent of Brazilians were aware of biodiversity loss in 2012, an increase from 43 per cent in 2006. Generally, less focus is placed on raising awareness of the importance of conservation across the region, and more effort is placed on improving the basic educational needs of the population (CBD 2015).

Ipsos[1] carries out annual surveys of the public's knowledge of biodiversity for the Union for Ethical Biotrade (UEBT) (UEBT 2015). In 2015, 1,000 people were surveyed in nine countries globally, including Brazil, Ecuador, and Mexico from the region. Results show there seems to be more understanding of the importance of biodiversity in Latin America and the Caribbean than in other regions of the world, as 74 per cent of respondents agreed that 'biodiversity is essential' compared to just 50 per cent globally. Over 95 per cent of respondents in Latin America and the Caribbean stated that 'it is important to personally contribute to biodiversity conservation' compared to 87 per cent globally. However, respondents overall were generally unsure about actions they could take to contribute themselves (UEBT 2015).

[1] *http://www.ipsos.com/*

Information from the global database, AidData, on investments in environmental education from 1995 to 2010 provides an indication of the commitment to increase awareness of environmental issues (Tierney et al. 2011). Actual investment in projects related to environmental education has varied over time, from a high of USD 137 million in 1997, to a low of USD 6.1 million in 1999. With the exception of a peak in 1997, the proportion of development assistance funds related to environmental education in LAC was consistently less than 1 per cent of the total during this period (Figure 1.1). The only data point within the Aichi Biodiversity Target time period is from 2010, indicating that around USD 80 million was invested in environmental education by foreign donors in the region in that year. However, as some projects included in this analysis target other activities as well as education, these data are a proxy and not a direct measure of the funds allocated to environmental education. AidData only contains information on the funding provided by conservation donors and does not reflect the funding to enhance awareness that has been provided by the countries in the region using their own resources. As this region contains many medium income countries there will be considerable national investment in this issue, which are reflected in the statements in the fifth national reports to the CBD.

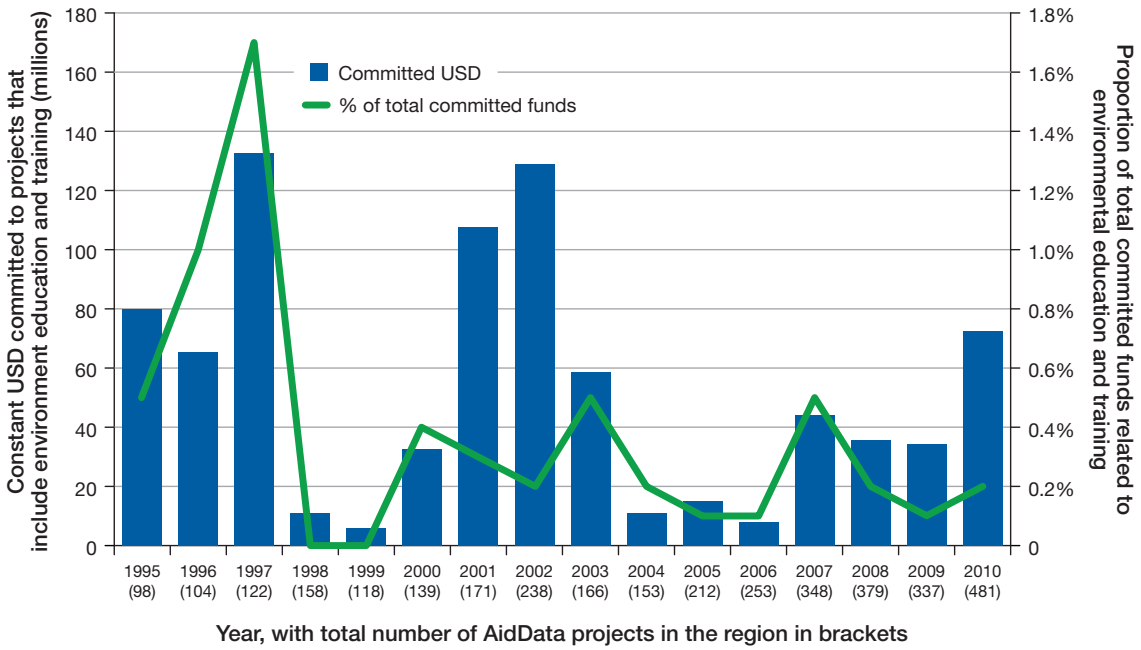


Figure 1.1: Absolute and proportional investment in environmental education in Latin America and the Caribbean by donors on AidData between 1995 and 2010 (source: Tierney et al. 2011)

In conclusion, progress is being made towards Target 1. In particular, there has been much effort in the region to build an environmental understanding, which compliments the traditionally strong awareness and education in some countries in the region about the value of nature. Although the protection and respect for biodiversity and its habitat is part of the culture and 'ethos' of some areas in the LAC region, it is unlikely that sufficient progress will be made, or quantified, to meet Target 1 by 2020.

TARGET 2: BIODIVERSITY VALUES INTEGRATED

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

"The values of biodiversity are not widely reflected in decision making, and holds true in the context of development and poverty reduction strategies. Integrating and reflecting the contribution of biodiversity, and the ecosystem services it provides, in relevant strategies, policies, programmes and reporting systems is an important element in ensuring that the diverse values of biodiversity and the opportunities derived from its conservation and sustainable use are recognized and reflected in decision making. Similarly, accounting for biodiversity in decision making is necessary to limit unintended negative consequences of local development and poverty reduction strategies." (CBD 2016c)

Balancing the imperatives of economic gain from resource extraction with conserving biodiversity is a serious challenge in rapidly developing regions such as Latin America and the Caribbean. The integration of biodiversity into economic and social development strategies requires an understanding of the precise aspects of biodiversity that support poverty alleviation, as well as other development and sector-specific activities. Such knowledge can assist mainstreaming biodiversity goals into sectoral decision making across productive sectors and governmental agencies, such as Ministries of Finance, Health, Planning and Economic Development, Agriculture, Tourism and Education, amongst others.

Within the LAC region, the fifth national reports to the CBD indicate that the majority of countries have made efforts towards carrying out biodiversity and ecosystem services valuations, and integrating them into government process. Most countries in the region also report some progress towards incorporating biodiversity and ecosystem services into planning processes, particularly within the environmental and land planning sectors. This is presents challenges in some countries, where planning happens at the municipal level. Less progress has been made within the development agenda, although several countries (Brazil, Cuba, Dominican Republic, Ecuador, Guatemala, and Nicaragua) have taken concrete actions to incorporate biodiversity values into their development policies (CBD 2015). To date, there have been few attempts within the region to integrate biodiversity values into national accounting, although countries including Brazil, Colombia, Ecuador, Guatemala and Panama have initiated projects to consider this (CBD 2015).

Investment in environmental impact assessments (EIA) can serve as an indication of the consideration of biodiversity values in development decision making, if activities are undertaken following the requirements of the law and appropriate qualitative and quantitative assessments of biodiversity are undertaken. AidData shows that with the exception of a large peak in 1997, and a smaller peak in 2002, less than 1 per cent of annual funds invested in Latin America and the Caribbean were used for EIA between 1995 and 2010 (Figure 2.1). No AidData funds were allocated to EIA in 1996, 2000 or 2001 (Tierney et al. 2011). However, it must be stated that these figures will fail to capture the significant investment in EIA - which are not available in any compiled form - which could have been made by governments and businesses in the region using their own resources.

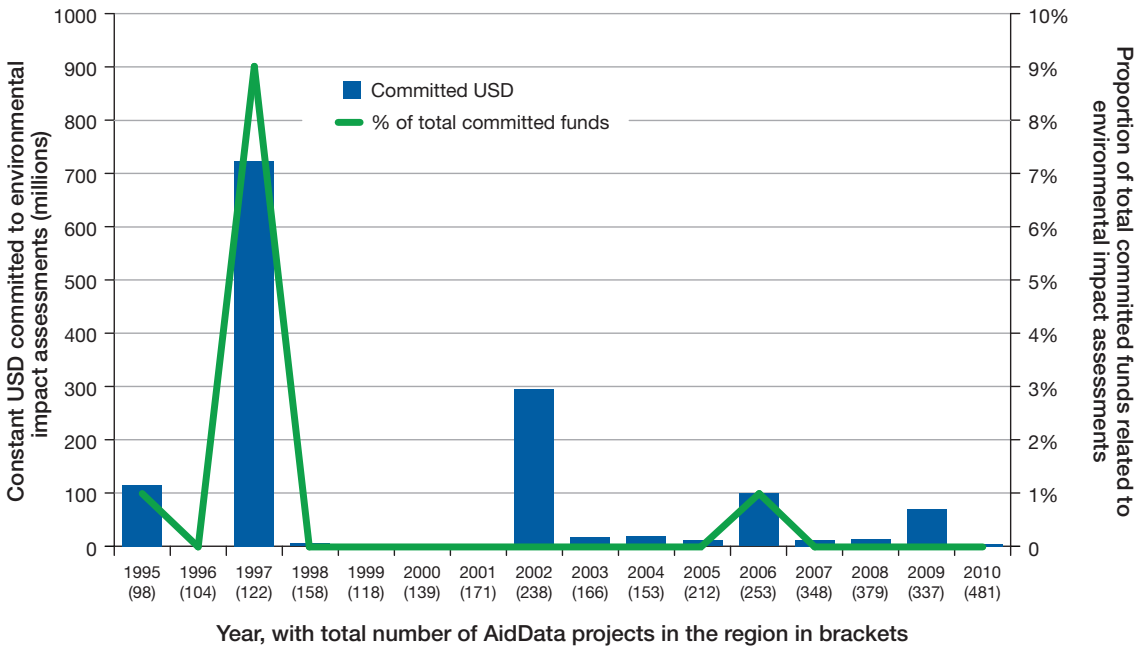


Figure 2.1: Absolute and proportional investment in Latin America and the Caribbean in environmental impact assessments by donors on AidData between 1995 and 2010 (source: Tierney et al. 2011).

In conclusion, progress is being made towards Target 2, but this will not be sufficient to meet the target by 2020. There are some initiatives in the region to make progress with this target, but these are not yet widespread. Gathering data to track progress on the target is not easy and more will need to be done in the lead up to 2020 to fully assess the achievements of the countries in the region against this target.

Box 2.1: Antigua and Barbuda.

The enactment of the Sustainable Island Resource Management Zoning Plan (SIRMZP) serves as the National Physical Development Plan (NPDP; GENIVAR Trinidad and Tobago 2011).

The SIRMZP is a critical master-planning tool that converts national environmental priorities into spatial form, which will assist in reducing development pressures on natural resources. The SIRMZP prescribes strategic development guidelines that enhance and preserve critical ecosystem functions. It also enables policy and decision makers to assess the appropriateness of development proposals in Antigua and Barbuda. The SIRMZP advocates for developments that are compatible with the surrounding habitat while maintaining environmental integrity. For instance, the SIRMZP recommends light recreational development for education in conservation and forest areas. Such development should avoid the use of hard structures.

Box 2.2: Argentina Includes Forestry Sector Activities in GDP.

Argentina is exploring the possibility to include the value of biodiversity and ecosystem services in its constitutional mandates and policies. The ecosystem services provided by the country's native forests have been quantified in relation to GDP and the activities of the forestry sector have been re-valued to be included in the new total GDP value. Thus, the share of the forestry sector in GDP has increased from 0.05 to 3.07 per cent (approximately 60 times the initial value) (Secretaría de Ambiente y Desarrollo Sustentable, República Argentina 2015).

TARGET 3: INCENTIVES REFORMED

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

"Substantial and widespread changes to subsidies and other incentives that are harmful to biodiversity are required to ensure sustainability. Ending or reforming harmful incentives is a critical and necessary step that would also generate net socio-economic benefits. The creation or further development of positive incentives for the conservation and sustainable use of biodiversity, provided that such incentives are in harmony with the Convention and other relevant international obligations, could also help in the implementation of the Strategic Plan by providing financial resources or other motives to encourage actors to undertake actions which would benefit biodiversity." (CBD 2016c)

This target aims to reduce the impact of harmful incentives, including subsidies, on biodiversity and enhance the development and application of positive incentives for better conservation practice. GBO-4 reports limited progress toward this target globally, particularly in terms of non-financial incentives. Thus far, limited action has been taken to remove harmful subsidies, although there is increasing recognition of the need to do so (SCBD 2014).

The fifth national reports to the CBD provide limited evidence of progress towards Target 3 in the LAC region. Most attention has been placed on establishing positive incentives within the region, including implementation of PES schemes, for example Ecuador's Rural Land Tax, and subsidies to small and medium farmers for the sustainable management of natural resources in Uruguay. According to the CBD, only five countries in the region (Argentina, Bolivia, Brazil, Colombia, and Guatemala) report any progress towards the reform of negative incentives, although three others (Chile, El Salvador, and Suriname) have initiated projects to identify them. Colombia reports that it has an efficient framework in place, backed up by legislation, to eliminate harmful incentives (CBD 2015). However, there are still examples of new laws being passed in the region, which promote land and agricultural management in ways, which could have negative effects on the environment and local communities.

The development mitigation hierarchy (avoid, minimize, restore, and offset) is increasingly being applied to the development of policy designed to protect biodiversity in this region. A review of environmental licencing policy frameworks in seven countries across Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela) found that all seven have a strong policy foundation in place. However, most countries place more emphasis on offsetting (the least desirable action from the mitigation hierarchy), and have less consistent requirements to avoid or minimise damage (Villarroya et al. 2014).

Costa Rica first implemented a nationalised PES programme in 1996, and is regarded as a pioneer of this type of programme. Four ecosystem services are explicitly recognised by the programme: capturing and storing atmospheric carbon, protecting water sources, conserving biodiversity and conserving scenic beauty. The programme is multi-faceted, using both legislation and economic instruments to achieve its aims. Payments are made for different actions including protection, reforestation, sustainable management and regeneration. The programme has adapted over its lifetime in response to changes in Costa Rica's economy, and limitations that have become apparent. For example, the programme moved from a 'first come first served' approach, to one, which prioritises areas of importance for conservation. Also as a result of these adaptations, the involvement of indigenous communities increased from 3 per cent of the budget allocation initially to 26 per cent in 2012. An average of 60,000 ha of forest are included in the programme annually, and forest cover is used as a key proxy indicator to monitor the success of the programme. In 2013, forest cover in Costa Rica reached 50 per cent, an increase from a low of just 20 per cent in the 1980s (Porras et al. 2013).

Some countries in the LAC region are working to implement REDD+ mechanisms. These actions are not only relevant to Aichi Biodiversity Target 3 but also to a range of other targets, including Aichi Biodiversity Targets 5, 11 and 15 (Miles et al. 2013). The intention of REDD+ is to provide incentives for countries to conserve and sustainably manage their forest resources

as a contribution towards the mitigation of global climate change, largely caused by the emissions of carbon dioxide and other green-house gases released when forests are cleared, often as a result of agricultural expansion. This in turn has positive effects on the protection of the region's biodiversity.

In addition to REDD+, individual country initiatives to develop environmental incentives have become more common, such as Brazil's Ecological VAT and Conservation Units initiative (Medeiros et al. 2011). This Ecological VAT, known as "ICMS Ecológico", is an innovative tax revenue-sharing scheme which acts as an intergovernmental tax incentive based on a "Protector-Recipient" principle, introducing environmental criteria in the calculation of 25 per cent of the natural resource transfer fares that municipalities are entitled to (Medeiros et al. 2011; ICMS Ecológico 2016; Grieg-Gran 2000).

In the marine areas, a FAO review of coastal fisheries in Latin America and the Caribbean found that government incentives and subsidies, including grants for new vessels and equipment, or for the modernisation of fleets, are contributing to the growth of the fishing industry in the area (FAO 2011). With the exception of a USD 55.9 million investment by the World Bank in an Aquaculture Development Project in 1997, AidData shows that no funding was invested in Latin America and the Caribbean in support of sustainable fisheries between 1995 and 2010 (Tierney et al. 2011). As with the EIA data in Target 2, these figures will fail to capture investments made by governments and businesses in the region using their own resources.

In conclusion, some countries in this region have made significant progress in developing and implementing positive incentives for conservation through payment for ecosystem services projects. National systems in Mexico and Costa Rica provide good examples of positive outcomes from investment in environmental incentives, such as the implementation of sophisticated PES schemes for water, carbon and other environmental services. In other countries in the region, substantial progress has been made around developing incentives for forest conservation, mainly linked to the development of the REDD+. Progress around removing negative incentives has been slow, and it is unlikely that the region will meet Aichi Biodiversity Target 3 by 2020.

Box 3.1: Colombia Environmental Policy Incentives (Secretaría General del Senado, República de Colombia 2015).

Colombia has created positive incentives to improve the national environmental legislation. These include:

- Charges for water use (L. 99/93, art. 43); the use of water for personal or public affairs will include a water tax set by national government which will be used for the payment of protection and renovation of water resources, as dictated in the "Política Nacional para la Gestión Integral del Recurso Hídrico (National Policy for the Integrated Management of Water Resources)" (Ministerio de Ambiente, Vivienda y Desarrollo Territorial, República de Colombia 2010).
- Polluter-pay principle for pollutant discharges (L. 99/93, art. 42); the direct or indirect use of the atmosphere, water or land for the disposal of waste or discarded material from agricultural, mining or industrial activities will be subject to the payment of a tax for the negative consequences of these activities.
- Fees for utilization and transport of wood.
- Payment for ecosystem services (PES) schemes (L. 99/93, art. 111) were put in place to guarantee the conservation of biodiversity and ecosystem services, and the equal and fair distribution of the benefits derived from them to contribute towards the improvement of the Colombian population's quality of life.

Regional Autonomous Corporations (CARs) hold key authorities and responsibilities for water management in Colombia. In 1997, a CAR enacted water regulations in the Eastern Antioquia region of Colombia, which, in effect, allowed businesses to pay to pollute fresh-water systems. If businesses chose not to reduce emissions, they could stay in operation, but the costs of polluting would rise steadily over time. If they reduced their pollution, the costs would come down. The new regime produced immediate positive results, where previous enforcement action in the form of fines and closing down factories, had not. Companies invested in infrastructure to treat and recycle their waste and began to use less polluting inputs and equipment. Municipal authorities were also subject to the charges, and invested in water-treatment facilities. By 2000, in the region's seven principle watersheds, organic waste had been reduced by 26 per cent, and suspended solids in fresh water had declined by 52 per cent (Ambrus 2000).

Box 3.2: Mexico Monitoring and Evaluation of Payment for Ecosystem Services Programmes.

The Federal Government of Mexico has been implementing payment for ecosystem services programmes for a number of years, aiming to create incentives to halt and reverse biodiversity loss. To evaluate the impact of these programmes, Mexico is implementing a national monitoring programme for particular aspects of biodiversity, such as ecosystem structure, functions and composition.

The National Commissions on Forestry (CONAFOR), National Commissions on Protected Areas (CONANP) and the National Commissions on Biodiversity (CONABIO) jointly operate these monitoring programmes. The data are gathered, analysed and distributed via data management systems designed and operated by CONABIO, and are collected by tools such as: photo traps, microphones in the field, observations and camera aided registries.

The data are collected from a total of 8,200 locations in the country and will be processed to showcase indicators reflecting temporal changes in composition, structure and functions of biodiversity and ecosystems.

The indicators will be used by CONAFOR and CONANP to assess the performance of land, forest and biodiversity management tools over time and adjust these tools to reflect maximum impact per investment.

Box 3.3: Dominican Republic Establishes its First Private Reserve and Sells the Caribbean's First Forest Carbon Offsets.

Through a multi-stakeholder partnership, the Dominican Republic established its first private reserve, Reserva Privada Zorzal when a consortium of private investors purchased 469 ha of land which expanded the existing protected areas of two scientific reserves, Loma Quita Espuela and Loma Guaconejo.

A Dominican non-profit organisation, Consorcio Ambiental Dominicano (CAD) recognised an opportunity to strengthen the country's environmental law (64-00) and resolution No. 012-2011 which provided a framework for the creation of private reserves. Through support from the Critical Ecosystem Partnership Fund (CEPF) and the Caribbean Natural Resources Institute (CANARI) in its role as the Regional Implementation Team for CEPF in the Caribbean region, CAD worked in close partnership with local communities, other Non-Governmental Organizations (NGOs), the government, academia and private investors to create the business plan, land use plan, biological inventory, and management plan for Reserva Privada Zorzal which were subsequently adopted by the Ministry of Environment and Natural Resources. These model documents can be replicated by other conservation-minded investors and landowners who want to register their land as a private reserve in the future.

An innovative aspect of the private reserve is that it is home to a rare bird, the Bicknell's Thrush, which migrates from the US to the Dominican Republic. This attracted support for the landmark purchase from investors in both countries. To date, USD 650,000 in private capital has been invested in the private reserve.

Another innovative sustainable funding mechanism supporting this important biological area is the country's first forest carbon offset project which allows companies to offset their climate change impacts. CAD completed the carbon quantification, initial planting system and what has become the sale of the Caribbean's first forest carbon offset credits to chocolate making companies in North America. Importantly, the carbon offset sales are a new source of income for small-scale farmers as the project is registered with international carbon standard, Plan Vivo, which has a strong emphasis on supporting sustainable livelihoods. The secured revenue from the sale of forest carbon credits was approximately USD 14,000 in one year, expected to yield at least USD 250,000 within 10 years.

TARGET 4: SUSTAINABLE CONSUMPTION AND PRODUCTION

By 2020, at the latest, Governments, businesses and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

"The unsustainable use or overexploitation of resources is one of the main threats to biodiversity. Currently, many individuals, businesses and countries are making efforts to substantially reduce their use of fossil fuels, with a view to mitigating climate change. Similar efforts are needed to ensure that the use of other natural resources is within sustainable limits. This is an integral part of the Vision of the Strategic Plan." (CBD 2016c)

Target 4 seeks to keep the use of natural resources within sustainable limits and improve production methods to make them more sustainable. Natural resources exported and produced within the LAC region, including crops, minerals, metals and fossil fuels, are significant contributors to economies across Latin America and the Caribbean (World Integrated Trade Solution 2013). However these industries are placing significant pressures on habitats and biodiversity, with land facing increasing pressures from food production, cattle and bioenergy production (Magrin et al. 2014). The need for sustainable land management is reflected in a focus on sustainable production over sustainable consumption in the fifth national reports to the CBD. Fifteen countries across the region report having policies in place to promote sustainable use and production, including certification schemes, organic farming, and regulation of the fishing industry. There is, however, scattered information available about the impacts of such policies, and the region is not on track to keep the use of natural resources within sustainable limits by 2020 (CBD 2015). Latin America and the Caribbean are also working to develop National Sustainable Consumption and Production programmes, with the support of UNEP.

The Human Appropriation of Net Primary Production (HANPP) is one way to measure the impact of human consumption on the world's biotic resources. HANPP is an indicator that assesses the extent to which biomass harvest and land use change affect flows of trophic energy (biomass) in ecosystems, namely net primary production (NPP), a key process in the Earth system (Haberl et al. 2013). In 2005, HANPP in Latin America and the Caribbean amounted to 17 per cent of the potentially available Net Primary Production (NPP). Whilst this is still below the global average of 23 per cent (Krausmann et al. 2013), there has been a consistent increase in HANPP in the region since 1960 (Figure 4.1). The greatest increases in HANPP results from an expansion or intensification of croplands and grasslands in the region, and human induced fires also contributed significantly to HANPP in Latin America and the Caribbean between 1960 and 2005 (Figure 4.2).

Green tea plantation, Colombia

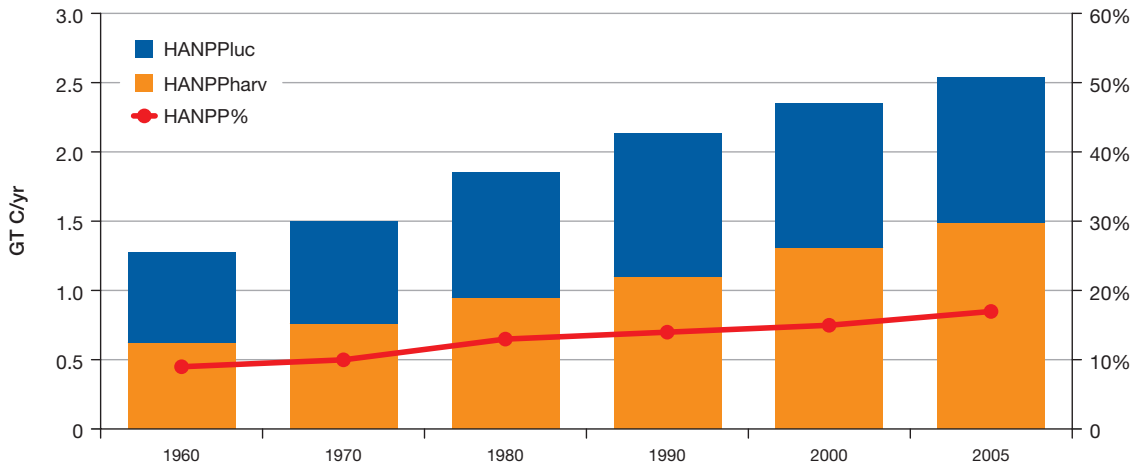


Figure 4.1: Human Appropriation of Net Primary Production (HANPP) in Latin America and the Caribbean, an aggregated indicator of land use intensity. It measures to what extent land conversion ($HANPP_{luc}$) and biomass harvest ($HANPP_{harv}$) alter the availability of net primary production (biomass) in ecosystems. Measured in GtC/yr and % of potentially available NPP (HANPP%) (source: Krausmann et al. 2013).

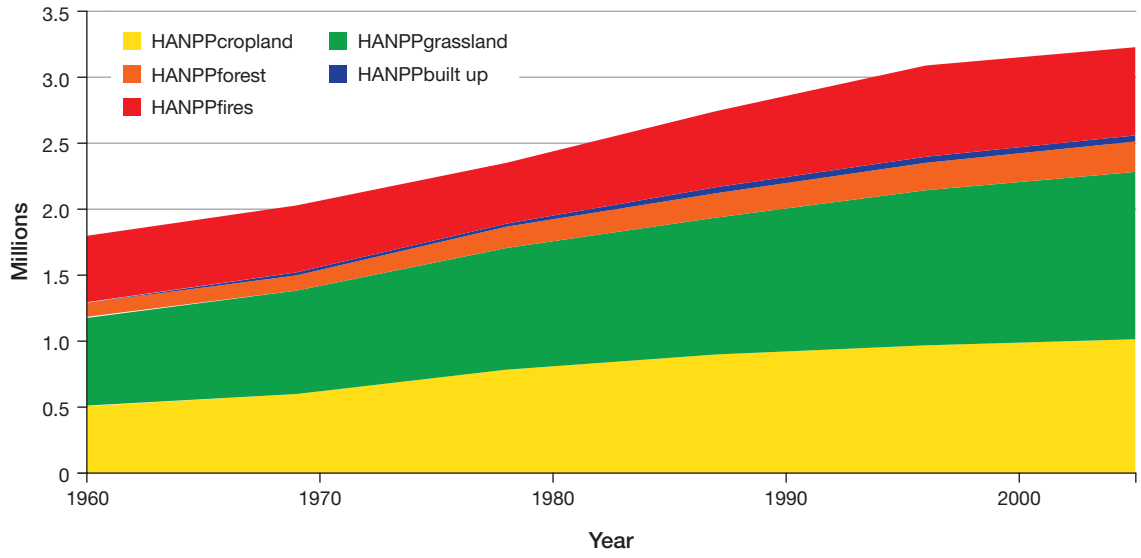


Figure 4.2: Human Appropriation of Net Primary Production (HANPP) in Latin America and the Caribbean by land use type (cropland, grassland, forest, built up land) and due to human induced fires in Gt C/yr (source: Krausmann et al. 2013).

Another way to measure impact is the Ecological Footprint (EF), which is a measure of the biocapacity required by a country or region to sustain its consumption and production patterns (Global Footprint Network 2012). The global EF has been rising steadily for the past 50 years, with a slight decrease of 3 per cent between 2008 and 2009 (Figure 4.3). This was due mostly to a decline in fossil fuel demand and, therefore, a decrease in carbon footprint (WWF 2014). In Latin America and the Caribbean, between 1961 and 2011 there was a slight upward trend in EF per capita, with an increase of 0.03 global ha per person over that time period (Figure 4.3) (Global Footprint Network 2012), and the per capita EF is similar to global levels (Figure 4.3).

In contrast to the global pattern of consumption, in which carbon has been the largest contributor to the global EF since 1961 (Figure 4.4a), in Latin America and the Caribbean, grazing land and cropland have historically been the major components of the total EF from consumption (Figure 4.b). Carbon consumption has grown rapidly over this period however, and in 2007 carbon became the region's largest contributor to the ecological footprint (Figure 4.4b). There are examples of the human footprint being downscaled to individual nations in South America, for example in Colombia (Etter et al. 2011).

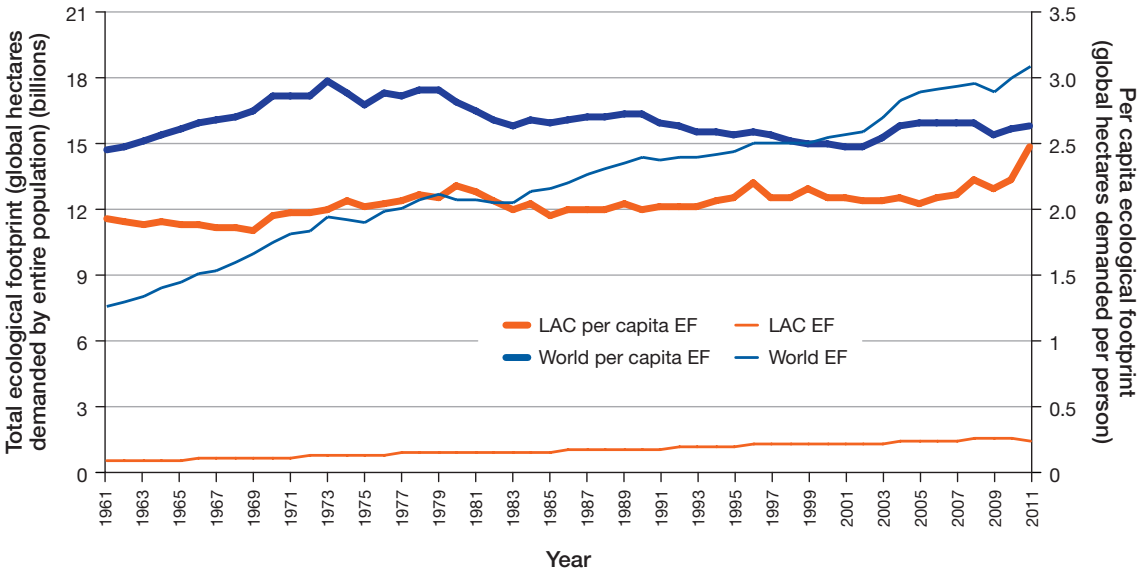


Figure 4.3: Combined graph showing the total and per capita Ecological Footprint (EF) for the World and Latin America and the Caribbean between 1961 and 2010 (source: Global Footprint Network 2015). EF per capita, measured in global ha demanded per person, reflects the goods and services used by an average person in the region, and the efficiency of the resources used to provide those good and services (WWF 2014).

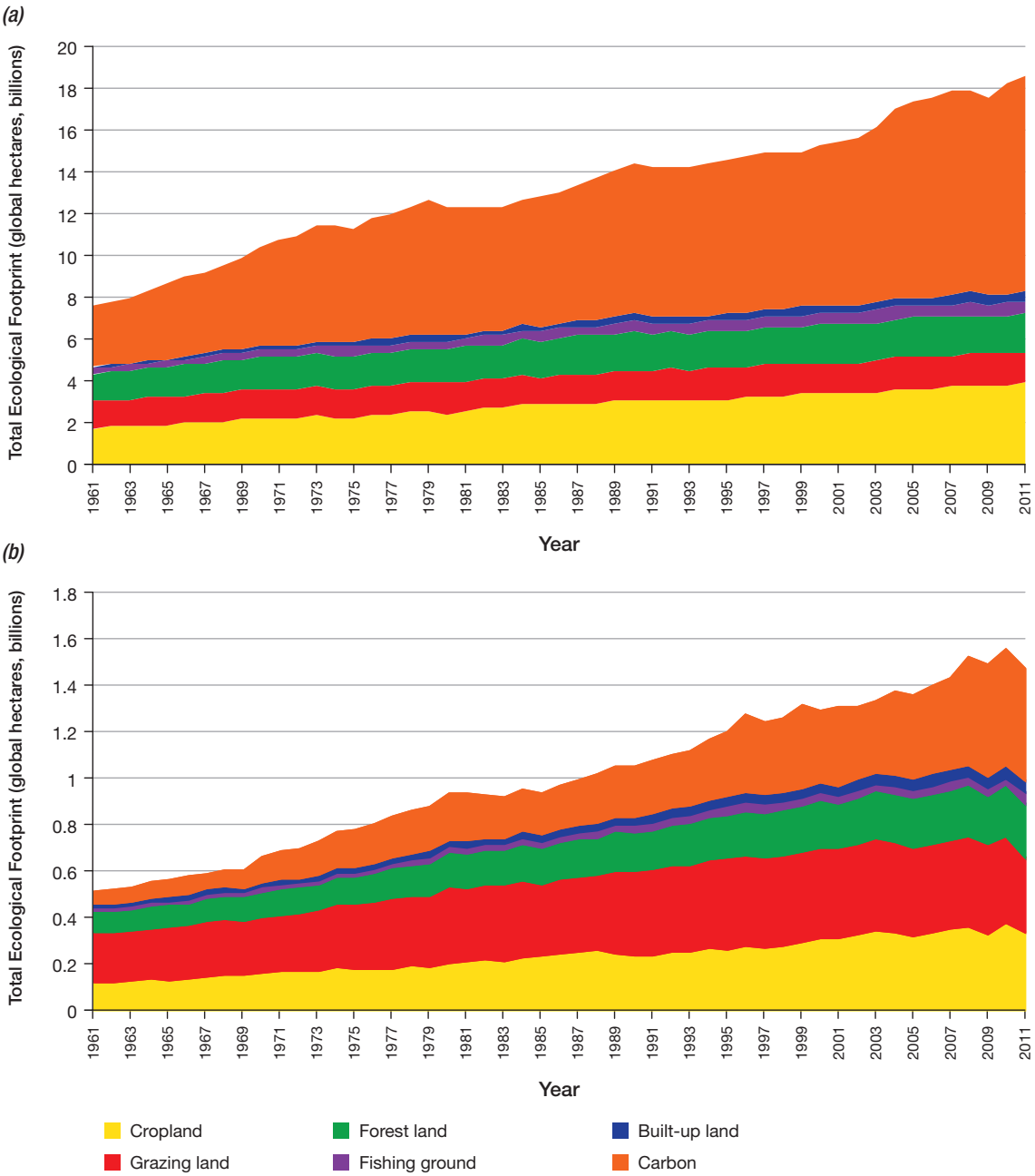


Figure 4.4: Area chart showing the Ecological Footprint by component (a) globally, and (b) in Latin America and the Caribbean (1961-2011) (source: Global Footprint Network 2015).

The LAC region supplies 27 per cent of global biofuels. Over 220 organisations working in biofuel production and processing in the region have signed up for voluntary certification schemes, however it is not clear that this is sufficient to ensure the sustainability of the industry (Bailis et al. 2015). Although conversion of land-use to growing sugarcane or soy beans for biofuels (often in conjunction with animal fodder) does not necessarily have a direct impact on biodiversity in the region, it may have a substantial indirect impact by displacing livestock breeding which can in turn lead to deforestation for cattle pasture (Janssen & Rutz, 2011).

In conclusion, the LAC region has been developing rapidly over the past decades and consequently increasing its global footprint and placing challenges on sustainable consumption and production. However, the region has implemented some innovative actions for reducing its footprint – for example, the extensive use of biofuel and innovative production and design practices. These innovations and the dynamic nature of the region offers hope that the development pathway can become more sustainable in the lead-up to 2020.

Box 4.1: The Sustainable Agriculture Network Standard and Rainforest Alliance Certification.

The Sustainable Agriculture Network (SAN) Standard sets out the requirements for certification of farms by the Rainforest Alliance. Requirements are grouped under ten principles: social and environmental management system; ecosystem conservation; wildlife protection; water conservation; fair treatment and good working conditions for workers; occupational health and safety; integrated crop management; soil management and conservation; and integrated waste management. In Latin America and the Caribbean, certificates have been awarded for crops including coffee, bananas, palm oil and cattle.

Latin America and the Caribbean accounts for over half (58 per cent) of certificates awarded, and 26 per cent of certified land globally. Seven of the top ten countries by number of certificates awarded are in Latin America and the Caribbean (Guatemala, Colombia, El Salvador, Chile, Ecuador, Brazil and Costa Rica). Brazil has the third largest area of land under certification of any country (after Côte d'Ivoire and Kenya), with 235,586 ha under certification distributed among 339 farms, most of which are coffee growers (Milder and Newsom 2015).

Box 4.2: Quantifying Carbon Emissions by Clean Production Agreements (CPA), Chile.

In 2010, the Chilean National Committees of Clean Production carried a national evaluation to quantify carbon emissions from sectors that have previously agreed to be under the CPA. The assessment compared carbon emission scenarios before and after the agreement. Results showed that the 16 sectors evaluated had reduced their emissions with 4 million tonnes of carbon. Based on the results, the Chilean government launch a carbon emission monitoring system in 2013, covering all the sectors under CPA. The monitoring system aims to inform the contribution of the Chilean productive sector to international targets of sustainable production, and will help to achieve the goals set by Aichi Biodiversity Target 4.

TARGET 5: HABITAT LOSS HALVED OR REDUCED

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation are significantly reduced.

"Habitat loss, including degradation and fragmentation, is the most important cause of biodiversity loss globally. Natural habitats in most parts of the world continue to decline in extent and integrity, although there has been significant progress to reduce this trend in some regions and habitats. Reducing the rate of habitat loss, and eventually halting it, is essential to protect biodiversity and to maintain the ecosystem services vital to human wellbeing." (CBD 2016c)

Habitat change is the primary cause of biodiversity loss globally, and in the LAC region habitat alteration and transformation is identified as the greatest risk to biodiversity, as habitat fragmentation, reduction and loss is causing a biodiversity crisis (UNEP 2010). The fifth national reports to the CBD for the region focus on forests and marine habitats, with very little information about other ecosystems. The national reports present a variable picture of progress, with a reduction in the rate of deforestation reported by Argentina, Brazil, Colombia, Cuba, Ecuador and Mexico, while Costa Rica, Nicaragua and Panama report that forests are recovering, at least in some areas (CBD 2015). However, other countries in the region have no available or scattered information. There has been considerable work investigating past and present patterns of forest loss in the lowlands and Andean portions of other countries (Etter et al. 2006). Moreover, dry tropical rainforest loss has been observed throughout the region (Leadley et al. 2014). Loss has also been seen in the Mediterranean forest in central Chile, with a national report showing an average annual decline of 0.5 per cent per year between 2001 and 2013 (Ministerio del Medio Ambiente, Chile 2014).

FAO's 2014 report on the 'State of the World's Forest' identifies Latin America and the Caribbean, as well as Europe, as the regions with most forest cover (25 per cent each) (FAO 2014b). Forest cover in South America is estimated at 864,351,000 ha, 49 per cent of the land area. For Central America this figure is 19,499,000 ha, 38 per cent of the land area (FAO 2014), and forest cover in the LAC region as a whole constitutes around 45 per cent of land area. Analysis of remotely sensed data by Hansen et al. (2013) indicates that six per cent of forest cover was lost in Latin America and the Caribbean between 2001 and 2013 (Figure 5.2). Annual rates of forest loss fluctuated over the period, with the highest annual loss recorded as 61,000 km^2 in 2004 (0.55 per cent of 2000 forest cover), and the lowest annual loss was 40,000 km^2 in 2013 (0.37 per cent of 2000 forest cover). These forest losses are in line with trends in forest extent reported by the FAO Global Forest Resources Assessment, which indicates forest cover loss of nine per cent between 1990 and 2015 in the LAC region (FAO 2015c).

International bodies such as the United Nations Framework Convention on Climate Change (UNFCCC) and the CBD have recognized the importance of the multiple services and functions provided by forests, and have initiated efforts to address the impacts of, and to reduce, forest loss and degradation (Miles et al. 2013). Many countries in the LAC region are working to develop policies to help address the drivers of deforestation, including the conversion of land for agriculture and development (Miles et al. 2013).

In preparation for REDD+ implementation, many countries have developed, or are developing, national REDD+ strategies or action plans, which describe how emissions will be reduced, and/or how forest carbon stocks will be enhanced, conserved or sustainably managed. LAC countries with significant areas of forest cover that are preparing to participate in REDD+, through a variety of national and international mechanisms include; Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay and Peru (Sanhuenza and Antonissen 2014). As well as REDD+, actions taken across the region in support of Target 5, include monitoring programmes and implementation of conservation strategies.

At the national scale, progress towards reducing habitat loss can be seen most clearly in Brazil and Colombia. The IPCC Fifth Assessment Report noted a 36 per cent reduction in the rate of deforestation in the Brazilian Amazon between 2005 and 2009 (Magrin et al. 2015). However, while the Amazon in Brazil remains mostly contiguous, the Brazilian Atlantic Forest has been dramatically fragmented and is now largely made up of forest patches under 1,000 ha. Reducing fragment areas and increasing the distance between them generally reduces the abundance of biodiversity and the capacity for carbon storage in all forest types (Haddad et al. 2015). Fragmentation caused by logging and vegetation clearance is also causing severe environmental damage in Chile's temperate forests (Echevarría et al. 2007). Studies suggest that if fragmentation process continues at the current rate, the ability of the remaining forest to maintain their original levels of biodiversity and support ecological process will be significantly reduced (Newton 2007).

Figure 5.1: Tree cover density in the Latin America and Caribbean region (map produced by UNEP-WCMC using data from Hansen et al. 2013).

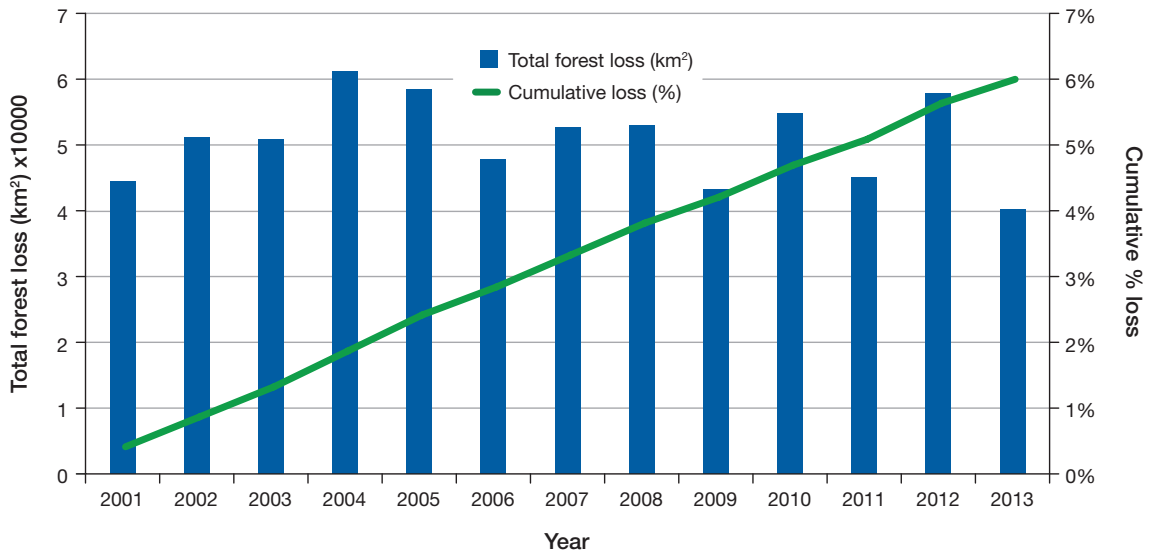


Figure 5.2: Changes in at least 10% tree cover density in the Latin America and the Caribbean region (1990-2013) compared to 2000 tree cover, blue bars represent annual forest loss and the grey line represents cumulative loss. Data are from global Landsat imagery at 30m spatial resolution. Version 1.1 was used which includes a new 2013 loss layer and updated 2011 and 2012 layers. A threshold of greater than 10% tree cover was used to remove uncertainty in forest definition around areas with sparse tree cover. Trees are all vegetation taller than 5m in height. Forest loss is a stand-replacement disturbance or a change from forest to non-forest state (source: Hansen et al. 2013).

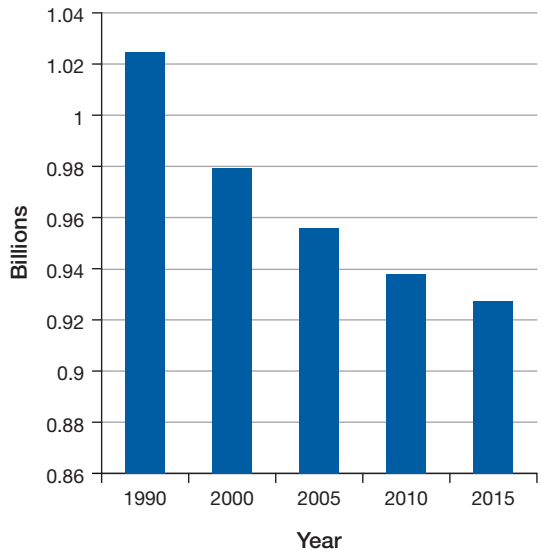


Figure 5.3: Total forest area in Latin America and the Caribbean (1990-2015) (source: FAO 2015c).

Around 12 per cent (22,000km²) of the world's mangrove forests are also found in the Caribbean (Spalding et al. 2010). Mangrove forest extends from Baja California in Mexico to the north of Peru on the Pacific coast, and from the Gulf of Mexico to Brazil's southern state of Rio Grande do Sul, in the Atlantic (CONABIO 2009). Giri et al. (2011) used Global Land Survey (GLS) data to map distribution and extent of global mangroves validated using and GIS[2] data and published literature, and report that the remaining area of mangroves worldwide is lower than previously reported by the FAO. The study reports that South America account for approximately 11 per cent of world mangrove extent, with the largest mangrove areas in Brazil and Mexico; 962,683 ha and 741,917 ha respectively.

[2] *Geographic Information Services (GIS) software*

Trends in mangrove forest cover in the LAC region are hard to assess accurately. Various studies and datasets use different metrics and sources to provide estimations of mangrove area and change in mangrove forest cover. The FAO Global Forest Resources Assessment data shows that mangrove extent increased in Latin America and the Caribbean between 2000 and 2015 (Figure 5.4) (FAO 2015c). These data are based on a combination of information provided from in-country reports and remote sensing data, and as with many datasets based on country reporting, there associated error in estimations should be considered. A study by Valiela et al. (2001) using country data from LAC countries which had multilayer records available found evidence of increase in mangrove are due to restoration initiatives in some countries, such a Belize, Cuba and Jamaica. Spalding et al. (1997) reported a 257 km² increase in area due to mangrove plantations, which match positive trends reported by FAO (2015c). These results are at variance with older studies that found losses of mangrove cover. For example, Polidoro et al. (2010) found that rates of mangrove area loss in the Caribbean sub-region were the second highest in the world, with around 24 per cent of mangrove area lost over 25 years.

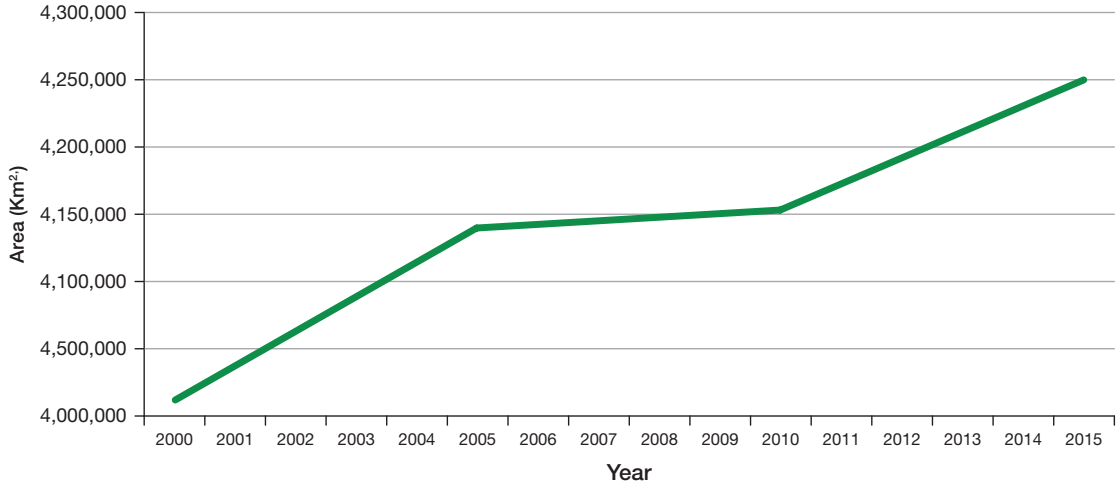


Figure 5.4: Total mangrove area in in Latin America and the Caribbean according to the FAO State of the World's Forests report (2000-2015) (source: FAO 2015c) (note: Barbados and Nicaragua are missing data for 2000 - as they have the same mangrove area for every subsequent year the same amount was entered for 2000).

The LAC region also hosts extensive areas of woodland savannahs, which are highly biodiverse. The Cerrado Region in Brazil has the largest extent of woodland savannah in South America, and is the most biodiverse savannah in the world. Rapid expansion of agriculture in the region has made it the largest producer of beef and important cash crops (World Bank 2015). Analysis of land cover by Beuchle et al. (2015) found that the net annual vegetation cover loss in the Cerrado was 0.44 per cent in the 2000s, a reduction from 0.79 per cent in the 1990s. In Colombia, high rates of habitat transformation and land use change can be seen in the savannahs of the Orinoco region and in the Llanos Orientales region (Romero-Ruiz et al. 2011; Etter et al. 2011). Between 1987 and 2007, 14 per cent of the Llanos Orientales study area underwent land use or land cover change, with greater loss of flooded savannah habitat linked to the expansion of palm oil plantations, growing from 31 km² in 1987 to 162 km² in 2007 (Romero-Ruiz et al. 2011).

Large and important wetlands are also found in the region. The Wetlands Extent Index uses a methodology, which combines over 1,000 existing datasets to assess broad global and regional trends in wetland cover (Dixon et al. 2016). Globally, the index declined by 31 per cent between 1970 and 2008. This study uses the Neotropical region (broadly equivalent to LAC) for analysis, but an accurate trend for this region could not be created as there was insufficient data (Dixon et al. 2016, Mosquera et al. 2015).

In conclusion, this region still contains huge areas of natural habitats, but many of these are shrinking due to human pressures, such as conversion for agricultural and urban development. Innovative policies around forests in the region have helped slow the rates of forest loss, particularly in the Amazon basin and in the region's mangrove forests. Other habitats, especially the savannah woodlands, are – however – being rapidly lost. In general, a lack of consistent and accurate data sources make it difficult to assess progress towards Target 5 confidently.

Box 5.1: Loss of Mangroves in Antigua and Barbuda.

Mangrove extent in Antigua dropped sharply in the decade to 2000, as a result of anthropogenic pressure on the coastline, particularly from development linked to the tourism sector. Since 2000, substantial efforts have been made to restore mangroves, resulting from increased awareness of their importance in supporting the local fishing industry, as well as understanding of other intrinsic values of mangroves. However, these attempts have been hindered by the island's exposure to frequent hurricanes and storms, which have been compounding the losses. The fifth national report to the CBD reports that mangrove cover increased between 2000 and 2004, and again between 2005 and 2010, but that a sharp loss between 2004 and 2005 resulted in 2010 levels being only slightly higher than cover in 2000. Every year between 2006 and 2012 saw at least one hurricane or tropical storm affect the island (Environmental Division, Government of Antigua and Barbuda 2014).

Box 5.2: Grenada's Forests.

Forests in Grenada are dominated by secondary forest, with only pockets of climax forest. A combination of anthropogenic pressures and natural disasters threaten the existing forest cover, including clearances for agriculture and development of the tourism sector housing, infrastructure and other commercial activities. Hurricanes, forest fires and invasive alien species are all threats to the forests and the biodiversity they contain. In 2004, hurricane Ivan had a severe impact on forest communities in Grenada. Weak public education and inadequate legislation, enforcement and monitoring have resulted in unsustainable extraction of species from the forests.

A substantial proportion of Grenada's population depend on its forests for their livelihoods, and despite these pressures, forests in Grenada are currently in a recovery phase. Replanting of mangrove forests in particular has achieved over 50 per cent restoration of mangrove ecosystems (Government of Grenada 2014).

Box 5.3: Modelling Land Use Change in Brazil.

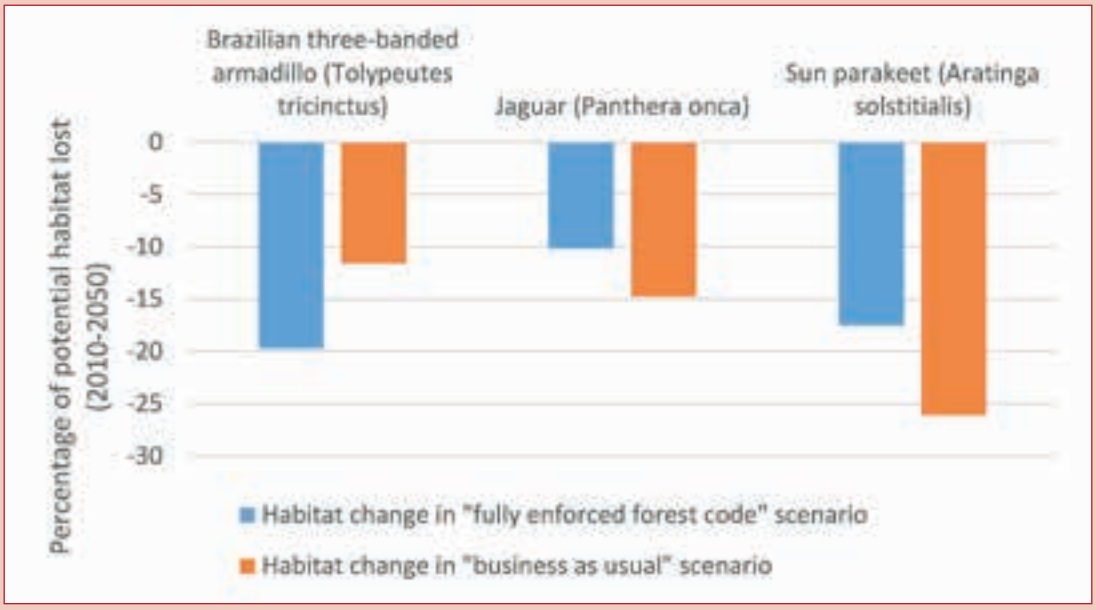
Brazil is committed to reducing its emissions from deforestation and to conserving its rich biodiversity. The policy options for reducing deforestation include the recently-revised Forest Code and various approaches to its implementation. Through the REDD-PAC project, an economic land use model GLOBIOM-Brazil has been used to model implementation of its different provisions, which differ among biomes, for different levels of enforcement. The results give projections of land use change over 2010-2050, which have been used to assess potential biodiversity impacts.

Focusing on areas identified by the Ministry of the Environment as "extremely important" for biodiversity (MMA 2007) in a scenario of full enforcement of the Forest Code, the analysis showed that:

- Relatively little conversion is projected for the remaining natural areas in the highly protected Amazonia and Mata Atlantica, suggesting positive biodiversity outcomes in these biomes.
- The Caatinga, Cerrado and Pantanal biomes face greater potential land use change pressure. 17 per cent of the area identified as "extremely important" for biodiversity in the Caatinga may face conversion.

Projected land use change under different scenarios can also be used to assess potential impacts on threatened species and compatibility of these scenarios with achieving Aichi Biodiversity Target 12 on reducing extinction of threatened species. Such analysis could also inform assessments of species threat status.

Projected impacts on the habitats of threatened species differ depending on whether or not there is full enforcement of the Forest Code. Some species, mainly in Caatinga and Cerrado, are projected to lose a large proportion of their potential habitat. The model projects a larger loss under full enforcement of the Forest Code for some species, because of displacement of land-use change pressures from Amazonia to other biomes.



Habitat loss projected for three of Brazil's threatened species under different scenarios

Three banded armadillo

Jaguar

Sun parakeet

Box 5.4: Measuring Change in Marine Systems in the Caribbean.

The Coral Reef Watch programme of the National Oceanic and Atmospheric Administration (NOAA) uses satellite monitoring to provide near-real-time data on reef environmental conditions at 5 km or 50 km resolution, including temperature and acidification. Monitoring these conditions enables identification of sites where bleaching is likely to occur, allowing bleaching response plans to be put in place promptly (NOAA 2016). A similar tool to predict the risk of coral disease is under development (Mumby et al. 2014).

CONABIO has in place a Satellite-Based Ocean Monitoring System to provide information at a 1 km resolution for the analysis of patterns in critical oceanographic processes, such as marine productivity, harmful algal blooms, and thermal stress in coral reefs in the Gulf of Mexico, northeastern Pacific Ocean, and western Caribbean Sea (Cerdeira-Estrada and López-Saldaña 2011).

Climate change data for the Caribbean are also provided by The Caribbean Community Climate Change Centre[3] at 50km resolution. The website includes a climate modelling tool which can be used to show predicted changes in temperature, precipitation, humidity and wind speed across the region to 2100 (Mumby et al. 2014).

Box 5.5: Monitoring Forest Change in the Great Chaco Region.

(source: Caballero et al. 2014)

Forest cover change monitoring in the Gran Chaco region in South America was undertaken using visual interpretation of Landsat satellite images, taken at monthly intervals throughout 2013. The Gran Chaco Americano is a region of forest habitat with exceptional biological diversity and unique ecological process. It covers an area of 1,066,000 km2 in four LAC countries; most of the region is in Argentina, followed by Bolivia, Paraguay and in smaller proportion, Brazil (TNC 2005).

Changes in land use were detected in 502,308 ha in 2013, the equivalent to a deforestation rate of 1,376 ha per day. Paraguay had the highest proportion of land use change recorded with 236,869 ha, followed by Argentina with 222,475 ha, and then Bolivia with 42,963 ha. According to the spatial distribution and trend of deforestation identified at the provincial, departmental, and municipal level, the Boqueron and Alto Paraguay departments had the highest rates of deforestation recorded around the Gran Chaco region. In Argentina, deforestation is concentrated in the provinces of Santiago del Estero, Salta and Chaco; whereas in Bolivia the province with the largest area of change was Santa Cruz. With a loss of over half a million hectares of forests in 2013, the land-use change in the Gran Chaco region is of great concern, and is primarily driven by the international demand for food, particularly meat production in Paraguay and soybean in Argentina.

[3] *www.caribbeanclimate.bz/*

TARGET 6: SUSTAINABLE MANAGEMENT OF AQUATIC LIVING RESOURCES

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

"Overexploitation is a severe pressure on marine ecosystems globally and has led to the loss of biodiversity and ecosystem structure. Harvests of global marine capture fisheries have been reduced from the unsustainable levels of a decade and more ago. However, overfishing still occurs in many areas, and fisheries could contribute more to the global economy and food security with more universal commitment to sustainable management policies. Target 6 should be regarded as a step towards ensuring that all marine resources are harvested sustainably." (CBD 2016c)

The sustainable management of natural resources, especially in marine and freshwater habitats, is critical for maintaining biodiversity but also for the provision of food to an expanding human population. People in the LAC region are heavily dependent on local marine and freshwater resources for food, and there are also important export industries around many marine fisheries.

Latin America and the Caribbean accounts for approximately 24 per cent of the global fisheries catch (Pérez-Ramírez et al. 2015). Peru is the second largest fisheries producer in the world, after China. No other fish species has yielded catches as large as the Peruvian anchoveta (Anchovy), but changing approaches to combat overfishing, together with shifting weather patterns, have resulted in great fluctuations in yearly catches. Argentina, Chile and Mexico also rank in the top twenty fisheries producers globally (Asthana 2015).

These issues, together with increasing demand for fish and government incentives, are also contributing more widely to the unsustainability of the fishing industry in Latin America and the Caribbean (FAO, 2011). Particular challenges are found in the deep water fisheries located in the southern end of the region, where the fish are very slow to mature, but also in the more productive fisheries of the cold water upwelling along the coast of western South America. Coral reef fisheries in the Caribbean are also challenged by overfishing at the artisanal level and the reefs themselves are also threatened by climate change and land-based pollution, including nutrient run-offs. Around two thirds of Caribbean coral reefs are under threat from coastal urbanisation, sedimentation, pollution from toxic substances, water acidification and overfishing (UNEP 2010).

None of the countries in Latin America and the Caribbean has reported in their fifth national reports to the CBD that aquatic stocks are sustainably managed, and only Guatemala specifically reports that overfishing has declined, although this may be a result of declining stocks and changing weather conditions rather than a response to policy or regulation. Actions taken around the region include establishing legislation and management plans, establishment of marine protected areas (MPAs), and the training of fishermen in sustainable fishing practices. Most actions have been implemented recently and for this reason, there is no evidence yet of positive impacts on fish populations (CBD 2015).

Only four per cent (around 10 fisheries) of fisheries in Latin America and the Caribbean are certified by the Marine Stewardship Council (MSC), and catch levels for MSC certified fisheries declined by one third between 2012 and 2015 (Figure 6.1). The ten MSC certified fisheries in the region have made twelve improvements in their environmental impact, the health of their target fish stocks and fisheries management practices, and have agreed to make a further 83 by 2020 (MSC 2016) (Figure 6.2). However, unstable governance and limited management information often hinders fisheries management (Pérez-Ramírez et al. 2015).

A study lead by the Humboldt Institute concluded that continental fisheries have reduced their catch by 60 per cent in recent decades. An inefficient and unsustainable management of these fisheries will most likely lead to their collapse, affecting communities who rely on the fishing industry, particularly in Colombia, Brazil and Peru. In general, continental fisheries are suffering great pressures, and the importance and impact of traditional fishing methods is being overlooked by policy and decision makers when designing sustainable use strategies for these fisheries (Lasso et al. 2011).

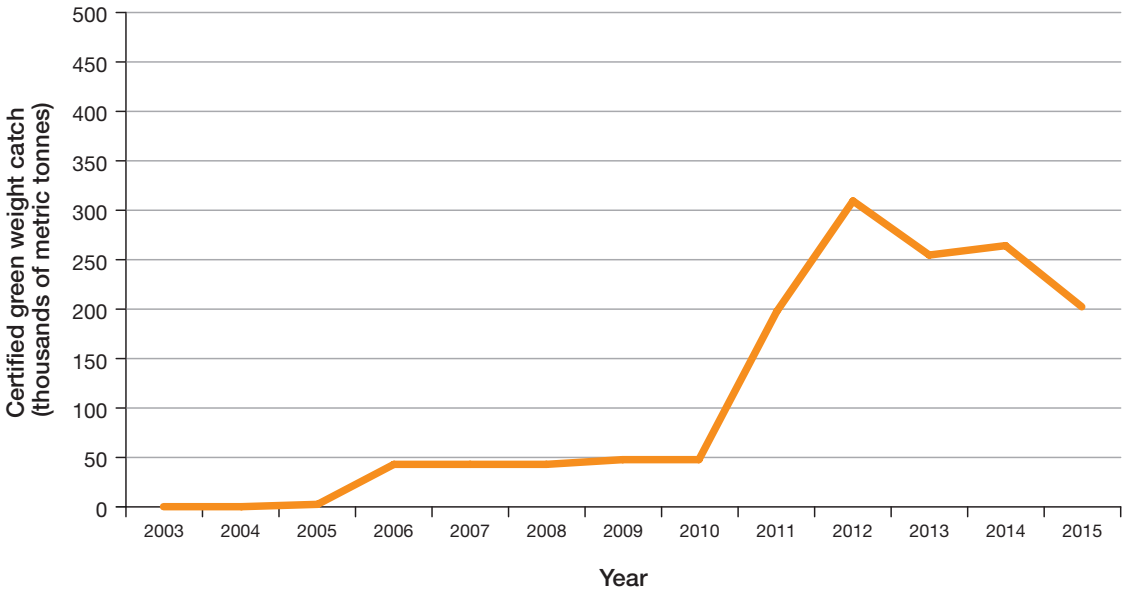


Figure 6.1: Total MSC certified catch in Latin America and the Caribbean, 2003-2015 (source: MSC 2016). All MSC fisheries assessments are carried out by accredited 3rd party certifiers, and therefore all data provided here have been generated by these companies. The MSC does monitor and correct data where possible, but cannot guarantee that the data has been validated against the most recent reports available on msc.org. Catch data collected prior to 2012 have in some cases been estimated or extrapolated based on past fisheries assessment reports in order to fill in data gaps.

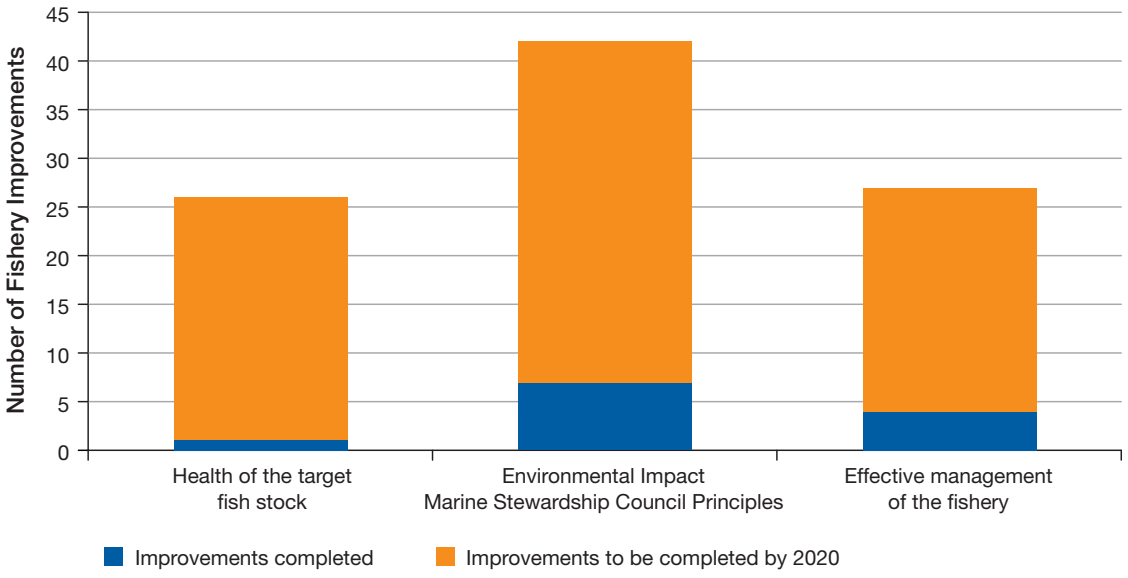


Figure 6.2: Number of fishery improvements completed and to be completed by MSC fisheries in Latin America and the Caribbean by 2020 (source: MSC 2016). There are 10 fisheries certified in Latin America and the Caribbean (as of end 2015). This includes 3 based in Argentina, 2 in Chile, 3 in Mexico, 1 in Suriname and one in the Falkland Islands (Malvinas).

In conclusion, the region is not on track to meet Target 6 by 2020, and much more needs to be done. The downturn in certification of marine fisheries in the region in recent years is of particular concern, as is the continued overfishing and illegal fishing of some of the regions fish stocks.

Box 6.1: The Patagonian Toothfish.

The Patagonian Toothfish (*Dissostichus eleginoides*) occurs in the Economic Exclusive Zones (EEZs) of Chile and Argentina as well as several sub-Antarctic islands. It grows up to 2 metres and lives for 50 years, which, combined with a relatively late sexual maturity and low fecundity, mean it is particularly vulnerable to overfishing (Lack and Sant 2001). Historically, legal catch volumes have followed a similar pattern in both Chile and Argentina, with a rapid expansion (peaking in 1992 in Chile and 1995 in Argentina) followed by nearly as rapid a decline (FAO 2004b).

Illegal, unreported and unregulated (IUU) fishing is a substantial pressure on toothfish populations; estimates of IUU for 1999/2000 range from 8.4 thousand tonnes to 33.9 thousand tonnes, compared to a reported legal catch of 25.2 thousand tonnes (Lack and Sant 2001). In response, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) established an International Catch Documentation Scheme (CDS) to monitor trade by requiring its members to document all toothfish catch (FAO 2004b). Argentina, Brazil, Chile and Uruguay are all members (CCAMLR, 2016). Catch quotas for fisheries, limits on the number of vessels working in exploratory fisheries and vessel monitoring systems (VMS) for all vessels with a licence to catch toothfish are among other conservation tools employed (Lank and Sant 2001).

More recently, although IUU remains a concern for the toothfish, estimated volumes are substantially lower, with estimates for IUU in 2007 ranging between 3.6 thousand tonnes and 5.7 thousand tonnes, approximately 16 per cent of the total toothfish trade (Lack 2008).

TARGET 7. SUSTAINABLE AGRICULTURE, AQUACULTURE AND FORESTRY

By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

"The growing demand for food, fibre and fuel will lead to increasing losses of biodiversity and ecosystem services if issues related to sustainable management are not addressed. On the other hand, sustainable management not only contributes to biodiversity conservation but also can deliver benefits to production systems in terms of services such as soil fertility, erosion control, enhanced pollination and reduced pest outbreaks, as well as contributing to the well-being and sustainable livelihoods of nearby communities engaged in the management of local natural resources." (CBD 2016c)

Agriculture, aquaculture and forestry are all significant threats to biodiversity across Latin America and the Caribbean, often driven by demand for exports. The fifth national reports to the CBD mention a variety of projects designed to increase sustainable agriculture across the region, including 'Clean Production Agreements' in Chile (Box 7.1).

Impacts from sustainable agriculture initiatives are varied, with several countries, including Belize, Ecuador, and Peru reporting an increase in sustainable agriculture, while Costa Rica reports a decrease in organic agriculture. Less information is available about aquaculture, but Belize stands out as a leading country for shrimp farm certification, and Peru provides guidelines for sustainable aquaculture within its National Aquaculture Development Plan (CBD 2015). Intensive salmon farming in Southern Chile – the second biggest salmon producer in the World - still presents important environmental challenges. In 2007, Chile produced a total of 904,000 tonnes of salmon, mollusc and seaweed through aquaculture (Buschmann et al. 2009). This intense production has caused overcrowding of farms which have been forced to use record levels of antibiotic to treat diseases (e.g. Piscirickettsiosis), causing significant impacts to marine ecosystems.

Countries may choose to incorporate sustainable practices into their National Biodiversity Strategic Action Plans (NBSAPs). For example, one of the activities in Peru's NBSAP was to strengthen the sustainable management of forest resources and wild animals by the second half of 2015 through implementing national plans and prioritising community forest management (Epple et al. 2014). There are also other elements of sustainable forest management in the region – for example a move towards Long-Term Forest Licences (Belize) and forest certification (Uruguay) are among the many programmes in place to move towards sustainable forestry, but there is little information on their impact (Forest Department, Ministry of Forestry, Fisheries and Sustainable Development, Belize 2015).

7.1 Agriculture

Rising global demand for meat and dairy products has substantially increased agricultural activity in the region. Between 2001 and 2011, poultry production in Latin America and the Caribbean nearly doubled, and production of milk, beef and pork increased by over one third, far exceeding average global increases. In 2012, the region produced 28 per cent of the world's beef, and 23 per cent of the world's poultry. Continued rapid growth in production is forecasted over the next decade (FAO 2014). This agricultural expansion leads to environmental pressures as deforestation occurs in order to grow crops, such as soybeans, as feed for livestock (Herrero et al. 2009), and highlights the need for sustainable agricultural practices.

Irrigation in the LAC region has expanded annually by an average of 250,000 ha over the past 50 years. In 2015, 15 million ha were equipped for irrigation, and 12 million ha were actually irrigated. Most irrigation utilises surface water, but there is a strip of land approximately 500 km wide and 2,500 km long, in Brazil and northeast Argentina, which is mainly irrigated from groundwater. A comparison of the withdrawal volume of groundwater for agriculture, industry and domestic water supply to the availability of groundwater found that 26 of 77 river basins studied across the LAC region face severe water scarcity for at least one month each year, and three experience water scarcity all year round. In total, 76 per cent of groundwater withdrawals across the LAC region are related to crop production (Mekonnen et al. 2015).

Box 7.1: Clean Production Agreements in Chile.

The National Council for Clean Production (NCCP) sits under the Ministry of Economy for Chile. The main instrument used by the NCCP is the Clean Production Agreement (CPA), a voluntary agreement setting out actions to be implemented by a productive industry within a specified time period. CPAs are agreed and signed by industrial organisations representing the companies in a specific sector. Under the agreements, companies receive technical assistance and training to help implement the agreed actions, and a certification scheme is in place to recognise companies that operate as set out in the CPAs. Reduction of carbon emissions is a key goal of the NCCP.

A study of 16 of the 54 CPAs implemented and certified between 2002 and 2010 estimated that each CPA had reduced carbon dioxide emissions by an average of 31.6 kilotonnes per year. By 2012, 76 CPAs had been signed (UNFCCC 2012).

Box 7.2: Sustainable Production Systems and Biodiversity in Mexico.

(source: Martha Rosas Hernández)

The Sustainable Production Systems and Biodiversity Project in Mexico supports producer associations to introduce biodiversity-friendly production practices and enables them to gain or increase access to markets that reward biodiversity-friendly goods and services. The project is being implemented by the National Commission for the Knowledge and Use of Biodiversity (CONABIO), co-financed by the Global Environmental Facility and supervised by the World Bank.

Implemented in six states in southern Mexico, the project is working on applying biodiversity-friendly production practices across seven production systems: coffee, cocoa, honey, eco-tourism, wildlife, forestry and silvopastoral systems. The agro-ecological perspective to production, coupled with the market linkages of biodiversity-friendly production, make this approach unique and adaptable to similar settings in other countries.

With more than 50 per cent of the land in Mexico being used for agricultural production, the management of natural resources with landscape approaches inevitably integrates food production and income generation with conservation of environmental assets.

Box. 7.3: National Policy for Agroecology and Organic Production - PNAPO.

The Brazilian National Policy of Agroecology and Organic Production (PNAPO) (DECREE No. 7794, 08/20/ 2012) was established with the objective to integrate, coordinate and adapt policies and programs, promote agroecological transition and organic production, contribute towards sustainable development and improve the quality of life for people through sustainable use of natural resources and the supply and consumption of healthy foods. The National Plan for Organic Production (PLANAPO) was set up for the implementation of the PNAPO, and includes multiple guidelines for producers and their organization, certification, credit expansion, technical training, fostering the conservation, management and sustainable use of resources natural; democratization of the research agenda, recognizing and strengthening the role of young people and rural women in agroecology and organic production. Between January 2014 and January 2015, the number of farmers who opted for organic production grew from 6,719 to 10,194 (51.7 per cent). The Northeast region is where there are the most organic farmers. *http://www.agricultura.gov.br/comunicacao/noticias/2015/03/numero-de-produtores-organicos-cresce-51porcento-em-um-ano.*

7.2 Aquaculture

In 2012, 20 per cent of fish production in Latin America and the Caribbean was from aquaculture. Chile is the largest producer in the region, with annual production of 0.7 million tonnes, mainly industrial production of Atlantic salmon. The majority of aquaculture production in other countries in the region is generally small-scale. Globally, it is expected that aquaculture will expand substantially to meet increasing demand for fish that cannot be met from extractive fishing due to depletion of marine resources (FAO, 2014). The World Wide Fund for Nature (WWF) and the Dutch Sustainable Trade Initiative (IDH) established the Aquaculture Stewardship Council (ASC) in 2010. The ASC aims to be a global leader in certification and labelling for responsible farmed seafood (ASC 2016). In 2014, the WWF received a grant from Sea Pact, a coalition of seafood companies in the US, for its Chilean Aquaculture Improvement Project, which seeks to move the farmed salmon industry in Chile into ASC certification (Undercurrent News 2014).

In conclusion, aquaculture has been expanding in the region, especially in southern countries. Efforts are being made to improve the sustainability of aquaculture production, especially for the salmon fisheries of Chile and Argentina, and of shrimp farming in the tropical countries of Central America.

Box 7.4: Shrimp Farming Certification in Belize.

The shrimp farming industry in Belize has taken the lead in introducing certification under the Aquaculture Stewardship Council. Belize is the first country in the world to introduce certification, and expects 75 per cent of its 13 shrimp farms (which together employ over 1,000 people) to be certified (Forest Department, Ministry of Forestry, Fisheries and Sustainable Development, Belize 2014).

Box 7.5: Law for the Promotion and Development of Aquaculture, Peru.

The Law for the Promotion and Development of Aquaculture was introduced in Peru in 2001. Under the regulations, a National Plan for Aquaculture Development is required to be approved by the Ministry of Production. Concessions are granted for the development of aquaculture in public areas, and authorisations are granted both for the development of aquaculture on private property, and for research and restocking. Legislation requires that an Environmental Certificate of the Environmental Impact Study granted by the Ministry of Production is in place before species are moved or introduced, and before aquaculture operations are established (FAO 2016a).

7.3 Forestry

Between 2005 and 2010, over 3.9 million ha of forest cover was lost in the region each year. This represents 70 per cent of the global reduction in forest cover over that period (FAO, 2014). Total annual roundwood production has steadily increased over the last decade, and FAO data show that 504 million cubic metres of roundwood were produced in Latin America and the Caribbean in 2014 (FAO 2016b).

One way of promoting sustainability within forestry is through the certification of timber. The FAO Global Forest Resources Assessments (FAO 2015c) contains detailed information on certification, including country reports with detailed assessments of deforestation and land cover, which allows the analysis of the sustainability of forest management techniques.

In addition, the Forest Stewardship Council (FSC) has been working in Latin America and the Caribbean since 1993, originally in Costa Rica, and shortly followed by Brazil in 1995. Both the area of certified sustainably managed forests, and the number of countries reporting certification has increased steadily until a peak in 2010 and have remained reasonably stable since then. In July 2015, 12.8 million ha of land were under an FSC certification (Figure 7.1). Nearly half of the certified land in the region (6.1 million ha) in July 2015 was within Brazil (FSC, 2016). Latin America has the second largest share of FSC Forest Management (FM) certificates in the world, after Europe. The FM certification confirms that an area of forest is being managed in line with the FSC principles and criteria, as assessed by an FSC accredited certification body, and these certifications are valid for five years (FSC 2016).

In the LAC region, Mexico has the largest per centage increase in FSC Certificates (18 per cent) followed by Chile (15 per cent), although Panama and Chile have seen the highest growth in areas of forest certified under the FSC, with the area of forest certified by the FSC (ha) growing by 139 per cent for Panama and 49 per cent for Chile between 2013 and 2015 (FSC 2015). The number of Chain of Custody (CoC) certifications, which trace wood from the forest through all stages of the production and distribution process, have grown steadily from 539 in 2010 to 1,450 in 2015 (FSC 2016), improving the sustainability of timber harvesting and marketing in the region.

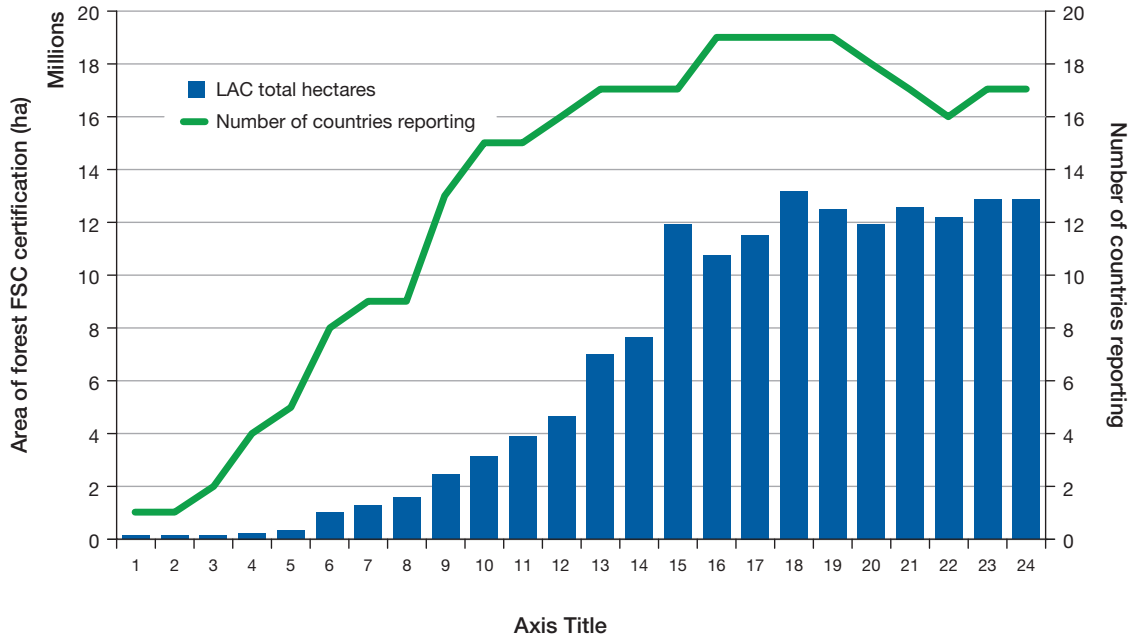


Figure 7.1: Area of forest with FSC certification, and the number of countries reporting sustainable forest management in Latin America and the Caribbean (1993-2015) (source: FSC 2016).

In conclusion, some progress is being made to achieve this target across the region. Efforts are in place to developed and maintain appropriate data bases and monitoring techniques to improve the sustainable management of agriculture, aquaculture and forestry. However, these efforts and the progress made seem insufficient to fully meet the target by 2020. There has also been some concerning stabilisation of the uptake of the certification standards in the region, and much of the production of materials remains uncertified.

TARGET 8: POLLUTION REDUCED

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

"Nutrient loading, primarily of nitrogen and phosphorus, is a major and increasing cause of biodiversity loss and ecosystem dysfunction, especially in wetland, coastal and dryland areas. As nitrogen and phosphorus are often limiting nutrients in many ecosystems, when they are present in excessive quantities they can result in rapid plant growth which can alter ecosystem composition and function. Humans have already more than doubled the amount of "reactive nitrogen" in the biosphere, and business-as-usual trends would suggest a further increase of the same magnitude by 2050." (CBD 2016c)

Agriculture, urbanisation, and mining are significant sources of pollution in Latin America and the Caribbean. Nearly 80 per cent of the population of Latin America and the Caribbean live in cities, the highest proportion of any region in the world (UN Habitat, 2012). Urban areas are particularly susceptible to outdoor air pollution, and over 100 million people living in the region are exposed to air pollution levels that exceed World Health Organization (WHO) air quality guidelines (UNEP 2016a). In 2014, the XIX Forum of Ministers of Environment of Latin America and the Caribbean adopted a Regional Action Plan on Air Pollution, with specific objectives including establishment of national standards, monitoring and evaluation programmes and national action plans for air quality (Clean Air Institute 2014). The quality of fresh water, in both rural and urban areas, is a key issue across Latin America and the Caribbean. Infrastructure is available to treat just 35 per cent of waste water, and in practice only 20 per cent is treated effectively (Mejia 2014). Cities across the region, including Buenos Aires (Argentina), Sao Paulo (Brazil), Bogota (Colombia), Mexico City (Mexico), and Lima (Peru), have been planning substantial development of wastewater treatment, but such investments have typically been delayed for many years due to institutional and policy framework challenges (Mejia 2014).

Pollution resulting from nutrient run-off from crops fields and farming activities is also a serious concern in the LAC region, including its downstream effects on marine and coastal areas. Around 18 million ha of land across the region are irrigated for agriculture each year, and in 2008, production and consumption of food and energy resulted in an average reactive nitrogen loss of around 36 kg of nitrogen per inhabitant per year. This is around 7.5 kg per person per year higher than the global average, with the difference being mostly attributable to food production (Figure 8.1). Use of nitrogen and phosphorus in agriculture varies, with different levels of nutrient loading across the region. No areas have a nitrogen or phosphorous load greater than 250,000 kg per hectare, however higher nitrogen loading (1,000–250,000 kg per hectare) is seen in Mexico, Cuba and southern Brazil, and phosphorous loading occurrences are also seen in southern Brazil (Figure 8.2). Other negative effects caused by agricultural intensification include pollution through release of pesticides, herbicides and organic waste into the environment (UNEP 2016a), and salinization resulting from irrigation in Argentina, northeast Brazil, Cuba, Mexico and Peru (Mejia 2014).

It has been estimated that 96.7 billion m^3 of water is affected by nitrogen-related pollution annually in the LAC region; 46 per cent as a result of crop production, 17 per cent by industrial production and 37 per cent resulting from domestic water supply (Mekkonen et al. 2015). Only 7 per cent of the total volume of water polluted is estimated to be a result of production for exports. Maize, sugarcane and wheat together account for 52 per cent of all fresh water pollution from crop production in the LAC region (Mekkonen et al. 2015).

Unfortunately, there is limited information reported in the fifth national reports to the CBD on actions taken to address Target 8. Just two countries in the region (Argentina and Dominica) report any improvement in pollution levels and only eight countries report any direct actions to tackle pollution (CBD 2015).

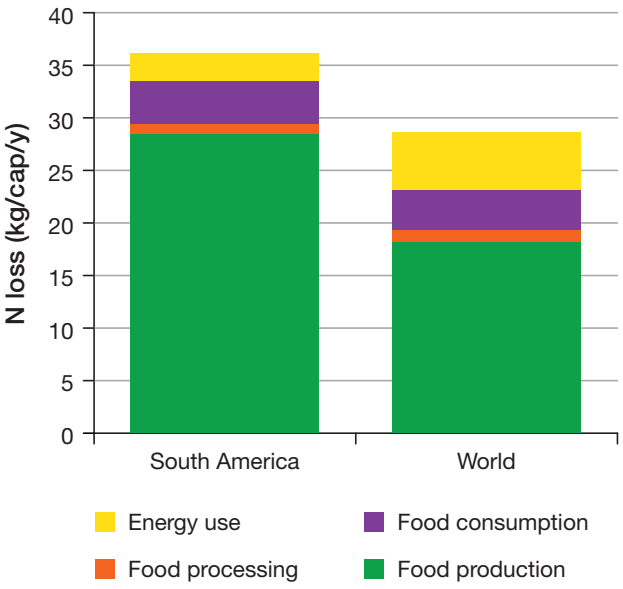


Figure 8.1: Average loss of reactive nitrogen per inhabitant in 2008 (source: International Nitrogen Initiative 2014a)

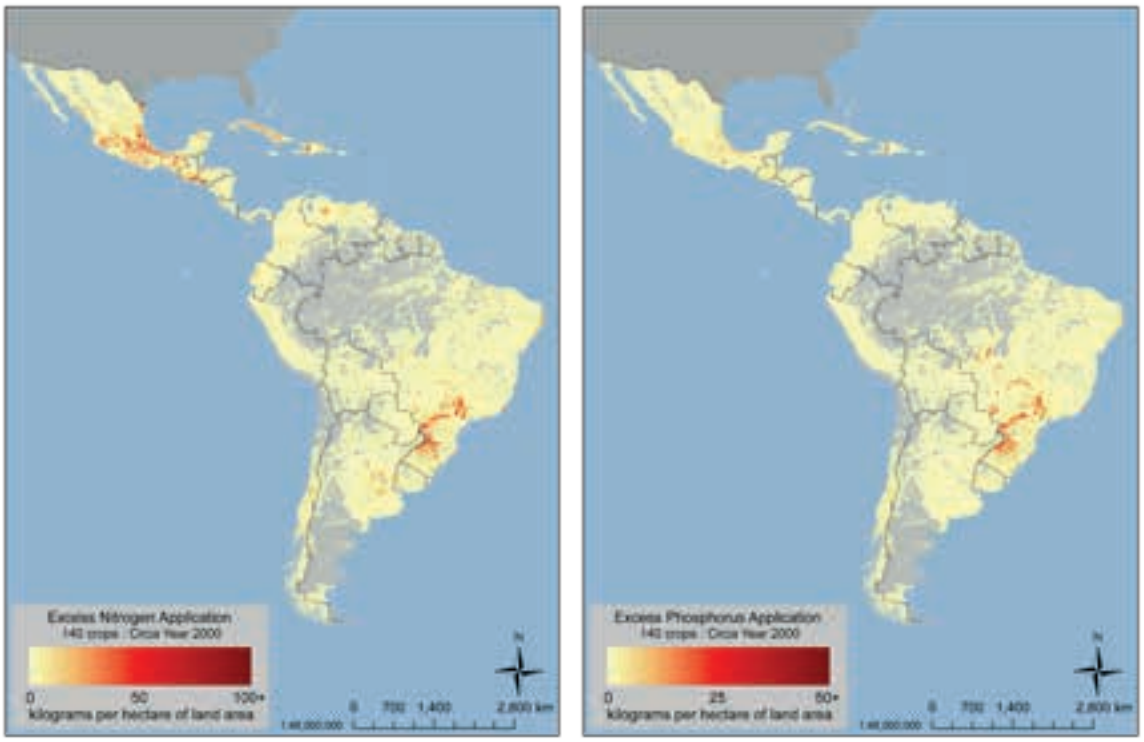


Figure 8.2. Nitrogen (a) and phosphorus (b) excess application in Latin America and the Caribbean. Data are based on administrative-level and crop-specific fertilizer application rates modelled at 5' spatial resolution (~10 km) using crop area and yield data as inputs. Given uncertainties in the model estimates at the grid cell scale, interpretation based on broader administrative units is advised (West et al. 2014) (source: Global Landscapes Initiative, Institute on the Environment, University of Minnesota. Data available at EarthStat.org).

Mining activities in many locations across Latin America and the Caribbean result in the release of pollutants to the environment, such as mercury from gold mines and 'red mud' resulting from bauxite extraction (UNEP 2016a). It has been estimated that over 13 billion cubic metres of water containing dissolved toxins are released into fresh water ecosystems each year from mining and metallurgy operations (Bebbington and Williams 2008). Similarly, the oil and gas industry is also a major source of water pollution.

Pollution in the Caribbean sub-region continues to be a problem, especially in marine and freshwater ecosystems, however there is limited available data on how pollution affects coastal water quality in the Caribbean. Available studies show that, in areas of coastal development and unregulated agriculture, water transparency generally declines steeply. For example, this has been demonstrated at Carrie Boy Cay in Belize and La Parguera in Puerto Rico. Coastal pollution has been linked to coral disease, but limited research has been carried out on this subject (Jackson et al. 2014). Díaz and Rosenberg (2008) identify 15 hypoxic 'dead zone' sites in Latin America and the Caribbean, where ocean biodiversity cannot survive due to low levels of oxygen in seawater (NOAA 2016). Most of these are associated with urban areas, including Buenos Aires in Argentina, Recife, Rio de Janeiro and Sao Paulo in Brazil, Cancun in Mexico, Lima in Peru and Montevideo in Uruguay (UNEP 2016a). The high maritime traffic in the semi-enclosed Caribbean Sea also increases the threat of pollution, from oil spills and ship waste water, and Singh et al. (2015) found that around 83 per cent of the Caribbean Sea could be impacted by oil spills derived from shipping if the current situation and lack of management continues.

In conclusion, pollution remains one of the region's most visible environmental problems, and more work is needed, as LAC is so far not on track to meet Target 8 by 2020. Pollution is particularly serious in some of the major cities in the region, and in the rivers and marine and coastal areas downstream of them. However, contamination levels remain lower across much of the areas in the LAC region, especially in some of the extensive remote forest and wetland habitats.

Box 8.1: Pollutant Release and Transfer Registries (PRTRs).

PRTRs are databases used to record and share information on both the release of chemicals and other pollutants into the air, water or soil, and the transfer of pollutants off-site for disposal by businesses and industry. They can be used by governments to monitor trends in the release and transfer of pollutants in order to take steps to reduce potentially damaging releases. Chile, Honduras and Mexico have all implemented national PRTRs (UNECE 2016).

TARGET 9: INVASIVE ALIEN SPECIES PREVENTED AND CONTROLLED

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

"Invasive alien species are one of the main direct drivers of biodiversity loss at the global level. In some ecosystems, such as many island ecosystems, invasive alien species are the leading cause of biodiversity decline. Invasive alien species primarily affect biodiversity by preying on native species or competing with them for resources. In addition to their environmental impacts, invasive alien species can pose a threat to food security, human health and economic development. Increasing levels of travel, trade, and tourism have facilitated the movement of species beyond natural bio-geographical barriers by creating new pathways for their introduction. As globalization continues to rise, the occurrence of invasive alien species is likely to increase unless additional measures are taken." (CBD 2016c)

Invasive Alien Species (IAS) are a serious and increasing problem globally, with species being moved around the world through global trade, especially in the marine realm (Bax et al. 2003). Island systems are particularly vulnerable to invasive species of plants and animals, sometimes resulting in considerable numbers of local extinctions (Butchart et al. 2006).

A review of the fifth national reports shows that ten countries within Latin America and the Caribbean have programmes in place to control or eradicate specific invasive alien species, for example the marine lionfish in Belize and Saint Vincent and the Grenadines, which is also known to be a problem in Antigua and Barbuda (Gómez Lozano et al. 2013). Another five countries are undertaking identification and assessment activities to identify IAS problems. Argentina, Brazil, Cuba, Dominican Republic, and Ecuador have each implemented a national strategy on invasive alien species, indicating a more comprehensive approach (CBD 2015).

In 2006, Brazil finished its first national report on invasive alien species. About 500 species were identified, recoding effects from invasive species on wild animals and plants, species of socio-economic importance and on marine and freshwater habitats. A national strategy was designed following this report by the Ministry of the Environment, however it suffers from continuity and a strategic implementation plan (MMA 2006).

There is insufficient and scattered data regarding marine alien species in the Caribbean, with the exception of the green mussel (*Perna viridis*) and the red lionfish (*Pterois volitans*). Researchers are aware of 45 alien species, but as a result of poor taxonomic knowledge in the region it is often difficult to determine whether species are introduced alien species, or native, but not previously recorded (Miloslavich et al. 2010).

Eradications of invasive alien species from islands are an important contribution towards meeting Aichi Biodiversity Target 9. So far, 175 successful island eradications of 20 different vertebrate species have been carried out in 15 countries in Latin America and the Caribbean (Figure 9.1). Of these, 28 per cent were carried out in Mexico by the "Grupo the Ecología y Conservación de Islas" (a Civil Society Organization in collaboration with different governmental institutions; Samaniego et al. 2009; Aguirre-Muñoz et al, 2011). A further 39 eradications (22 per cent) were carried out in the Galapagos archipelago (Ecuador), a well-known center of biodiversity and evolution (Island Conservation, University of California at Santa Cruz, IUCN SSC Invasive Species Specialist Group, University of Auckland and Landcare Research New Zealand, 2014). A recent highlight was the rat eradication in Cayo Centro, part of the Banco Chinchorro area in the Mexican Caribbean.

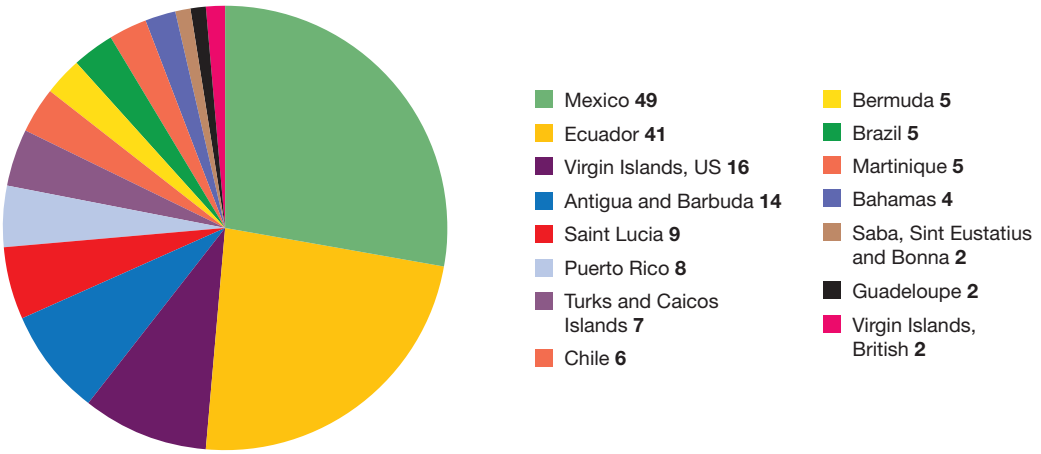


Figure 9.1: Per centage of successful invasive vertebrate species eradications from Mexico (MX), Ecuador (EC), United States Virgin Islands (VI), Antigua and Barbuda (AG) , Saint Lucia (LC), Puerto Rico (PR), Turks and Caicos Islands (TC), Chile (CL), Bermuda (BM), Brazil (BR), Martinique (MQ), Bahamas (BS), Saba, Sint Eusatius and Bonnaire (BQ), Guadeloupe (GP) and the British Virgin Islands (VG) (n = 175) (source Database of Islands and Invasive Species Eradications, June 2014 (Island Conservation, University of California at Santa Cruz, IUCN SSC Invasive Species Specialist Group, University of Auckland and Landcare Research New Zealand, 2014)).

In conclusion, Invasive Alien Species are a significant challenge in parts of the region – especially in the islands and some of the near shore marine areas. There are also examples of introductions of invasive northern hemisphere mammals and plants into southern South America. Active programs to control and eradicate these species are in place and some successes have been achieved. However, there remains much to do and progress towards the target is probably insufficient to fully address its needs by 2020.

Box 9.1: Early Warning System and Rapid Response for Alien and Invasive Species in Cuba.

Cuba has developed an Early Warning System and Rapid Response for Alien and Invasive Species, which is now being implemented for 13 plant and 14 animal species. It is an important mechanism for both early detection of exotic species, and for the detection of any unusual behaviour seen in both alien and native species. Over 30 national institutions are involved in this initiative and progress has been high since 2011 (República de Cuba 2014).

Box 9.2: Mitigating the Threats of IAS in the Insular Caribbean (Dominican Republic).

The major achievements of the project "Mitigating the Threats of IAS in the Insular Caribbean" include (Ministerio de Medio Ambiente y Recursos Naturales, República Dominicana 2014):

- Creation of the National Committee on IAS
- Preparation of the National IAS Strategy (Ministerio de Medio Ambiente y Recursos Naturales, República Dominicana 2012)
- Publication of a Critical Situation Analysis of IAS in the Dominican Republic
- Preparation and publication of a booklet with basic guidelines for the management of invasive species, aimed at students in secondary education
- An education and awareness campaign was conducted nationwide, including the creation of a documentary about invasive species. This campaign was complemented by talks aimed at secondary school students in five pilot provinces
- Baseline studies conducted in Alto Velo, to identify the presence of invasive plants as well as mammals
- Implementation of the pilot project "Eradication of mammal invaders" in Cabritos, which resulted in the removal of a total of 133 donkeys, 196 cats and 2 cattle (Caribbean Invasive Alien Species Network 2011).

Box 9.3: Identifying Invasive Alien Species in Mexico and Implementing Measures.

(source: Ana Isabel González, Georgia Born-Schmidt and Patricia Koleff)

Mexico developed its National Strategy on Invasive Alien Species (NSIAS) during 2008-2010. This document is in line with other strategies on biodiversity (at both national and state levels), considering the importance of safeguarding Mexico´s natural capital and preserving its extraordinary biological diversity (CNM 2009).

Work on the implementation of the NSIAS has been ongoing since 2010, with the collaboration of numerous institutions and experts. Examples include changes in the General Law of Wildlife, which now includes invasive alien species (IAS) that should be regulated. CONABIO coordinated the risk evaluation of over 450 taxa belonging to most biological groups, to provide the Ministry of Environment with a comprehensive list of the worst IAS that are already present in the country, those that are of major concern considering pathways and some feral species that pose a threat to areas of high biodiversity value. The National Invasive Species Information System (NISIS) continues to be an important reference regarding decision making on IAS in Mexico, and has been widely used by decision makers. The system currently holds information on almost 2000 species, including risk assessment data, specimen and observation records, distribution maps and species information sheets; to improve the monitoring and early detection of IAS the NISIS is also successfully associated with other national efforts such as the Degradation Monitoring Systems, which are based on the National Forest Monitoring System and the citizen science portal (NaturaLista), as well as with international partners such as the Invasive Species Compendium from CABI, the Global Invasive Species Database and the GIASIPartnership. The GEF financed project "*Enhancing National Capacities to Manage Invasive Alien Species (IAS) by Implementing the National Strategy on IAS*" has been running since 2014 and aims to strengthen the strategic actions that are being developed to ensure that, by 2020, Mexico will achieve the results set in the NSIAS as well as Aichi´s Biodiversity Target 9. There are currently 15 partners in this project, including federal and state governments, productive sectors, universities and NGO´s and it is being implemented with support from UNEP and coordinated by CONABIO and CONANP.

Box 9.4: Pinzón and Plaza Sur Islands, Galápagos.

Rats introduced to Pinzón Island preyed on the eggs and hatchlings of the island-endemic Pinzón Giant Tortoise (Chelonoidis nigra duncanensis) for 150 years, preventing them from reproducing and leaving an aging population to gradually die off. In the 1960s, conservation efforts were implemented by harvesting eggs, incubating them and raising the hatchlings in captivity until they were big enough to survive the rats in the wild. To implement a more permanent solution, an eradication operation was carried out by a partnership of conservation organisations in 2012 to remove all invasive rodents from the island. Extensive monitoring in 2015 confirmed that the eradication was successful, allowing the Pinzón Giant Tortoise to once again reproduce successfully in the wild.

On the small nearby island of Plaza Sur, invasive house mice were eating the root systems of a sister species of the Opuntia cactus (Opuntia galapageia), found only in the Galápagos Islands. Not only was this causing the cacti to fall over and stopping them from regenerating, but the fruit of the cactus is the favoured food of the Galápagos Land Iguana (Conolophus subcristatus) and so the mice were also depleting the iguana's food source. A successful eradication operation was also carried out on Plaza Sur in 2012 (Island Conservation et al. 2016).

TARGET 10: ECOSYSTEMS VULNERABLE TO CLIMATE CHANGE

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

"Urgently reducing anthropogenic pressures on those ecosystems affected by climate change or ocean acidification will give them greater opportunity to adapt. Where multiple drivers are combining to weaken ecosystems, aggressive action to reduce those pressures most amenable to rapid intervention should be prioritized. Many of these drivers can be addressed more easily than climate change or ocean acidification." (CBD 2016c)

This target focuses on coral reefs and their status under climate change as well as other climate vulnerable ecosystems – such as high mountain habitats, Andean forests and mountain wetlands.

Globally Target 10 was not reached by its 2015 deadline. The fifth national reports to the CBD suggest a similar situation for Latin America and the Caribbean. A slight recovery of corals was reported in Costa Rica, and Belize reported an increase in coral cover together with a decrease in coral health. The overall picture, however, is that marine ecosystems vulnerable to climate change and ocean acidification continue to face significant pressures. Actions implemented across the region to address these pressures include MPAs, trawling bans, and managed access areas (CBD 2015).

Coral reefs harbour the most biodiversity of any marine ecosystem and constitute important links in maintaining healthy fisheries (Miranda et al. 2003). Within the LAC region, the Caribbean and Indo-Western Pacific sub-regions in particular supports important tropical coral reef communities (Reef Base 2014; Mumby et al 2014). Analyses of the threats to the coral reefs in the LAC region based on Reef Base (2014) data show that many of the reefs have been affected by bleaching events in the period 1998-2006 (Figure 10.1). The oceans of the region are also subject to satellite measured thermal stress (Figure 10.1). In the eastern Pacific, coral reefs face a variety of threats, including sedimentation, overgrowth of algae and algal blooms, worsened by high levels of nutrients resulting from agricultural and urban pollution, and increasingly from growing levels of plastics reaching coastal and marine areas. In the Atlantic and the Caribbean Sea, declines in coral reefs area linked to overfishing and diseases, both of corals themselves and of other marine biodiversity such as the long-spined sea urchins (*Diadema antillarum*) that graze on algae, making space for corals. Other threats include pollution and damage from hurricanes. Over 75 per cent of Caribbean reefs are considered to be under threat, and over 30 per cent are categorised as highly, or very highly, threatened. Almost all reefs, which are considered to have a low threat status, are distant from large landmasses (Burke et al. 2011) (Figure 10.2).

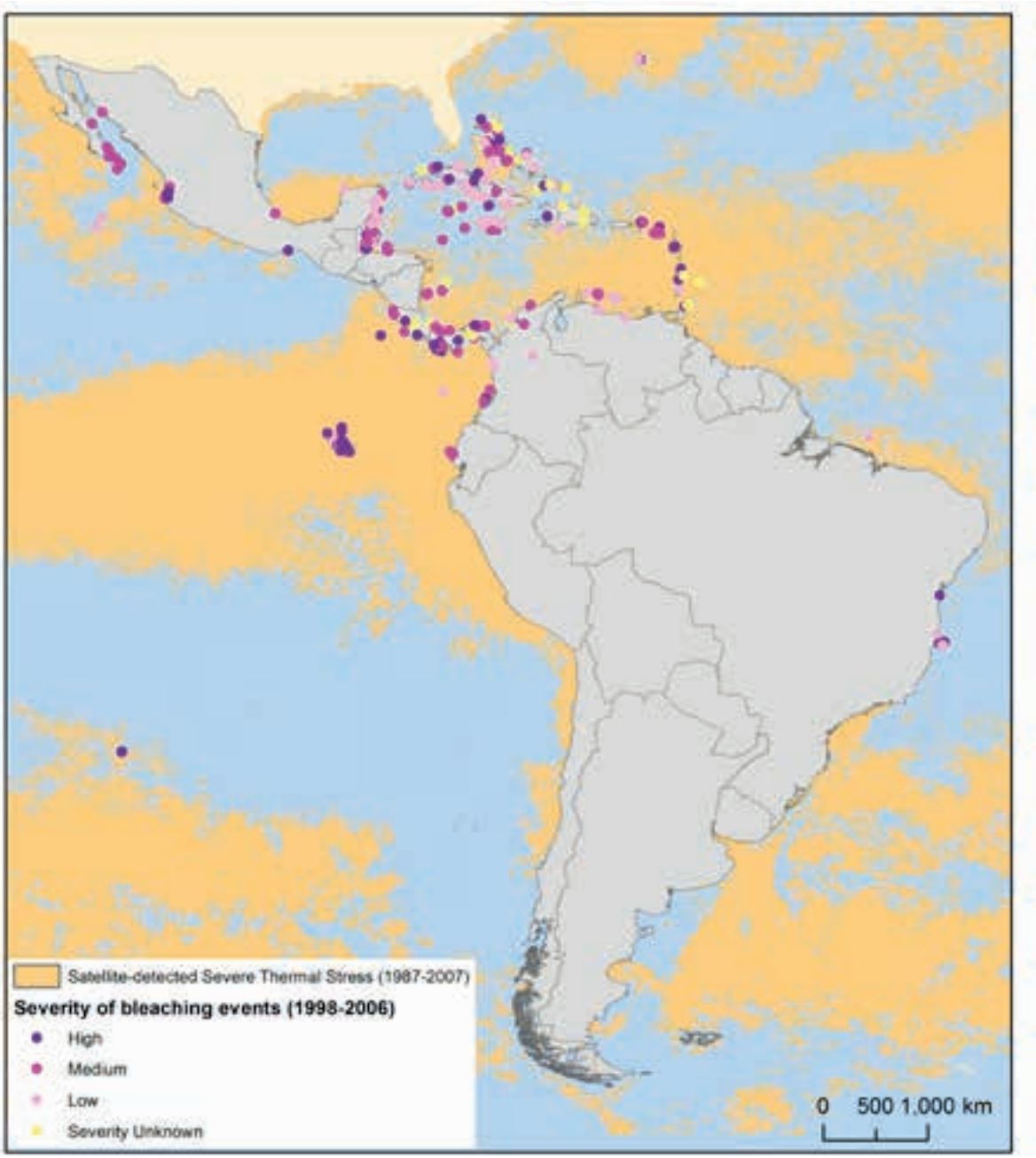


Figure 10.1: Severity of coral bleaching in Latin America and the Caribbean coral reefs and areas of high thermal stress in the region's oceans (Reef Base 2014).

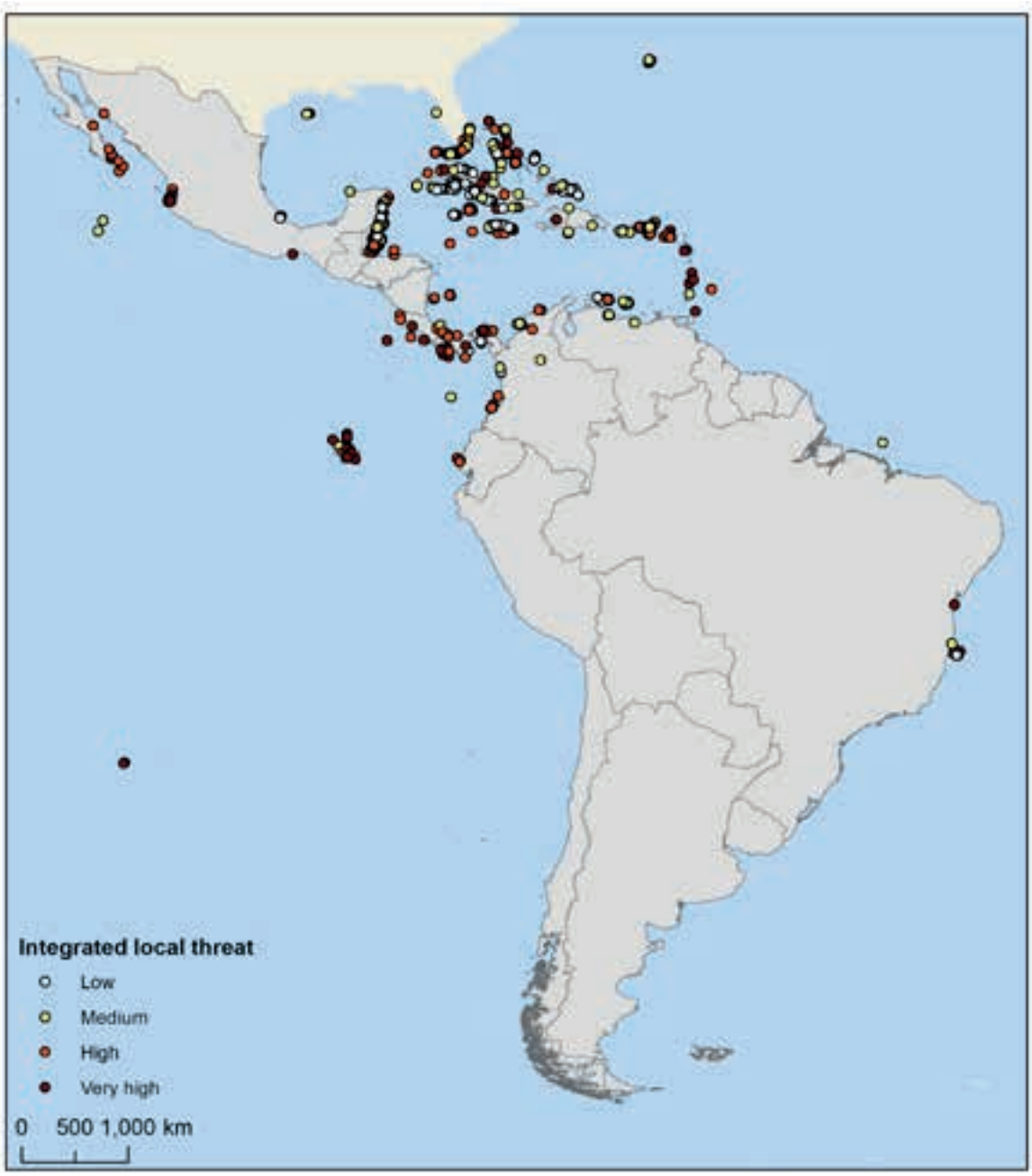


Figure 10.2: Coral reefs classified by integrated local threats. Reef locations are based on 500 meter resolution gridded data reflecting shallow, tropical coral reefs of the world. Organizations contributing to the data and development of the map include the Institute for Marine Remote Sensing, University of South Florida (IMaRS/USF), Institut de Recherche pour le Développement (IRD), UNEP-WCMC, The World Fish Center, and WRI. The composite data set was compiled from multiple sources, incorporating products from the Millennium Coral Reef Mapping Project prepared by IMaRS/USF and IRD (map produced by UNEP-WCMC using data from Reef Base 2014).

Anthropogenic pressures also pose a serious threat to marine and coastal ecosystems. Driven by international market demand for reef resources, overfishing and unsustainable fishing practices are both threats to coral reefs (Mumby et al 2014). Bleaching is most severe around the Caribbean islands and Central American coastline (Figure 10.1). Reef systems are highly sensitive to human disturbance, and sedimentation from upstream land-uses and pollution are among the greatest threats to coral reefs (International Coral Reef Initiative 2016). Mining activities also cause increased sedimentation and can severely harm reef ecosystems, especially in cases where wastes are dumped directly in rivers and oceans, which can cause heavy metal pollution (Guzmán and Garcia 2002). In addition, warming of the oceans due to climate change will likely continue to cause coral bleaching and further damage the coral reefs of the area, making these ecosystems some of the most endangered globally within the next decade.

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Box 10.1: Water Security in the Plurinational State of Bolivia.

Climate change is leading to serious water security concerns in the Plurinational State of Bolivia. Due to limited rainfall, cities at high altitudes in the arid Andes rely on water sources such as glaciers and lakes. This is especially the case in winter, as 90 per cent of rainfall occurs in the wet summer season. Almost half the ice mass of glaciers in the Bolivian Andes has been lost over the last 50 years, and projections suggest that many lower altitude glaciers in the region may disappear altogether over the next 10 to 20 years. Investment in infrastructure, water management policies and changes in agricultural practices will be required to enable the Plurinational State of Bolivia to adapt to these changes in the supply of water (Rangecroft et al. 2015).

Another set of climate vulnerable ecosystems in the LAC region are some of the high mountain habitats of the Andes. Significant global warming may threaten some of these habitats, along with the extremely high diversity of endemic species they support. Between 1939 and 2006, temperatures in the tropical Andes have increased by about 0.7 degrees Celsius, and in that time glaciers have been severely diminished. For example, glaciers in Venezuela have lost 95 per cent of their surface area since 1850. In 2010, glacier area in Colombia was 45 km^2, with an estimated 3 km^2 being lost every year. Projections suggest that the largest future temperature increases will occur at high altitudes, where the glaciers are located (Vuille 2013).

In conclusion, progress towards Target 10 is challenging, and is currently insufficient to achieve all requirements by 2020. Particular challenges are around the reduction of other factors that are stressing coral reefs and hence making them more vulnerable to climate change impacts. Vulnerable systems in the high Andes are also facing pressures in addition to climate change that makes managing the impacts of climate change more challenging.

TARGET 11: PROTECTED AREAS

By 2020, at least seventeen per cent of terrestrial and inland water, and ten per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

"Well-governed and effectively managed protected areas are a proven method for safeguarding both habitats and populations of species and for delivering important ecosystem services. Particular emphasis is needed to protect critical ecosystems such as tropical coral reefs, sea-grass beds, deep water cold coral reefs, seamounts, tropical forests, peat lands, freshwater ecosystems and coastal wetlands. Additionally, there is a need for increased attention to the representativeness, connectivity and management effectiveness of protected areas." (CBD 2016c)

Protected areas are widely regarded as one of the most successful strategies for conserving nature (Geldmann et al. 2013). Target 11 includes several different elements, which need to be met in order for the target to be reached in full; these relate to coverage, effectiveness, equitability, representativity and connectivity.

The fifth national reports to the CBD suggest that nine countries in the region are on track to meet or exceed the coverage element of Target 11 by 2020, however there is less information provided on effectiveness and equitability. Limited information about connectivity is provided although some relevant actions are being taken including the establishment of biological corridors. Some countries highlight the selection of protected areas based on representativeness of ecosystems (CBD 2015).

Protected area designation for terrestrial areas (which includes inland water) covered 23 per cent of the region by 2010, exceeding the 17 per cent global target (Figure 11.1; Figure 11.2). Individually, 17 countries in the region had already met the 17 per cent target by 2014. Together those 17 countries make up 71 per cent of the total land area of Latin America and the Caribbean. Three countries in the region have over a third of their total land area designated as a protected area: Venezuela (53.9 per cent), Nicaragua (37.1 per cent), and Belize (36.7 per cent) (UNEP-WCMC 2014).

Countries in the LAC region, which are engaging in REDD+, are making greater efforts to promote activities, which protect carbon stocks and the multiple functions of forests (Miles et al. 2013). Mapping protected areas can help prioritise areas for specific REDD+ actions, and may also help identify important considerations for REDD+ safeguards, such as in the equitable management of protected areas. Areas suitable for REDD+ implementation often overlap with areas of high biodiversity importance, carbon storage and a wealth of ecosystem services. Countries including Brazil, Ecuador, Paraguay (Walcott et al. 2015) and Panama (Kapos et al. 2015) have used mapping of protected areas to identify areas for potential REDD+ activities.

The Amazon basin plays an important role in conservation and there are ongoing conservation initiatives such as the 'Integration of Amazon Protected Areas' (IAPA) – Amazon Vision project, implemented by FAO, WWF, IUCN and UNEP, that aims to create a network around the protected areas systems located in the Amazon region, covering more than 170 million ha; one-fifth of Brazil's Amazon is protected through around 300 Conservation Units (SNUC). Colombia and Ecuador are also leading in terms of forest protection, with 70 and 80 per cent of the natural rainforest estimated to be under protection in Colombia and Ecuador, respectively (Ringhofer et al. 2013). Chile has almost 20 per cent of its area assigned to protected areas, making the country, currently above the conservation target set by Aichi Biodiversity Target 11 (Tognelli et al. 2007).

There has been less progress in the designation of marine protected areas, and the region is not close to meeting the target of coverage of at least 10 per cent of marine and coastal areas (Figure 11.3). For territorial seas (0 to 12 nautical miles) 13.8 per cent was protected by 2014, with Ecuador notably protecting 76 per cent of its territorial seas. However, only 2.1 per cent of EEZs (12 to 200 nautical miles) was protected by 2014. Taking territorial seas and Economic Exclusion Zones together, the region has protected 3.4 per cent of the total area, and only two countries have met the 10 per cent target: Ecuador (13 per cent) and Nicaragua (10 per cent) (UNEP-WCMC 2014). In addition, the Dominican Republic has protected over 10 per cent of their EEZ area and are part of the Caribbean Biological Corridor, along with Haiti and Cuba, that provides a framework for cooperation among the countries of the insular Caribbean for protecting and reducing the loss of biodiversity, by rehabilitating the environment, developing livelihood alternatives -particularly in Haiti-, and alleviating poverty as a mean to reduce the pressure on biological resources.

Reflecting the importance of Caribbean marine ecosystems, the Caribbean Challenge Initiative (CCI)'s goal to "effectively conserve and manage at least 20 per cent of the marine and coastal environment by 2020" is substantially more ambitious than Target 11 (CCI 2016). Knowles et al. (2015) calculated that across the whole of the insular Caribbean, around 7 per cent of the EEZ area is protected. However, when only sovereign states are considered that figure drops to approximately 3.25 per cent closer to the level of protection found across Latin America and the Caribbean as a whole.

There is no readily compiled information on trends in protected area effectiveness, although some baselines are found in Coad et al. (2015). Similarly, there are no trends in equitability of the protected areas in the region over time, and baseline information is also hard to find relating to the LAC region. Representativity of the protected areas network in the LAC region has been calculated as a baseline by Butchart et al. (2015) and connectivity at the continental scale by Santini et al. (2015), who calculated the per centage of reachable area within protected area networks around the world for different dispersal abilities. The study found that South America has one of the highest scores for amount (per centage) of reachable areas for species dispersal within protected areas (0.86–2.25 per cent).

Although connectivity has not been assessed for the LAC region specifically, there are some efforts to measure it in specific biomes. Brazil's Atlantic Forests is an example of the importance of inter-protected area connectivity, as these forest habitats are severely fragmented and deforested, causing forest bird species to extend their ranges to cover small fragmented forest patches (Santini et al. 2015). Thus, the creation of conservation corridors between larger patches of forests and the establishment of networks of small protected forest areas is key to maintain species abundance (Uezu and Metzger 2011). Using a case study from the Brazilian Atlantic forest, Tambosi et al. (2014) assessed the effectiveness of ecological restoration actions towards biodiversity conservation, taking into account different constraints. They proposed a multiscale framework based on landscape attributes of the habitat extinction and connectivity to infer landscape resilience. Results show that areas with high restoration effectiveness represent only 10 per cent of the region, identifying around 15 million hectares of land that could be the focus of restoration actions.

The coverage of endangered and endemic species by protected areas varies throughout the LAC region. In Chile, over 13 per cent of all species are not covered by any protected area, and 73 per cent of vertebrate species ranges are not currently under protection (Tognelli et al. 2007).

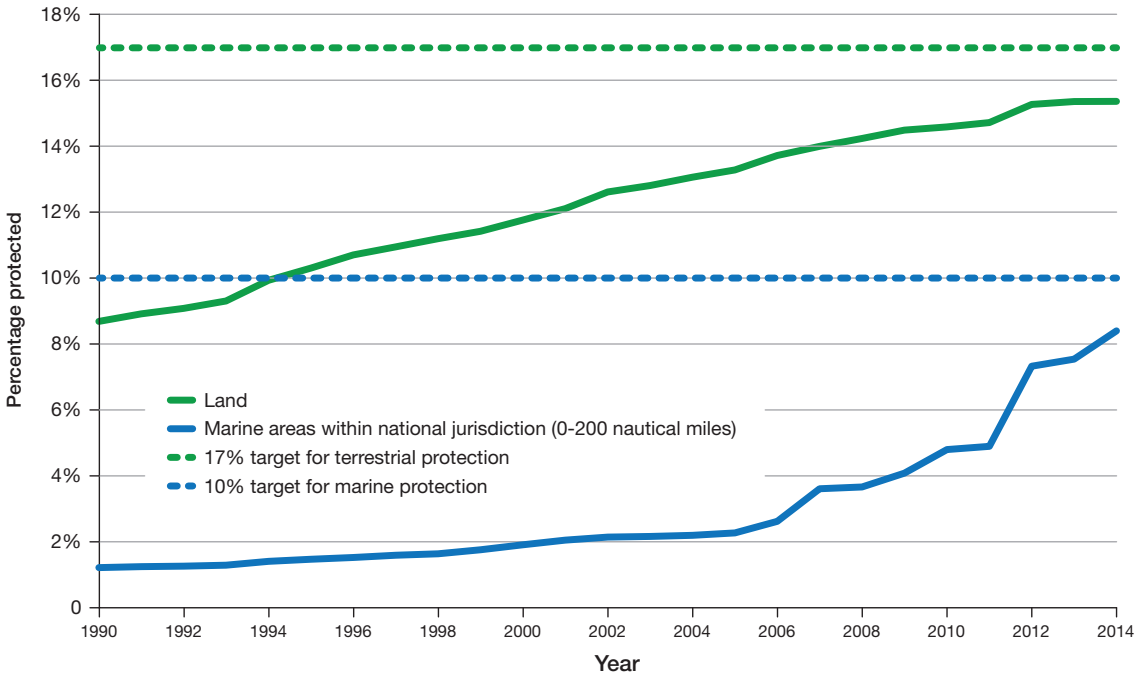


Figure 11.1: Global protected area trends and targets, 1990-2014 (source: UNEP-WCMC 2014).

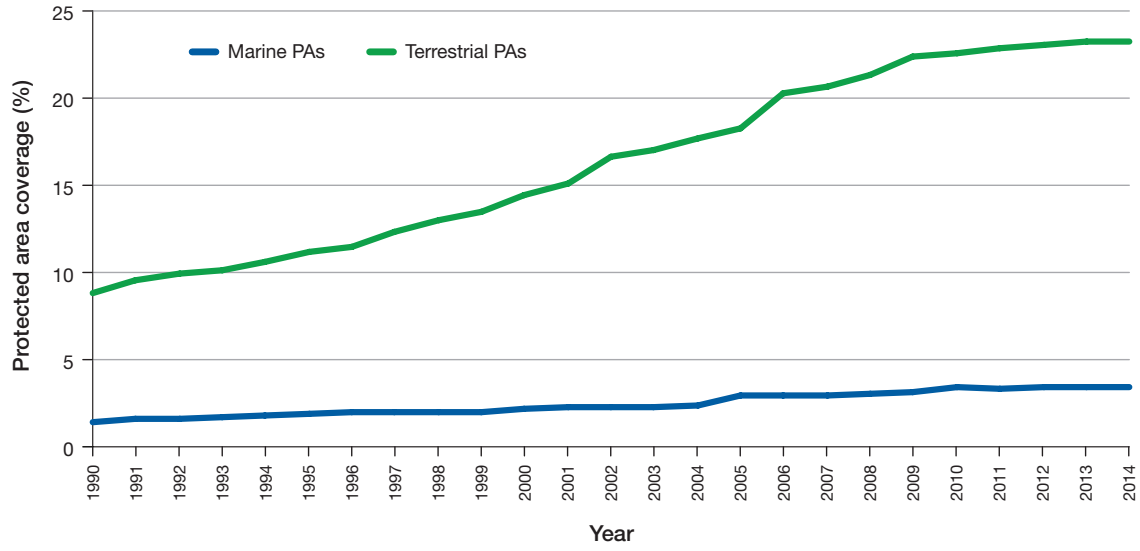


Figure 11.2: Trends in terrestrial and marine protected areas coverage over time in the Latin America and Caribbean region (1990-2014) (source: UNEP-WCMC 2014).

Key Biodiversity Areas (KBAs) are sited which contribute significantly to the global persistence of biodiversity, and KBA sites can be identified through assessments against standard criteria which consider the levels of threatened biodiversity based on Red Lists, amongst other biodiversity-related criteria (IUCN 2014a). Brooks et al. (2016) assessed the trend in coverage of KBAs, specifically of Important Bird Areas (IBAs) and Alliance for Zero Extinction (AZE) sites[4], by protected area in all UNEP regions, including Latin America and the Caribbean (Figure 11.4; Figure 11.5).

[4] *http://www.zeroextinction.org/*

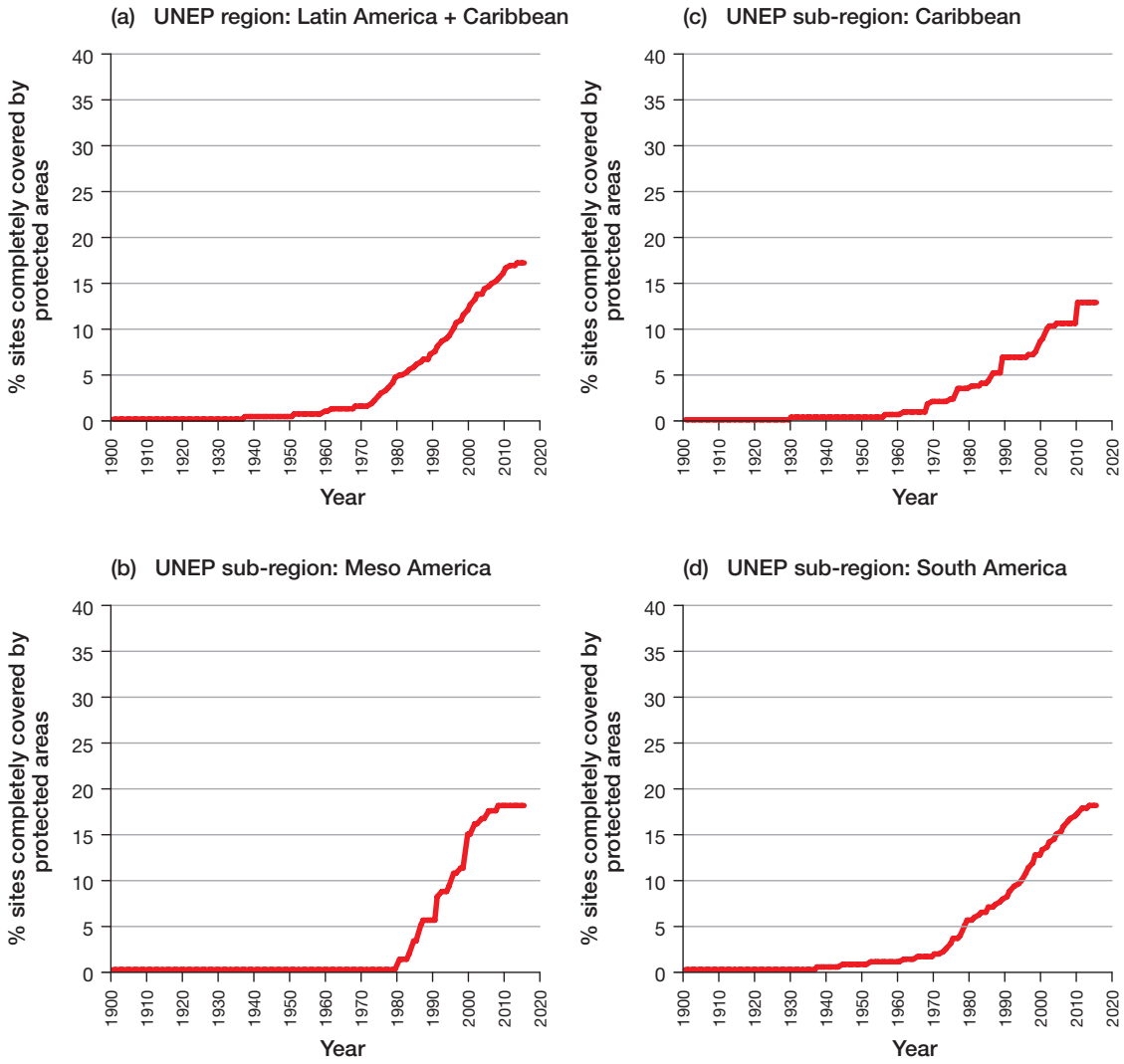


Figure 11.4. Growth in proportion of IBAs fully covered by protected areas for the LAC region (a) and sub-regions; Meso America (b), Caribbean (c) and South America (d) (source: Brooks et al. 2016).

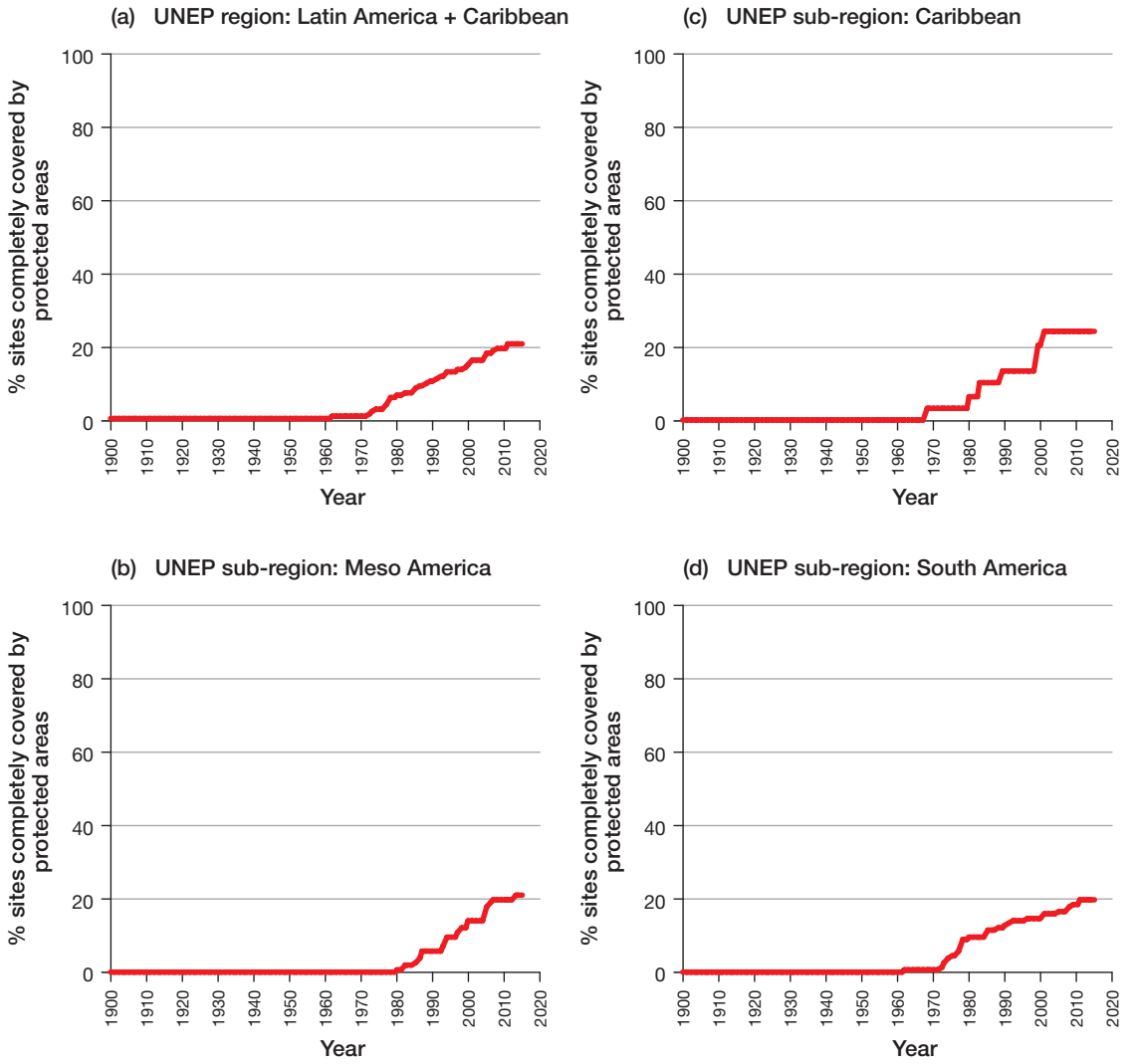


Figure 11.5. Growth in proportion of AZE sites fully covered by protected areas for the LAC region (a) and sub-regions; Meso America (b), Caribbean (c) and South America (d) (Brooks et al. 2016).

In conclusion, although the coverage element of the target has been or will be achieved by 2020, other elements of the target are less well studied and progress is less clear. More work is required to better understand and put in place systems to track changes in management effectiveness, equitability, connectivity and representativity over the next years until 2020.

Figure 11.6: Map of the protected area network in the Latin America and Caribbean region (IUCN and UNEP-WCMC 2015). This map is derived from the February 2016 version of the World Database on Protected Areas. Some sites, particularly community and privately managed reserves may be missing because they have not been submitted to UNEP-WCMC by the relevant focal points in the region.

Box 11.1: Guiding Conservation Efforts in Mexico.

(source: Tania Urquiza Haas and Patricia Koleff)

In face of global environmental change, an important first step to achieve Aichi Biodiversity Target 11 is the identification of ecologically representative and biodiversity relevant areas to strategically guide conservation efforts. This is of particular importance in megadiverse countries, like Mexico, where biodiversity is heterogeneously distributed and there is significant environmental degradation. In 2005, following commitments to the CBD Program of Work on Protected Areas, Mexico started an ambitious analysis under the coordination of The National Commission for Knowledge and Use of Biodiversity and the National Commission of Natural Protected Areas in which more than 260 stakeholders from academia, government and nongovernmental organizations participated. This analysis demonstrated the importance of having a National Biodiversity Information System to provide open access and reliable data to conduct systematic conservation planning. Further, it demonstrated the need for updated information on environmental degradation to avoid the identification of unsuitable conservation areas. In a timeframe of five years, the country concluded a comprehensive analysis to identify priority areas in the marine, freshwater and terrestrial realms and the identification of conservation gaps in the protected area network (CONABIO et al. 2007a, CONABIO et al. 2007b; Koleff et al. 2009; CONABIO and CONANP 2010). During the process, important institutional capacities were gained to carry through systematic analyses with large amounts of data at different spatial scales and to model the human impact on biodiversity using spatial information on environmental drivers (Kolb 2009). The results of these analyses provides updated insights into conservation needs for Mexico to fulfil Aichi Biodiversity Target 11 and guides the expansion of protected areas, as well as the promotion of other conservation measures, such as sustainable forestry, sustainable use of wildlife, ecological restoration, payment for ecological services, and ecological planning of the territory.

Box 11.2: Integrating Ecosystem Services and Biodiversity into Spatial Conservation Planning for the Benefit of Local and Traditional Communities.

Spatial conservation planning can be a powerful tool for choosing the best, or most cost-effective areas for conservation of biodiversity, such as formal protected areas e.g. parks or reserves and other effective area-based conservation measures (OECMs) - e.g. some community conservation areas. Most spatial conservation planning exercises, including those in South America and the Caribbean, have focused on the biological aspects of target areas such as forest cover, species distribution and existing protected areas. With the improvement in computational power, however, more data layers have become readily available and can be added to these spatial conservation planning tools such as Zonation, Marxan and C-Plan.

UNEP-WCMC has been exploring the integration of both potential and realised ecosystem services data into spatial conservation planning tools. By utilising the Co$ting Nature model UNEP-WCMC has been able to integrate data layers which incorporate water provision, carbon derived services and hazard mitigation to more traditional data layers such as species and habitats in spatial conservation planning work (Mulligan 2015; Mulligan et al. 2010). This work utilised the Zonation tool and focussed on the Chocó region in Colombia. The work has been carried out with the support of the Rainforest Trust, which wants to improve the science underpinning its decision making for the establishment of new conservation areas, including protected areas and connectivity conservation areas. The work aims to delineate complementary areas that not only have high biodiversity conservation value but also a high provision of potential and realised ecosystem services, thereby identifying areas, which have the potential to benefit indigenous and traditional communities whilst simultaneously strengthening biodiversity conservation.

Box 11.2 continued

The model below represents how Zonation integrates all these data layers and generates a complementarity-based balanced ranking of the landscape, e.g. how to incorporate as much of the three environmental data layers, around the two focal area datasets whilst accounting for the human threats layer. The model outputs show the best areas for conservation and how much is gained in terms of biodiversity and ecosystem services by increasing these conservation areas. In this example, the graph shows that a small increase in the area already protected (circa 11 per cent of total target area) can enhance dramatically the conservation of species and ecosystem services if the right areas are chosen. This model can help decision makers across multiple sectors make sound scientific decisions that will both conserve biodiversity as well as help maintain the economic, social and cultural health of local and neighbouring communities, and support the tracking and achievement of important commitments such as the UN's Aichi Biodiversity Targets and Sustainable Development Goals (SDGs).

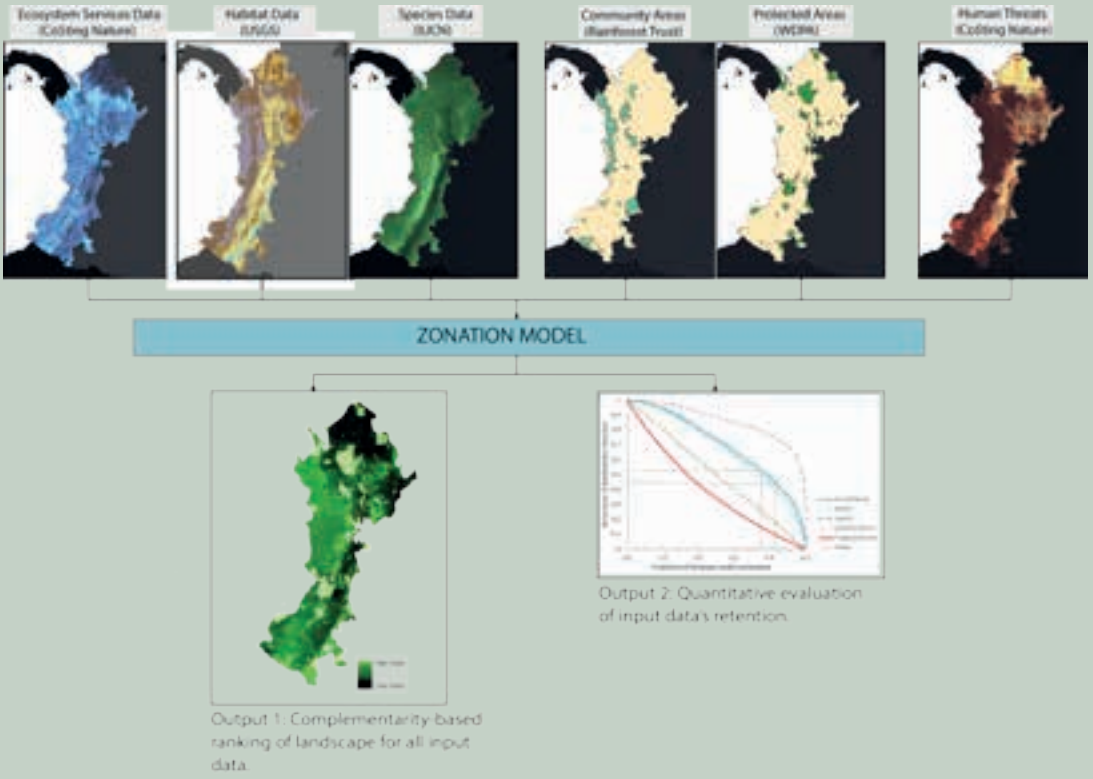


Figure 11.7: The Zonation model effectively balances where to prioritise for conservation (via the environmental layers) and where to avoid (via the human threats cost layer) using the community and protected areas as the starting point for any further expansion. Data layers have been simplified (aggregated) for graphical purposes.

Box 11.3: Community Based Monitoring of Fog Capture in Loma Alta, Ecuador.

In 1995, several villagers from the community of Loma Alta, situated in the Loma Alta watershed, were trained by People Allied for Nature (PAN) and EarthWatch to monitor the quantity of water captured by local trees and plants. After a year of monitoring, they reached a conservative estimate that forest clearances resulted in a loss of about 190 thousand litres of water per hectare per year that would have otherwise become available for use. Water supply is a key issue in the area as agriculture is water-limited, and so water lost to deforestation represents a substantial economic loss to Loma Alta.

The results of the monitoring were communicated locally through leaflets, talks in schools, and circulation of a video featuring the villagers who had taken part in the monitoring. The information generated a strong response throughout the community and six community meetings were held to discuss a resulting proposal to establish a forest ecological reserve in order to protect water resources. In August 1996, an area of about 1,000 ha was officially declared a reserve.

This rapid response was possible because the community of Loma Alta have had established tenure of their land since the *Law of the Comunas* in 1937. There is no private ownership of the land, but the *Comuna* had granted land use rights to individuals. Strong governance enabled discussion with those individuals with existing right over the course of the community meetings until a consensus was established that the reserve should be established. Since then, the reserve has tripled in size to 3,000 ha, and deforestation within the reserve has been effectively eradicated (Becker et al. 2005; Balmford, 2012).

TARGET 12: REDUCING RISK OF EXTINCTION

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

"Though some extinctions are the result of natural processes, human actions have greatly increased the extinction rate in recent times. Reducing the threat of human-induced extinction requires action to address the direct and indirect drivers of change (see the Aichi Biodiversity Targets under Goals A and B of the *Strategic Plan for Biodiversity 2011-2020*) and can be long-term processes. Yet imminent extinctions of known threatened species can in many cases be prevented by protecting important habitats (such as Alliance for Zero Extinction sites) or by addressing the specific direct causes of the decline of these species (such as overexploitation, invasive alien species, pollution and disease)." (CBD 2016c)

Species extinction is one of the major environmental challenges facing the LAC region. Species endemism in the LAC region is high; a recent study by Brooks et al. (2016) shows that the LAC region contains the highest proportion of threatened species (critically endangered, endangered and/or vulnerable) when compared with all other regions on Earth (Figure 12.1), providing an indication of the scale of the challenge to prevent extinctions in the coming decades. Particularly high endemism is found in the Andean and Atlantic forests (CEPF 2015; CEPF 2016), and the Caribbean islands, as many species are confined to single islands or small patches of forest along the Andean mountain chain or in the Amazon basin.

Global trends indicate that little progress is being made toward preventing the extinction of known threatened species and that progress is moving away from improving the conservation status of those species most in decline (SCBD 2014). Within the LAC region, the fifth national reports to the CBD demonstrate that management plans have been implemented across the region for specific species, and the establishment of protected areas are expected to contribute to reaching Aichi Biodiversity Target 12. Success stories highlighted include the humpbacked whale in Brazil, whose status is being reconsidered from 'threatened' to 'almost threatened' and the critically endangered Ridgway's Hawk (*Buteo ridgwayi)*, which is starting to recover in Dominican Republic. However, despite these success stories, only Cuba and Mexico mention that they will meet the target by 2020, whereas the majority of countries in the region that provide information on Target 12 acknowledge that threat levels are increasing for many species, in line with global trends (CBD 2015).

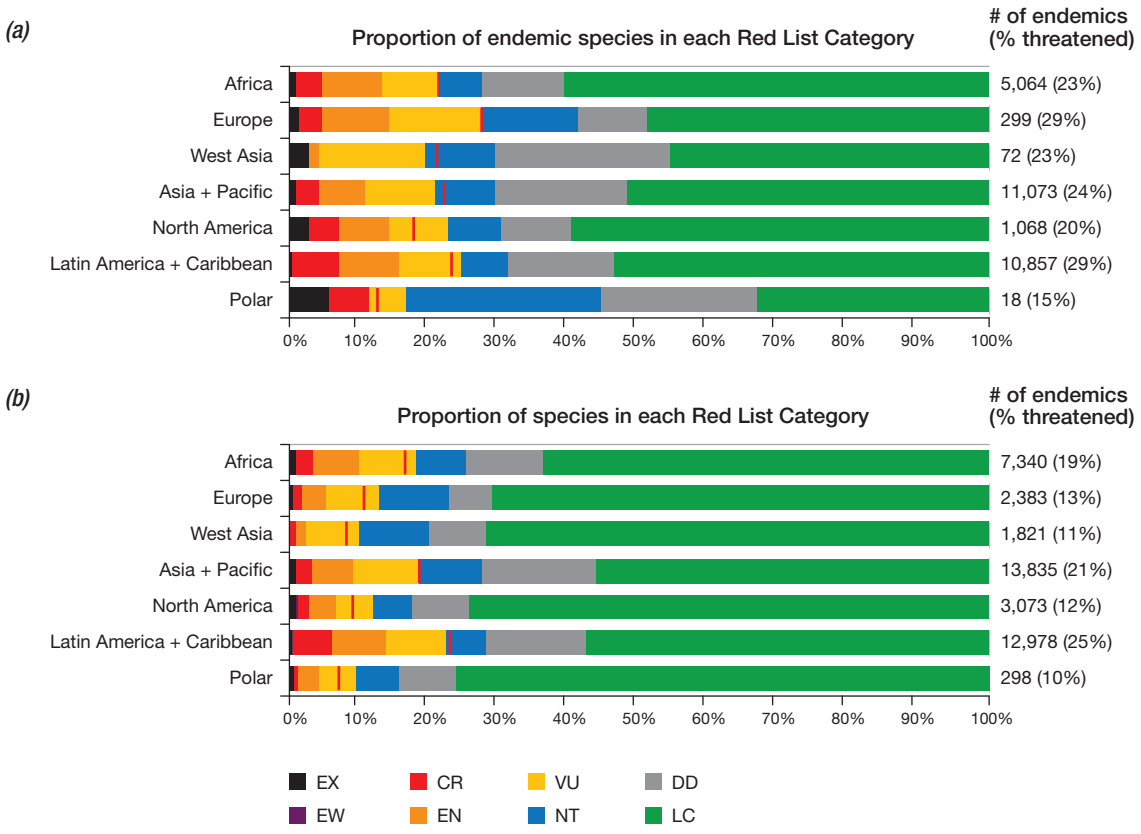


Figure 12.1: (a) Proportions of endemic species, by Red List Category, in comprehensively assessed groups on The IUCN Red List of Threatened Species and (b) proportion of all species, by Red List Category, in comprehensively assessed groups on The IUCN Red List of Threatened Species (Version 2015-2) occurring in each UNEP region. The vertical red lines show the best estimate for the proportion of extant species, which are considered threatened (CR, EN and VU). The number to the right of the bar represent the total number of species assessed, and the best estimate of the percentage threatened is written in brackets. The numbers to the right of each bar represent the total number of species assessed and in parentheses the best estimate of the percentage threatened. CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient, LC = Least Concern (source: Brooks et al. 2016).

Estimates of the intactness of local ecological assemblages in terms of species richness in the LAC region, using the PREDICTS model (Newbold et al. 2015), show that the Amazon rainforest is projected to retain most of its original species richness, whereas other areas outside the main forest block are projected to have lost considerable amounts of their original species richness (Figure 12.4). Nonetheless, this region retains a much more intact flora and fauna than some other regions (Newbold et al. 2015).

A species richness map for mammals, amphibians and birds based on ranges of occurrence for species from the Red list of threatened Species (IUCN 2014b) shows the Amazon basin in particular has high species richness levels (Figure 12.3). Mean range-size rarity in the LAC region was also analysed using the Red List data, and serves as a measure of endemism, which is higher in areas of the Andes mountains where species' ranges are smaller (Figure 12.2).

Figure 12.2: Patterns of range size rarity (a measure of richness in endemic species) based on known distributions for all birds, mammals and amphibians in the LAC region at 0.5 degree resolution (source: IUCN 2014b).

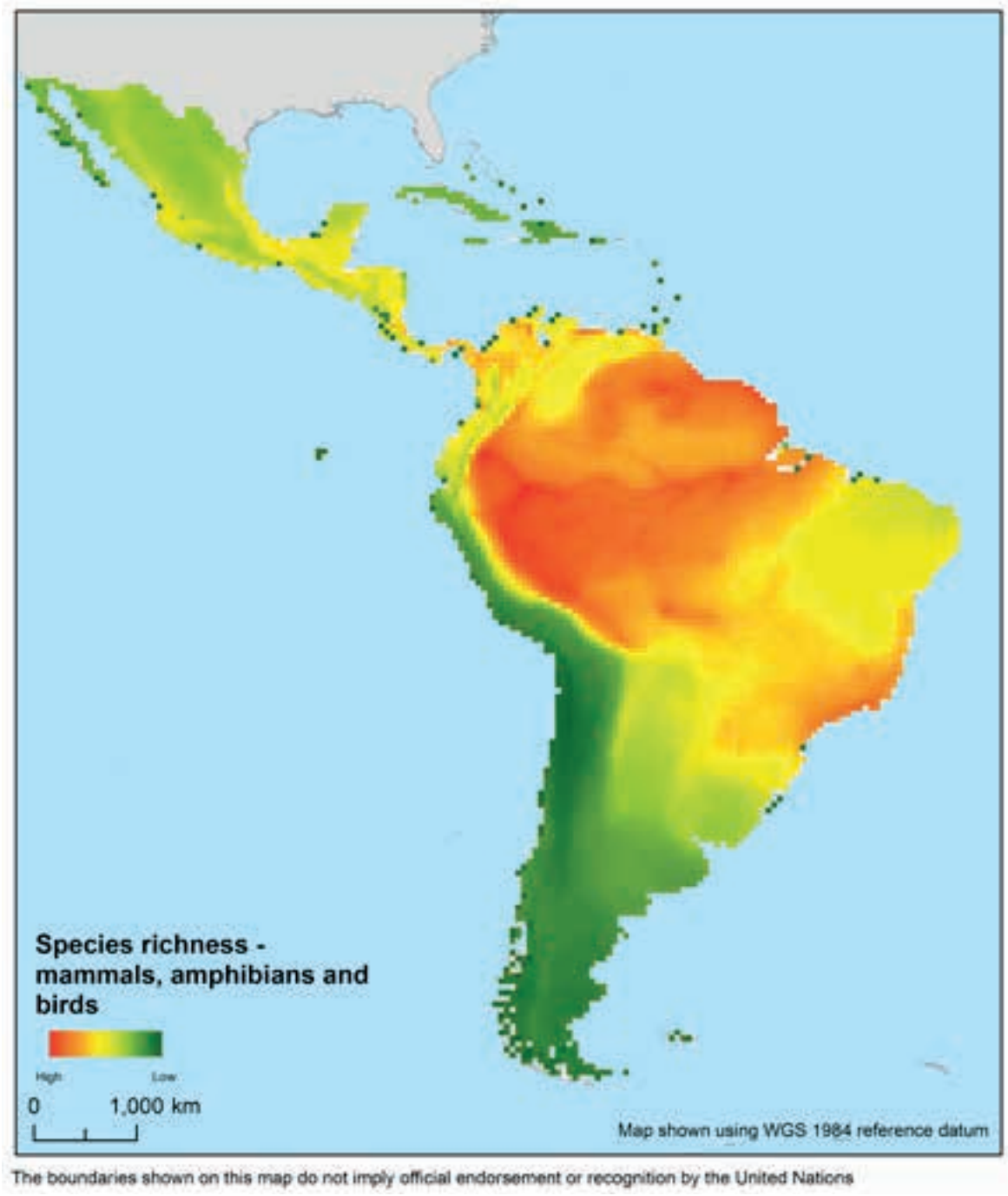


Figure 12.3: Species richness at 0.5 degree resolution based on known distributions for all birds, mammals and amphibians in the LAC region (source: IUCN 2014b).

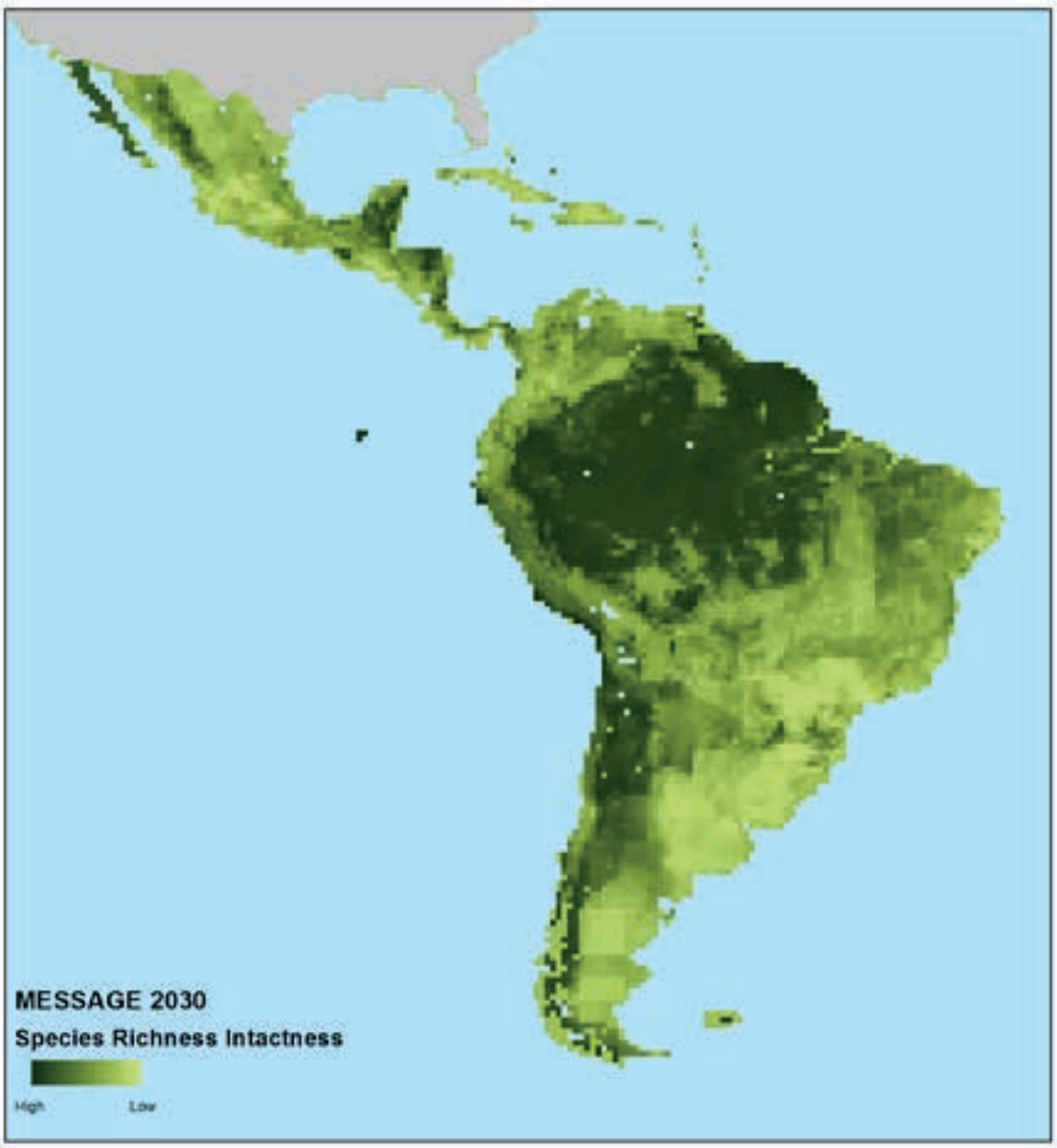


Figure 12.4: Intactness of the species richness assemblage in the LAC region as measured using the PREDICTS database and modelling framework (source: Newbold et al. 2015).

The IUCN Red List Index (RLI) for bird species, compiled by BirdLife International, shows that, on average, bird species of Latin America and the Caribbean have higher RLI values (i.e. a lower extinction risk), than bird species globally. Between 2008 and 2012, however, the RLI for bird species within the LAC region showed an increasing risk of extinction (Figure 12.5). This downward trend is concerning and shows that the rate at which species are moving towards extinction is accelerating. Considerable action is thus needed to safeguard the unique biodiversity of this region.

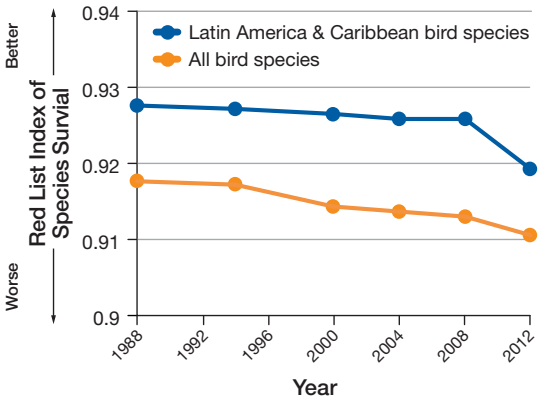


Figure 12.5: IUCN Red List Index of species survival (1988-2012). A Red List Index value of 1.0 means that all species are categorized as 'Least Concern', and hence none are expected to go extinct in the near future. A value of zero indicates that all species have gone extinct (source: BirdLife International 2016b).

The Living Planet Index (LPI) (WWF 2014), a weighted measure of changes in species populations, shows a steep decline in the population sizes of vertebrates in the Neotropical realm (broadly equivalent to the LAC region) between 1970 and 2010, although this has stabilised since around 2010 (Figure 12.6). Overall, this region has recorded the highest rate of decline on Earth: on average, population sizes decreased by 83 per cent over this time period. This analysis is based on data from 86 species of marine and freshwater fish, 61 species of amphibians, 25 species of reptiles, 310 species of birds and 66 species of mammals.

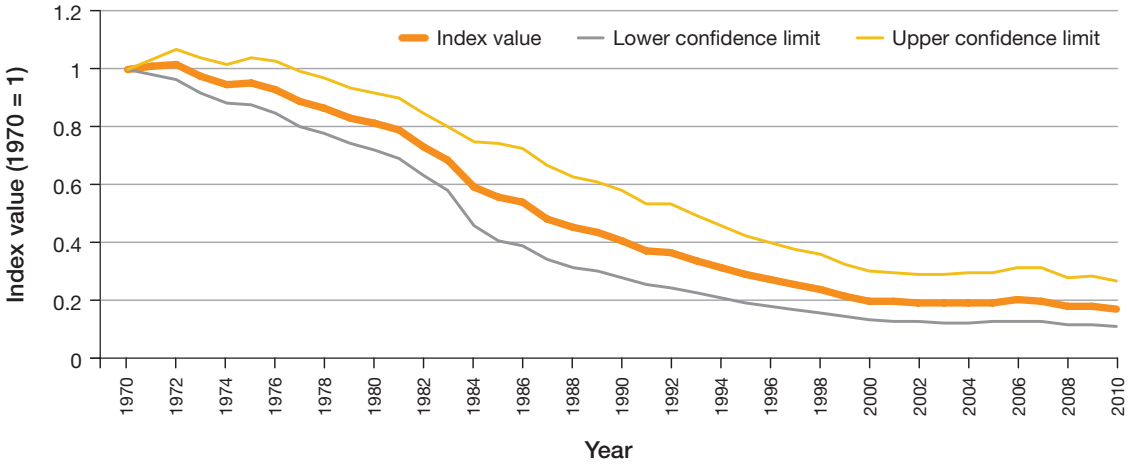


Figure 12.6: Neotropical Living Planet Index 1970-2010. Dashed lines indicate confidence limits (source: McRae et al. 2014).

In conclusion, the LAC region contains exceptional biodiversity and in the main forest region, this diversity remains largely intact, with losses elsewhere – particularly in the more developed agricultural and pasture regions, and on the islands of the Caribbean. Preventing extinction and managing populations of heavily threatened species – especially on the offshore islands – will likely remain the focus in this region. The target is not likely to be met in the LAC region, but many countries are making serious efforts to stem biodiversity loss.

TARGET 13: SAFEGUARDING GENETIC DIVERSITY

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

"The genetic diversity of cultivated plants and farmed or domesticated animals and of wild relatives is in decline, as is the genetic diversity of other socio-economically and culturally valuable species. The genetic diversity that remains needs to be maintained and strategies need to be developed and implemented to minimize the current erosion of genetic diversity, particularly as it offers options for increasing the resilience of agricultural systems and for adaptation to changing conditions (including the escalating impacts of climate change)." (CBD 2016c)

The genetic diversity of domestic crops and animals is high in this region. Most major food crops grown and consumed by the majority of the world's population originate in the tropics and subtropics of Asia, Africa and Latin America (FAO 2004a). Famous examples of genetically diverse and important crops originating from the LAC region include potatoes and tomatoes in the Andes and maize in South and Central America (FAO 2004a; Hijmans et al. 2000). Efforts by the countries of the region to maintain their diversity are extensive, with dedicated centres in place to maintain diversity of some key crop types – such as the International Potato Center[5] with regional offices in Quito (Ecuador) and Lima (Peru).

Domesticated animals, for example cattle, sheep and goats brought to the region contain a relatively low diversity of breeds. Currently, the LAC region contains 27 per cent of the world's cattle population, 15 per cent of the world's chicken population, 7 per cent of the world's sheep population and 9 per cent of the world's pig population, with the highest numbers in Brazil and Mexico (FAO 2015g).

Data on domestic animal population sizes from the Domestic Animal Diversity Information System (DAD-IS) enable calculation of extinction risk, based on population sizes described by the FAO (2007). Using this approach, 58 per cent of transboundary breeds in Latin America and the Caribbean are not considered at risk, broadly in line with transboundary breeds globally. However, there is very little information about the risk status of local breeds in Latin America and the Caribbean, and the region has been identified as having one of the highest proportions of breeds with an unknown risk status, making it difficult to assess the challenges and conservation needs for species and breeds (Leadley et al. 2014). For example, population sizes are unknown for 92 per cent of the 581 local breeds reported in the region, compared to 64 per cent globally (Figure 13.1) (DAD-IS 2016).

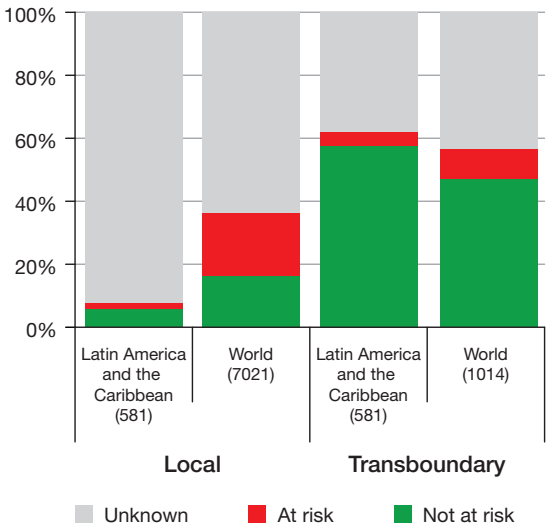


Figure 13.1: Per centage of breeds at risk of extinction in Latin America and the Caribbean, and globally, for both local and transboundary breeds. The absolute numbers for each category are included in brackets (source: DAD-IS 2016).

Country reports to FAO's Second Report on the State of the World's Animal Genetic Resources (2015) show that some countries in the region have a relatively high proportion of breeds maintained under conservation programmes (Figure 13.2), and high scores are more frequent in Latin America (and southern Asia) than in other developing regions.

[5] http://cipotato.org/

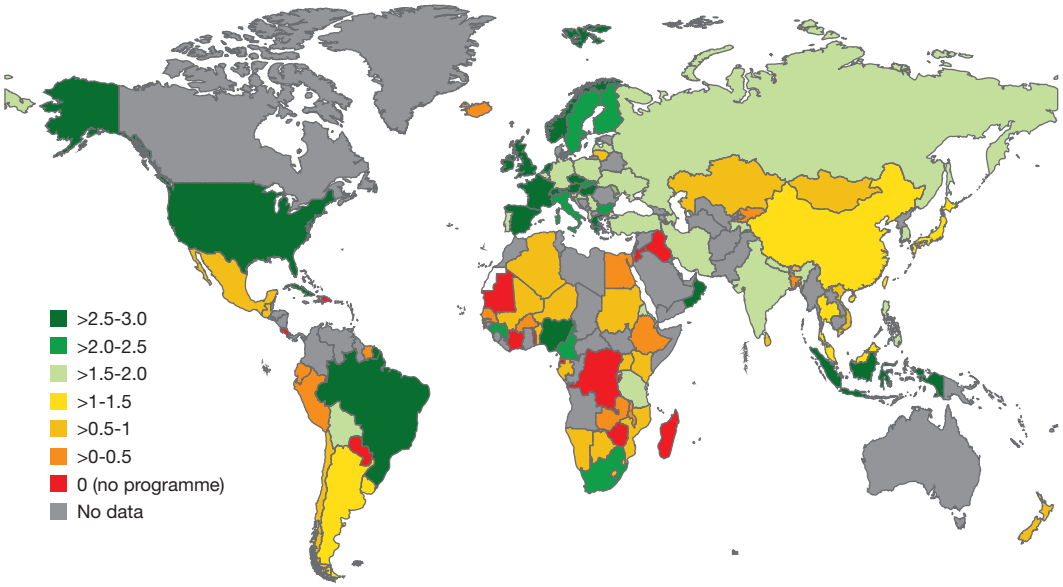


Figure 13.2. Coverage of in situ conservation programmes for five big livestock species. Coverage indicates the reported extent to which country's breeds are covered by conservation programmes, scored as none (0), low (1), medium (2) or high (3) for each of the big five species (cattle, sheep, pigs, chickens and goats). Beef, dairy and multipurpose cattle were treated separately (source: FAO 2015g).

The LAC region's progress towards Target 13 differs across countries. Some notable developments include the implementation of selection schemes for improving goat meat and milk production in a small selection of imported and locally adapted breeds in Brazil (FAO 2015g). In the past decade, efforts to manage genetic diversity in the LAC region have increased. In 2002, the Andean Community of Nations (CAN) put in place a number of instruments relevant to the management of animal genetic resources through Decision 523, which approved the Regional Biodiversity Strategy for the Countries of the Tropical Andes (FAO 2015e). However, this strategy did not include any provisions specifically addressing animal genetic resources management, but it included a "line of action" on the conservation and sustainable use of native and locally adapted agrobiodiversity.

The fifth national reports from Latin America and the Caribbean region outline a large number of actions undertaken by countries to safeguard the genetic diversity of plants, including the establishment of seed and gene banks (Argentina, Bolivia, Brazil, Chile, Dominican Republic, El Salvador, Guatemala, Nicaragua, Panamá, Uruguay, with plans to establish a gene bank in Suriname) and herbariums (SCBD 2015). The status of these gene banks varies across the region, and some are private initiatives with no central coordination. However, very little information is provided in the fifth national reports to the CBD about the preservation of genetic diversity of animals (CBD 2015).

Box 13.1: Impact of Legislation on Preservation of Genetic Diversity in Brazil.

Regarding rural producers, Embrapa Genetic Resources and Biotechnology carried out an assessment of how existing legislation is impacting on the conservation of local products, given that it has been observed that the implementation of public policies has been leading to a decrease in the seed/species exchange networks among rural producers, which creates a risk of loss of land race varieties of cultivated and raised species, reduction of gene flow, and reduction of the generation of new varieties.

In conclusion, safeguarding genetic diversity has important implications for food security in the region (León-Lobos et al. 2012). The LAC region is an important centre of crop diversity for some of the main food crops globally. The conservation of this diversity is important in the region and there have been significant efforts to maintain diversity with dedicated centers for some of the main crops established in the region. The diversity of domestic animals is lower and the main global breeds are fairly newcomers to the region. Overall, the region is making progress towards the target but is unclear whether it will fully achieve the target by 2020.

TARGET 14: ECOSYSTEM SERVICES

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

"All terrestrial, freshwater and marine ecosystems provide multiple ecosystem services. Some ecosystems are particularly important in that they provide services that directly contribute to human wellbeing by providing services and goods to fulfil daily needs. Actions taken to protect and restore such ecosystems will have benefits for biodiversity as well as human wellbeing." (CBD 2016c)

An ecosystem is a dynamic complex of plant, animal, and microorganism communities and their non-living environment interacting as a functional unit (Art. 2 of the Convention on Biological Diversity). Ecosystem services are the benefits that people obtain from ecosystems (MA 2005). Four types of ecosystem services have been defined; provisioning (e.g. food, water and fibre); regulating (e.g. climate and flood regulation); cultural (e.g. aesthetic, recreation and spiritual); and supporting (e.g. nutrient cycling and soil formation).

The GBO-4 analysis suggested that globally we are moving away from the target, especially with regard to provisioning services being over-used to support economies and human livelihoods (SCBD 2014). Continued degradation of habitats that provide important ecosystem services suggests that service provision from natural habitats is declining, but there is little data on this at regional scales. Global analyses, although with limited data, suggest that we are moving away from the target in terms of taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Actions reported in the fifth national reports to CBD in relation to Target 14 tend to be a series of specific projects contributing to the protection of ecosystems, particularly forests. Argentina, Belize, Brazil, Cuba, Ecuador, El Salvador and Peru all report actions which take into the needs of women, or indigenous and local communities, including PES schemes and managed access programmes. Action plans have not generally been put in place to systematically address this target, and the region is not on track to meet the target by 2020. Colombia in particular reports that many ecosystems have already crossed irreversible thresholds making them impossible to restore, such as the eutrophication of wetlands (CBD 2015).

There is a strong link between Aichi Biodiversity Target 14 and a number of the Cancun safeguards for REDD+, which were agreed in 2010 (UNFCCC 2014). These include: safeguards d) which promotes the full and effective participation of relevant stakeholders, particularly indigenous people and local communities and e) which supports the protection and conservation of natural forests and their ecosystem services (UNFCCC 2016). Community consultations may help to identify essential services that can be incorporated into REDD+ planning and the design of REDD+ actions to secure their provision.

Although there are limited data available to measure progress towards Target 14, it is possible to examine trends in some of the benefits derived from ecosystem services in the region, and on how access to those services is distributed across the population.

Food

The per centage of land dedicated to agriculture across Latin America and the Caribbean has increased steadily since 1961 (FAO, 2015a) (Figure 14.1). FAO data also show that access to food has improved within the region. In 1990-1992 (three year average) five countries (Bolivia, Dominican Republic, Haiti, Nicaragua, and Peru) had a dietary energy supply adequacy of less than 100 per cent of the energy requirement of their population, but by 2014-2016, Haiti is the only country in the region reported to have an overall food energy deficit (FAO, 2015b). Despite a surplus of food available in the majority of countries, it is estimated that 13 per cent of the population of Latin America and the Caribbean will be undernourished between 2014 and 2016, based on a three year average (FAO, 2015c). Progress is being made as this is a reduction from 25 per cent between 1990 and 1992 (FAO, 2015c), but more needs to be done to ensure the poor and vulnerable have access to sufficient food security (Figure 14.2).

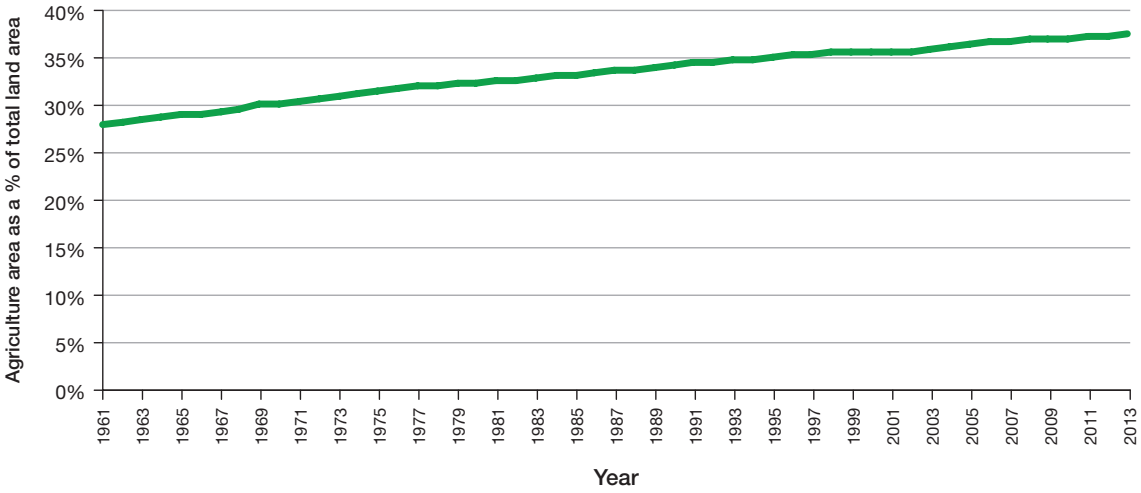


Figure 14.1: Trends in agriculture area as a % of total land area in Latin America and the Caribbean between 1961 and 2013 (source: FAO, 2015a).

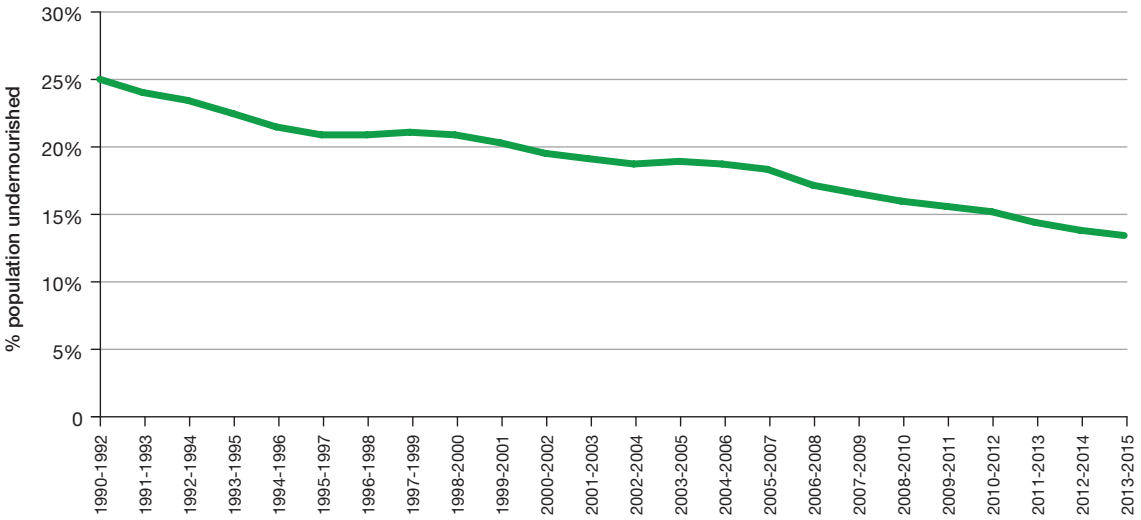


Figure 14.2: Trends in the proportion of the population of Latin America and the Caribbean estimated to be undernourished, shown as three year averages from 1990-1992 to 2013-2015 (source: FAO, 2015c).

Water

Around 34 per cent of the world's renewable water resources are in Latin America and the Caribbean, although this is not distributed evenly across the region (Mekonnen et al. 2015). A country with annual renewable water resources of under 1,000 m^3 per capita is considered to be under water stress (Falkenmark & Lindh, 1976; UN-Water, 2011) and in 2014, six Caribbean countries fell into that category (Antigua and Barbuda, Barbados, Haiti, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines). Barbados has the least water per capita of any country in the region, at 280 m^3 per person per year (FAO, 2015d).

Access to improved water sources (defined as "one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter" (JMPWSS, 2015a) has increased across the region from 67 per cent (1990) to 83 per cent (2014) (JMPWSS, 2015b). Despite this improvement in access to clean water, a steadily increasing population in Latin America and the Caribbean is putting increasing pressure on overall freshwater resources (FAO, 2015d) (Figure 14.3).

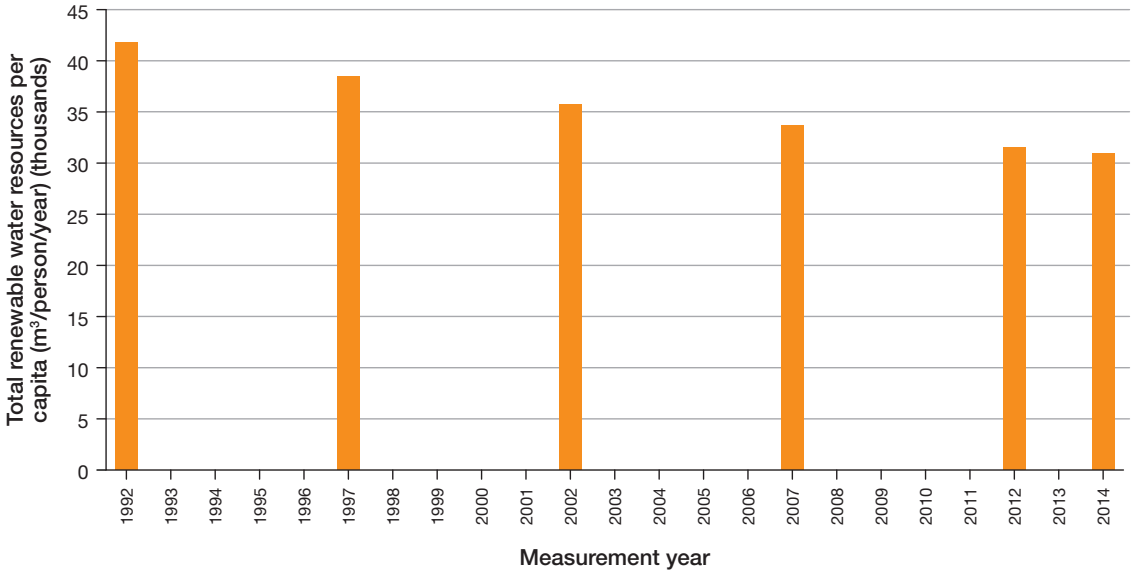


Figure 14.3: Trends in total renewable water resources per capita, measured at different intervals between 1992 and 2014, in Latin America and the Caribbean (source: FAO, 2015d).

Air quality

Yale University's Environmental Performance Index shows that the proportion of the region's population exposed to fine particulate matter ($PM_{2.5}$) over the WHO recommended levels of 10µg/m³ (WHO, 2005) has remained fairly stable since 2000. In 2012, over 10 per cent of the population was exposed to higher than recommended levels in four countries: Bolivia (12 per cent), Mexico (50 per cent) Paraguay (33 per cent) and Peru (12 per cent) (Figure 14.4). More needs to be done to improve air quality, particularly in these countries. The proportion of the population exposed in other countries in the region averaged between zero and nine per cent over the same period (Yale University, 2012).

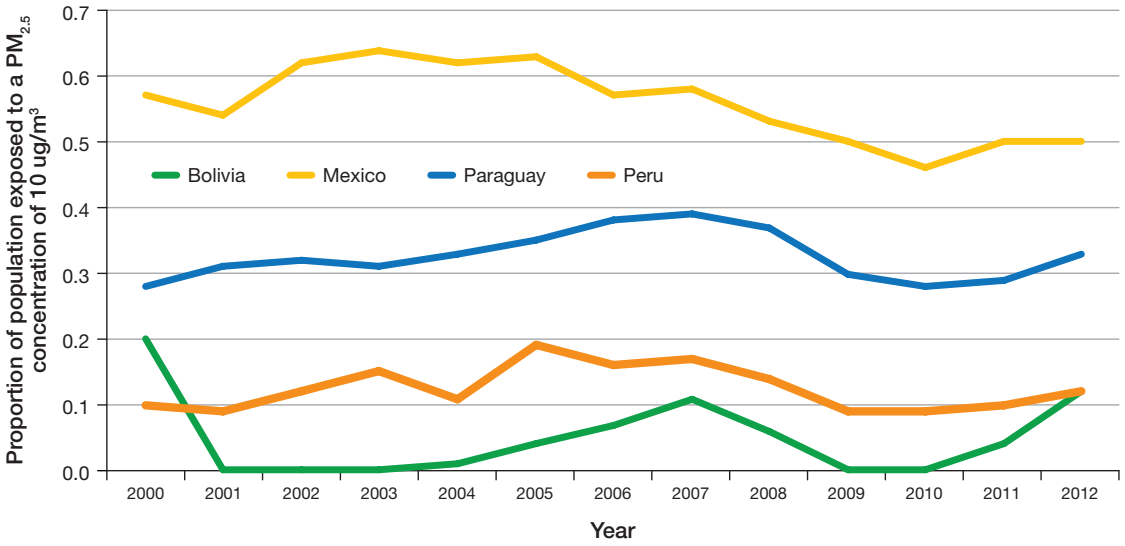


Figure 14.4: Trends in the proportion of the national population exposed to a $PM_{2.5}$ concentration of 10µg/m³, from 2000 to 2012, for all countries in Latin America and the Caribbean with a proportion of over 10% in 2012 (source: Yale University 2015).

Ocean

The Ocean Health Index combines multiple datasets to calculate annual index scores for ten goals, plus an overall index score, which cover the range of ecosystem services that humans derive from the ocean (Figure 14.5). In 2015, Latin America and the Caribbean scored slightly lower than the global average in all but three of the elements of the index (*Carbon Storage*, *Livelihoods and Economics*, and *Sense of Place*). Latin America and the Caribbean scores particularly low in absolute terms, and compared to global averages, in *Natural Products* and *Tourism and Recreation*. Ocean Health Index scores for Latin America and the Caribbean have not changed significantly between 2012 and 2015 (Ocean Health Index, 2016). However, some of the underlying datasets have not been updated since 2012, which may be masking regional changes (Halpern et al. 2015).

In conclusion, there are considerable broad scale data on changes in ecosystem services in the region. Natural resources are being converted gradually through ecosystem service provision and resulting in a lower stock of natural resources across the region. Although there are efforts to enhance sustainability of use of ecosystem services in the region, it is likely that the countries are mainly moving away from this target and that additional actions are needed to keep this target on track.

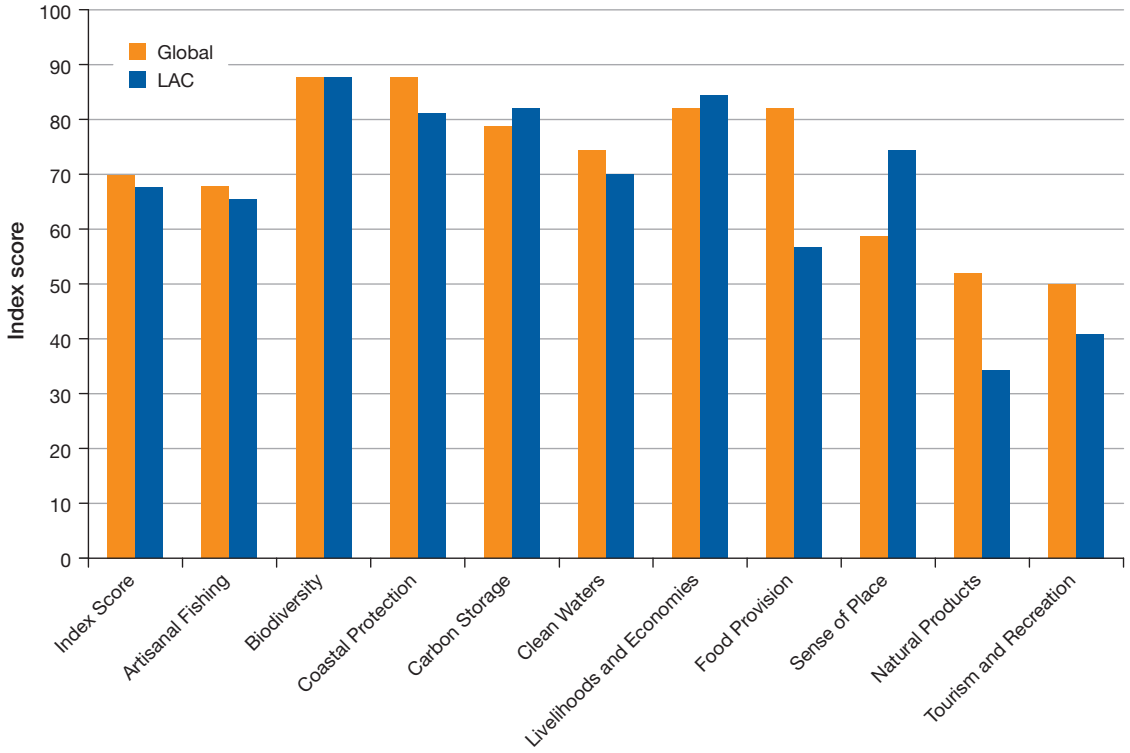


Figure 14.5: 2015 Ocean Health Index scores by goal, comparing Exclusive Economic Zone (EEZ) area weighted average scores for Latin America and the Caribbean with global scores (source: Ocean Health Index 2016).

Box 14.1: Impacts of Dams.

The increasing dam development in the Amazon basin is feared to have severe effects on the region's biodiversity.

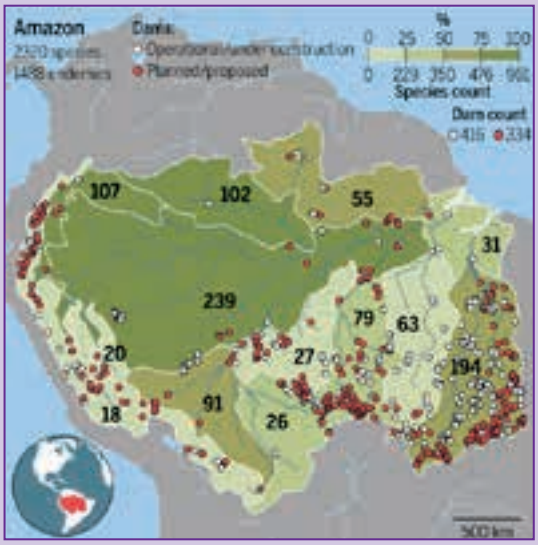


Figure 14.6. Fish diversity and dam locations in the Amazon basin. Numbers indicate where species occur only within a specific ecoregion (white boundaries) (source: Winemiller et al. 2015).

Current and planned dams in the Amazon Basin (Figure 14.6) are likely to have long-term cascading effects on biodiversity and ecosystem services, which are rarely analysed and considered fully during dam planning (Winemiller et al. 2015). For example, the Belo Monte dam project (Amazon Watch, 2016) is expected to set a new record for biodiversity loss due to high endemism amongst species in the construction site.

Sustainable management of infrastructure development is key in order for communities in affected areas to continue receiving benefits from the ecosystem services and goods provided. Actions must be taken in order to protect these habitats and their services, and to ensure that the costs of lost biodiversity, genetic resources, cultural values and water and soil quality do not outweigh the potential benefits from infrastructure development and energy supply to local communities.

Box 14.2: Brazilian Biological Resources Centers Network - Br-BRCN.

Ecosystems provide many different services, some of which are provided through the presence of microorganisms that contribute to the health of natural habitats, but also to industry, agriculture and health. Within this context, there is an important initiative in Brazil at the Federal Government level which entails the structuring of the Brazilian Biological Resource Center Network (Br-BRCN), composed of collections of protozoa, fungi, bacteria and virus, as well as replicable parts of these from Fiocruz (Oswaldo Cruz Foundation), Embrapa (Brazilian Agricultural Research Corporation), Unicamp (University of Campinas) and other universities, with the support of CRIA (Reference Center on Environmental Information), Inmetro (National Council of Metrology, Standardization and Industrial Quality), INPI (National Institute of Industrial Property) and SBM (Brazilian Society of Microbiology). The Brazilian BRCN will provide certified and authenticated biological material, specialized services and associated information in accordance with all the national and international regulations and legislations related to these biological materials and activities conducted by the BRCs. The Network aims to offer new opportunities to maintain the productive capacity of ecosystems and promote sustainable development. This infrastructure will be responsible for preserving an important part of Brazil's biodiversity.

TARGET 15: ECOSYSTEM RESTORATION AND RESILIENCE

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least fifteen per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

"Deforestation, wetland drainage and other types of habitat change and degradation lead to the emission of carbon dioxide, methane and other greenhouse gases. The reversal of these processes, through ecosystem restoration, represents an immense opportunity for both biodiversity restoration and carbon sequestration. In fact, in many countries degraded landscapes represent a huge wasted resource. Restored landscapes and seascapes can improve resilience including adaptive capacity of ecosystems and societies, and can contribute to climate change adaptation and generate additional benefits for people, in particular indigenous and local communities as well as the rural poor. The conservation, restoration and sustainable management of forests, soils (especially peatlands), freshwater and coastal wetlands and other ecosystems are proven to be cost-effective, safe and immediately-available means to sequester carbon dioxide and prevent the loss of other greenhouse gases." (CBD 2016e)

Ecosystem resilience is a term that describes the capacity of ecosystems to absorb and adapt to disturbances while preserving their ecological functions and without moving to a new state governed by different processes and controls (Carpenter et al. 2001). Restoration of degraded ecosystems can enhance ecosystem resilience, improve the adaptive capacity of ecosystems, contribute to climate change adaptation and mitigation, and generate additional benefits for local people.

Despite its many benefits to ecosystems and biodiversity of restoration and enhancing resilience, there is a lack of indicators to assess the progress towards Target 15 (Chenery et al. 2015; GEO BON, 2015), due in part to the difficulties with defining restoration itself. The area of restoration projects in the Global Restoration Network Database is the only potential global indicator, but even this has low alignment to the target (Chenery et al. 2015).

The Group on Earth Observations Biodiversity Observation Network's (GEO BON) is working on a 'global ecosystem restoration index' that integrates elements of the restoration process, including structural and functional aspects, to assess improvements or declines against a baseline (GEO BON, 2015). This index builds upon recent advances in remote sensing (using the MODIS sensor) and ecosystem mapping to combine the assessment of three main elements of restoration: change in ecosystem productivity; change in ecosystem energy balance; and changes in land cover. The index has near-global coverage at 1 km^2 spatial resolution, but the data are not yet available for general use.

The fifth national reports to the CBD show that restoration of forests and mangroves is taking place across Latin America and the Caribbean, but progress is slow compared to the extent of ecosystem degradation. In Cuba, forest cover has increased since 2000 through management efforts, despite no reforestation or forest restoration taking place. Many countries in the region also report a reduction in deforestation rates, such as Brazil (for detail see text under Target 5). However, deforestation is currently expected to increase in many other countries (CBD 2015).

National statements have been made by several countries to the UNFCCC, indicating their intent to carry out reforestation through a variety of initiatives. These include: Intended Nationally Determined Contributions (INDCs) prepared for the UN Framework Convention on Climate Change (UNFCCC) 21st Conference of the Parties (COP21) in Paris in December 2015 (see Box 15.2).

Activities carried out under commitments to REDD+ will also work toward increasing the resilience of forest carbon stocks to climate change and improve the ability of forest ecosystems to adapt to climate change (Miles et al. 2013). In Peru, elements of the country's NBSAP for 2014-2018 and their participatory approach to the implementation of Nationally Appropriate Mitigation Actions (NAMAs) for 3 main economic activities associated with deforestation and forest degradation have the potential to contribute to enhancing carbon stocks and mitigating climate change (Epple et al. 2014).

The largest such statements made by each country amount to 33.5 million ha, 4 per cent of the region's 2015 forest area, or 43 per cent of the reduction in forest area in the region between 1990 and 2015 (Murcia & Guariguata 2014; Miles & Sonwa, 2015; Murcia et al. 2015) (Figure 15.1). Thus if these intentions are enacted, significant progress will be made towards Target 15. As an example of forest recovery in the region, and according to FAO data (FAO 2015), forest cover has increased between 1990 and 2015 in six countries in Latin America and the Caribbean: Chile (16 per cent) Costa Rica (7 per cent) Cuba (55 per cent), Dominican Republic (79 per cent), Saint Vincent and the Grenadines (8 per cent), and Uruguay (131 per cent). This is against an overall 9 per cent total reduction of forest area across the region over the same period (FAO 2015e).

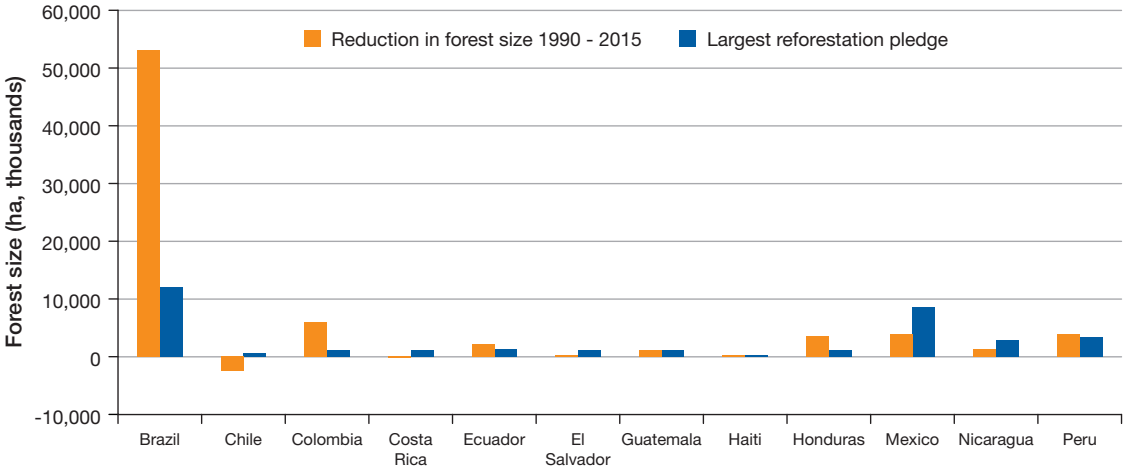


Figure 15.1: Reduction in forest size from 1990 to 2015 compared to the largest reforestation statement made, for all countries in Latin America and the Caribbean that have made a reforestation statement through an Intended Nationally Determined Contribution (INDC), the Bonn Challenge or Initiative 20x20 (source: Miles & Sonwa, 2015).

Reforestation cover is only one aspect of forest restoration. As well as the issues of replacing primary forest with new forest, Aide et al. (2012) found wide variation in deforestation and reforestation rates in the ten major biomes of Latin America and the Caribbean. Moist forest, dry forest and savannah/scrubland accounted for more than 80 per cent of deforestation in the region between 2001 and 2010, whereas over 40 per cent of reforestation over the same period took place in the desert/xeric shrub biome.

In conclusion, despite poor data and a lack of indicators to track the achievement of this target, there are a number of dramatic commitments at the global and regional level that, if implemented, would make a significant impact on the restoration of forests around the world, including within the LAC region.

Box 15.1: National Forestry Evaluation, Ecuador.

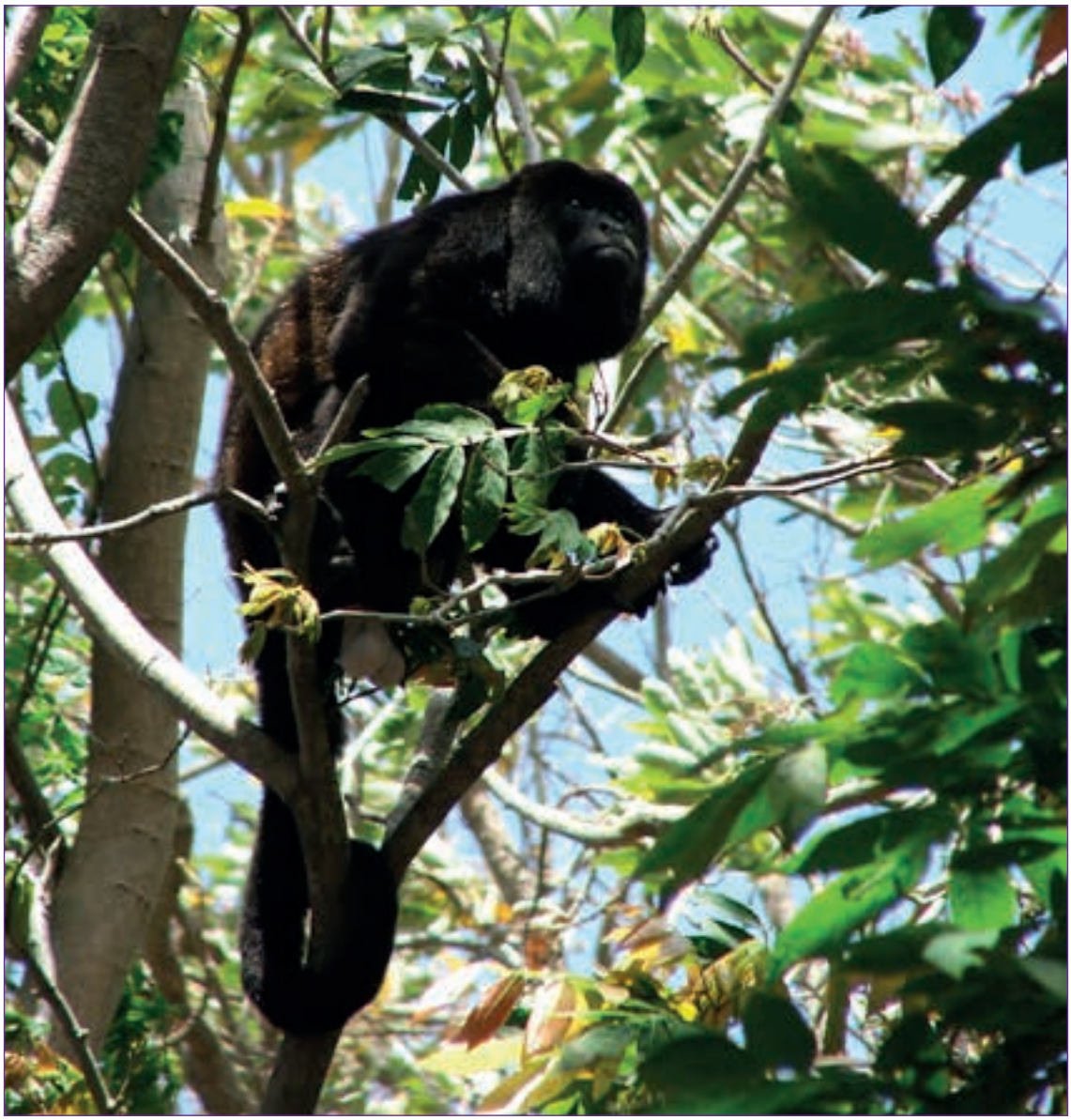
The National Forestry Evaluation in Ecuador, with technical input provided by the FAO, was initiated in 2006 to compile biophysical, environmental and socio-economic information about forests. Information about different classes of vegetation are captured so that changes in biomass and land use can be capture for different vegetation types. One impact of this approach has been to allow Ecuador to include trees outside of forests in its land cover measures. The outputs from the programme will inform decision making and policy development (The REDD Desk 2016b). Calculation of carbon stocks stratified across different ecosystems has been another output of the programme (Ministerio del Ambiente, Ecuador 2015).

Box 15.2: Initiative 20x20.

Initiative 20x20 was formally launched at the UNFCCC COP-20 in Lima, with the goal of bringing 20 million ha of degraded land across Latin America and the Caribbean into restoration projects by 2020. Initiative 20x20 will support the Bonn Challenge, a global commitment to restore 150 million ha of land by 2020. USD 730 million of private investment has been provided for ten countries, three states and one regional programme, which together have committed to begin restoring 27.7 million ha by 2020 (WRI 2016).

Box 15.3: Social Forest Program in Argentina.

The Social Forest Programme (Programa Social de Bosques, ProSoBo) aims to preserve and restore the sustainable use of native forests and their biodiversity, by enabling local people to utilise their environment to earn a livelihood and improve their standard of living. The programme provides technical and financial support, mostly to inhabitants of forests, including rural communities and farming organisations, indigenous peoples, and small farmers (Secretaria de Ambiente y Desarrollo Sustentable, Republica Argentina 2015).



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TARGET 16: ACCESS TO AND SHARING BENEFITS FROM GENETIC RESOURCES

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

"The fair and equitable sharing of the benefits arising out of the utilization of genetic resources is one of the three objectives of the Convention on Biological Diversity. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity was adopted by the Conference of the Parties to the Convention on Biological Diversity at its tenth meeting in Nagoya, Japan." (CBD 2016e)

The *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS)* entered into force in October 2014. In order to fulfil its aim of fair and equitable sharing of the benefits of the utilisation of genetic resources, the Protocol provides a comprehensive framework aimed at ensuring that genetic resources and associated traditional knowledge are only accessed with free prior and informed consent of the country of origin providing those resources, the involvement of indigenous peoples and local communities, and under mutually agreed terms. The Protocol aims to provide users, producers of genetic resources and holders of traditional knowledge in all countries with greater legal certainty, clarity and transparency (South Centre, 2015). In brief, it advances in the implementation of the third objective of the CBD by enhancing the contribution of biodiversity to sustainable development and human well-being (CBD 2014b).

Progress towards the achievement of Aichi Biodiversity Target 16 is analysed in relation to two aspects. Firstly, with respect to those countries in the region that have ratified the Protocol, therefore bring it into force at the national level. Secondly, elements linked to the operationalisation of the Protocol consistent with national legislation will also be considered.

To date, nine countries in Latin America and the Caribbean have acceded to or ratified the Nagoya Protocol, and a further eight countries are signatories but have not yet ratified (Table 16.1) (CBD 2016b). In addition, consultation processes that could lead towards its ratification are taking place in several countries at the domestic level. Recent research found that 19 countries in Latin American and the Caribbean had some form of access and benefit sharing measures either in place or in the process of being drafted (CBD 2014a; Medaglia et al. 2014).

At the time of submission of the fifth national reports to the CBD, four countries (Argentina, Costa Rica, Honduras and Nicaragua) had national legislation in place on the utilization of genetic resources in support of the Nagoya Protocol. A further five (Dominican Republic, Ecuador, Guatemala, Mexico, and Panama) were in the process of developing such legislation. Other countries in the region either provided no information in their fifth national reports, or were in the early stages of considering Target 16 (CBD 2015).

Table 16.1: Dates of signature and ratification or accession to the Nagoya Protocol for countries in the Latin America and the Caribbean region (source: CBD 2016b).

Country	Signed	Ratification/ Accession
Antigua and Barbuda	28/07/2011	N/A
Argentina	15/11/2011	N/A
Brazil	02/02/2011	N/A
Colombia	02/02/2011	N/A
Costa Rica	06/07/2011	N/A
Cuba	N/A	17/09/2015
Dominican Republic	20/09/2011	13/11/2014
Ecuador	01/04/2011	N/A
El Salvador	01/02/2012	N/A
Grenada	22/09/2011	N/A
Guatemala	11/05/2011	18/06/2014
Guyana	N/A	22/04/2014
Honduras	01/02/2012	12/08/2013
Mexico	24/02/2011	16/05/2012
Panama	03/05/2011	12/12/2012
Peru	04/05/2011	08/07/2014
Uruguay	19/07/2011	14/07/2014

In accordance with the information available in the fifth national reports, most of the countries that ratified the Protocol are currently in the process of either developing legal and institutional frameworks to create conditions for effective implementation, or adapting existing legal and institutional frameworks in order to make them compliant with the Protocol's provisions. Other countries in the region are in the early stages of considering this target. Several other countries that are not Parties to the Nagoya Protocol, such as Argentina, Bolivia, Brazil, Colombia, Costa Rica, and Ecuador, had national legislation on access to genetic resources in place before the Protocol entered into force (Medaglia et al. 2014).

Moreover, the Secretariat of the Caribbean Community and Common Market (CARICOM) has conducted several activities in the Caribbean in order to build capacities of its Member States in the implementation of the Nagoya Protocol. The *Access and Benefit Sharing Capacity Development Initiative (ABS Initiative)* is working with CARICOM to support the development of the necessary legal and policy frameworks for that sub-region (ABS Initiative 2016). At the regional level, there have been substantive developments in the implementation of ABS, particularly in the Andean Community. Several countries in the LAC region are in the process of developing and implementing ABS regimes, through Global Environment Facility (GEF) projects implemented by UNEP.

Box 16.1: Advancing the Nagoya Protocol in Countries of the Caribbean.

This three year Global Environment Facility (GEF) project being implemented by UNEP intends to make progress in defining variables to measure implementation of the Nagoya Protocol within the Caribbean region, and to integrate Access and benefit Sharing (ABS) mechanisms into policies and government plans.

The project focuses on awareness raising and capacity building in eight countries across the Caribbean (Antigua and Barbuda, Barbados, Grenada, Guyana, Jamaica, Saint Lucia, Saint Kitts and Nevis, and Trinidad and Tobago) and has four components:

1. Identifying regional commonalities and assets, and basic elements conducive to policy formulation.
2. Uptake of the Nagoya Protocol.
3. Implementation of the Nagoya Protocol and establishing an enabling environment for the basic provisions of the NP.
4. Regional Coordination, technical support and capacity development.

The project plan identifies issues hindering the implementation of ABS mechanisms including: gaps in understanding of how ABS can be incorporated into the existing legal framework; no coordinated regional Inventory of Common Genetic Resources and Traditional Knowledge in place; and the absence of a dedicated National ABS Focal Point for most of the countries involved (UNEP 2015a).

In conclusion, Latin America and the Caribbean has made substantial progress in relation to the achievement of Aichi Biodiversity Target 16, though it has not been possible to fully reach the target by its agreed deadline. However, the progress is continuing and it seems highly likely that all countries will attain the target before 2020. There is also encouraging efforts in many countries to translate the Nagoya protocol into relevant national and even sub-regional policy and supporting legislation.

TARGET 17: BIODIVERSITY STRATEGIES AND ACTION PLANS

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

"National Biodiversity Strategies and Action Plans (NBSAPs) are the key instrument for translating the Convention and decisions of the Conference of the Parties into national action. For this reason it will be essential that Parties have developed, adopted and commenced implementing as a policy instrument an updated NBSAP which is in line with the goals and targets set out in the *Strategic Plan* by 2015" (CBD 2016c).

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In accordance with article 6 of the Convention on Biological Diversity, Parties have to develop National Biodiversity Strategies and Action Plans (NBSAPs). The NBSAPs need to address the three objectives of the Convention, i.e. conservation of biodiversity, sustainable use of the components of biodiversity, and fair and equitable sharing of the benefits deriving from the utilization of genetic resources. Parties have also been requested to develop or update their NBSAPs in line with the *Strategic Plan for Biodiversity 2011-2020* and the 20 Aichi Biodiversity Targets (SCBD 2011).

At the time of submission of the fifth national reports to the CBD, five countries in Latin America and the Caribbean (Colombia, Cuba, Dominican Republic, Ecuador, and Guatemala) reported that their NBSAP had been adopted as a policy instrument, while Peru was in the process of approving it. Most other countries in the region reported that progress was being made towards development or approval of the NBSAP (CBD 2015).

Through international support, considerable efforts have been carried out to assist countries in Latin America and the Caribbean to revise and update their NBSAPs. Since 2011, five regional and sub-regional capacity-building workshops were held for countries in the region under the CBD, with a focus on the information needs and use of indicators in setting and monitoring national targets to support the process of updating NBSAPs (CBD 2016a).

As of January 2016, seven of the 33 Parties to the CBD in Latin America and the Caribbean had submitted a post-2010 NBSAP to the CDB which incorporated the *Strategic Plan for Biodiversity 2011-2020* (Table 17.1). Only Haiti is yet to submit an NBSAP to the CBD, and ten countries have revised their submitted NBSAPs at least once (CBD 2016a).

Table 17.1: Status of NBSAP development for Latin America and the Caribbean (as of January 2016) (source: SCBD 2016).

Parties	Parties with their first NBSAP under development	*Parties that have submitted a pre-2010 NBSAP to the CBD, and have not yet submitted a post-2010 NBSAP*	*Parties that have submitted a post-2010 NBSAP to the CBD*
Antigua and Barbuda			X
Argentina		X	
Bahamas		X	
Barbados		X	
Belize		X	
Bolivia (*Plurinational* State of)		X	
Brazil		X	
Chile		X	
Colombia			X
Costa Rica		X	
Cuba		X	
Dominica			X
Dominican Republic			X
Ecuador		X	
El Salvador		X	
Grenada		X	
Guatemala			X
Guyana		X	
Haiti	X		
Honduras		X	
Jamaica		X	
Mexico		X	
Nicaragua		X	
Panamá		X	
Paraguay		X	
Peru			X
Saint Kitts and Nevis		X	
Saint Lucia		X	
Saint Vincent and the Grenadines		X	
Suriname		X	
Trinidad and Tobago		X	
Uruguay		X	
Venezuela (Bolivarian Republic of)			X
Total	1	25	7

In conclusion, this region is somewhat behind other parts of the world in its development of updated NBSAP documents for submission to the CBD. However, there is progress on this task in many countries and almost all countries have pre-2010 documents that provide a basis for much of their national action to achieve the goals of the CBD. Given that a number of countries are known to be working hard on their NBSAPs, for example, Mexico has a detailed national plan and set of subnational biodiversity strategies under development, it is expected that this region will complete the NBSAP process and have them under implementation before 2020.

TARGET 18: TRADITIONAL KNOWLEDGE

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

"There is a close and traditional dependence of many indigenous and local communities on biological resources. Traditional knowledge can contribute to both the conservation and sustainable use of biological diversity. Target 18 aims to ensure that traditional knowledge is respected and reflected in the implementation of the Convention, subject to national legislation and relevant international obligations, with the effective participation of indigenous and local communities." (CBD 2016c)

The GBO-4 has shown that the world is making insufficient progress toward Target 18 due to "limited support, recognition and capacity" (SCBD 2014, p.115). However, there was also the recognition that there is "growing interest in traditional cultures and involvement of local communities in the governance and management of protected areas and the growing recognition of the importance of community conserved areas". This suggests that global trends may not reflect realties in some regions.

The LAC region has a strong history of conservation and awareness of the importance of biological diversity by indigenous peoples and local communities. Large areas of the Amazon are under the management of indigenous groups – and this has been formally recognised in the laws of a number of countries. There are also indigenously managed areas further south in the continent (Ricketts et al. 2010).

Examples of actions indicating progress in Latin America and the Caribbean towards Target 18 mentioned in the fifth national reports to the CBD include; the consultation and involvement of indigenous people in specific conservation projects (Colombia, Costa Rica, El Salvador, Guatemala, and Guyana), the creation of inventories of traditional knowledge (Dominican Republic), putting in place incentive systems to encourage indigenous communities to maintain traditional knowledge in Peru, and Chile (Crowley 2015). Relevant legislation and policy instruments include the creation of the Council of Family, Peasant and Indigenous Agriculture in Argentina, the Law of Ancestral Medicine in Bolivia, and the National Commission for the Sustainable Development of Traditional Peoples and Communities (CBD 2006) in Brazil. Little information is provided on the impact of these measures, although Dominica reports that traditional knowledge continues to decline (CBD 2015).

Linguistic diversity is an important indicator of measuring trends in traditional knowledge, as traditional knowledge is mainly transmitted orally from generation to generation, and indigenous people, in part, identify themselves as 'indigenous' through the use of their language (Larsen et al. 2012). Twenty-four per cent of the languages recorded in the *UNESCO Atlas of the World's Languages in Danger* are spoken in Latin America and the Caribbean, a disproportionately high number compared to the population of the region. The Atlas records that 390 languages in the region are definitely, severely, or critically endangered, a further 217 languages are recorded as vulnerable, and 36 are reported to be extinct (UNESCO 2015). The Index of Linguistic Diversity suggests that there has been a steep decline of linguistic diversity in Latin America and the Caribbean since 1970 (Figure 18.1) (Loh & Harmon 2014).

In conclusion, achieving the intention of this target by 2020 will be a challenge, however, there are many examples of indigenous knowledge being used to further conservation in the region and parts of the region have some of the most vibrant and intact systems of local knowledge remaining on Earth. The diversity of languages in the LAC region, the best proxy of indigenous knowledge that can be tracked across the whole region, is in decline, and this decline seems to be accelerating in recent years. This suggests it will be hard to meet the target by 2020.

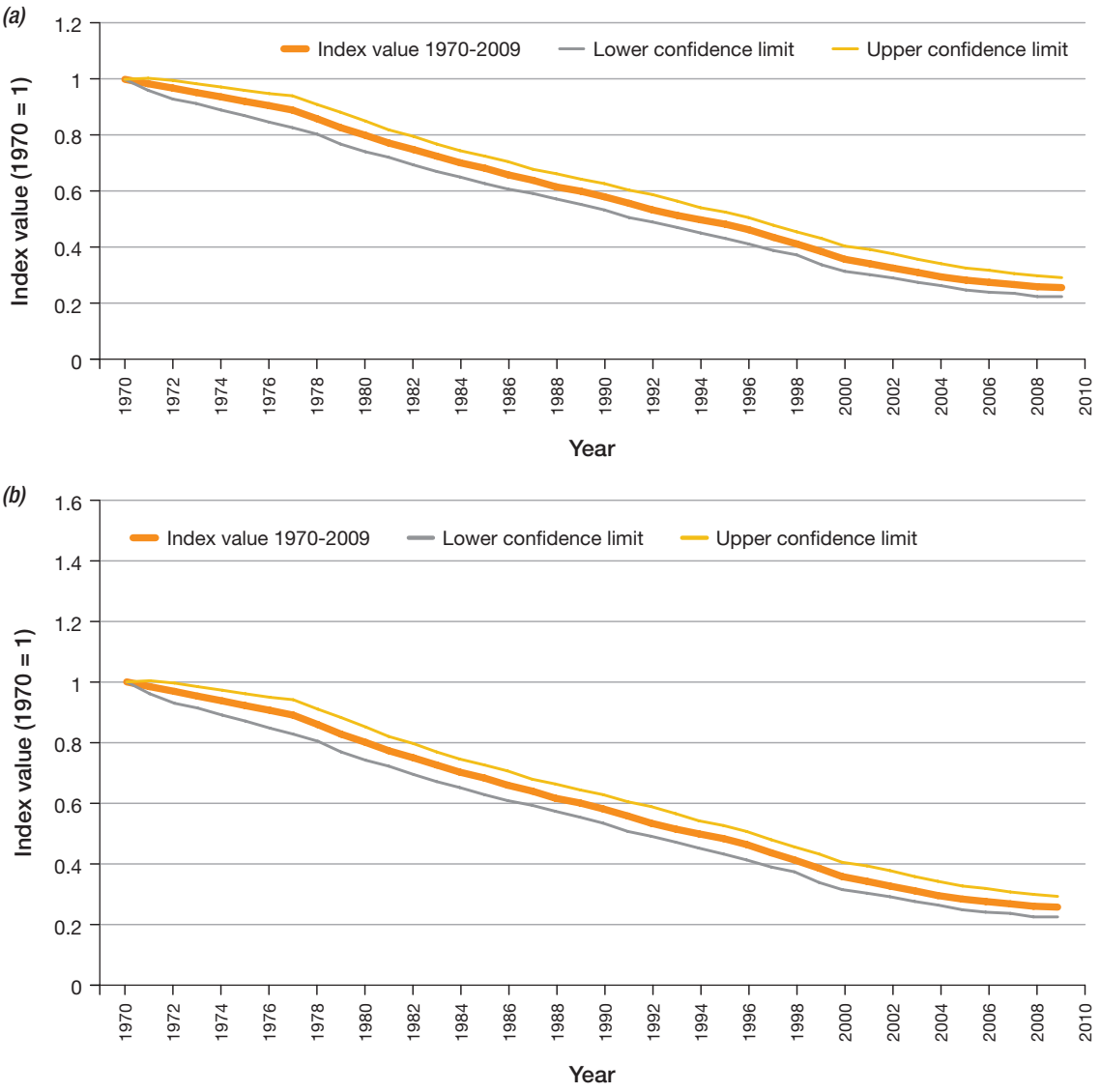


Figure 18.1: Neotropical (a) and Nearctic (b) Index of Linguistic Diversity 1970-2010 (source: Loh and Harmon 2014). While most of the LAC region is within the Neotropical realm, parts of Mexico fall within the Nearctic realm.

Box 18.1: Brazil's Indigenous Environmental and Territorial Management Project (GATI).

The main objective of Brazil's Indigenous Environmental and Territorial Management Project (GATI) is to strengthen "indigenous practices for the management, sustainable use and conservation of natural resources, as well as enhancing social inclusion of indigenous peoples" (Ministry of the Environment, Brazil 2015). The project has been implemented in 32 indigenous lands, selected to include all of the Brazilian forest biomes (Amazon, Atlantic Forest, Caatinga, Cerrado and Pantanal). Other criteria for the selection of land included a requirement for "significant biological diversity and vegetation cover", the existence of potential threats to biodiversity that could be mitigated by the project, and the existence of "outstanding indigenous initiatives" for environmental protection (Ministry of the Environment, Brazil 2015).

Since implementation of GATI in 2010, project activities have included: supporting small projects towards the sustainable management of native species; workshops on agroecology and agroforestry; ten information exchange events, including the participation of indigenous representatives in the United Nations Conference on Sustainable Development (Rio +20); and the establishment of the Indigenous Capacity Building Center (Ministry of the Environment, Brazil 2015).

Box 18.2: Protection Regime for the Collective Knowledge of Indigenous Peoples Derived from Biological Resources, Peru.

In 2002, Law No 27811 was introduced in Peru to establish a protection regime for traditional knowledge connected with biological resources. The objectives of the regime are:

a) To promote respect for and the protection, preservation, wider application and development of the collective knowledge of indigenous peoples;

b) To promote the fair and equitable distribution of the benefits derived from the use of that collective knowledge;

c) To promote the use of the knowledge for the benefit of the indigenous peoples and mankind in general;

d) To ensure that the use of the knowledge takes place with the prior informed consent of the indigenous peoples;

e) To promote the strengthening and development of the potential of the indigenous peoples and of the machinery traditionally used by them to share and distribute collectively generated benefits under the terms of this regime;

To avoid situations where patents are granted for inventions made or developed on the basis of collective knowledge of the indigenous peoples of Peru without any account being taken of that knowledge as prior art in the examination of the novelty and inventiveness of the said inventions" (The Peruvian Sate 2002).

The general principles of the law are that: prior informed consent is required from the representatives of indigenous peoples before traditional knowledge is accessed for scientific, commercial or industrial application; licences shall be used to ensure equitable distribution of benefits arising from commercial or industrial use of traditional knowledge; traditional knowledge shall be capture and preserved for the benefit of future generations (The Peruvian Sate 2002).

TARGET 19: SHARING INFORMATION AND KNOWLEDGE

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

"All countries need information to identify threats to biodiversity and to determine priorities for conservation and sustainable resource use. While nearly all parties report that they are taking actions related to monitoring and research, most also indicate that the absence or difficulty in accessing relevant information is an obstacle to the implementation of the goals of the Convention." (CBD 2016c)

Sharing information and knowledge plays a crucial role in assessing the status of biodiversity and identifying threats and responses to prevent its loss. Knowledge also helps countries undertake better conservation on the ground and play a larger role in international discussions related to conservation and sustainable use of natural resources. It thus greatly facilitate the achievement of all Aichi Biodiversity Targets.

The lack of consistent data and information collection relating to habitat loss is a problem in the LAC region. A recent review by Armenteras et al. (2016) on forest degradation in the LAC region identified the lack of information on forest degradation was an issue when trying to improve conservation and habitat protected in Bolivia and Nicaragua. However, in Paraguay deforestation and forest degradation has been estimated using aggregated data from three ecoregions, the Atlantic forest 'Alto Paraná', the humid Chaco region and the dry Chaco, using remote sensing techniques which allow a better assessment of the state of the countries forests, and thus better conservation planning.

The fifth national reports to the CBD demonstrate that nearly every country in Latin America and the Caribbean is increasing its knowledge base in relation to biodiversity, although it is acknowledged that gaps remain. For example, St Vincent and the Grenadines and Guyana specifically point to the lack of available information as a reason for a lack of progress towards the Aichi Biodiversity Targets as a whole (CBD 2015). Reported efforts to share and apply information are more limited and vary significantly across the region.

The Caribbean has a strong history of co-operation and knowledge sharing in marine research, starting with the establishment of the Association of Marine Laboratories of the Caribbean (AMLC) in 1957. More recently, the Census of Marine Life (Census) programme has been working in the Caribbean since an initial workshop in 2004, attended by ten Caribbean countries, to assess the state of marine biodiversity knowledge in the region. Since then, the Census has been involved in several projects to enhance understanding of marine ecosystems in the Caribbean, using the Ocean Biogeographic Information System[6] to provide wide access to the resulting data (Miloslavich et al., 2010).

Mexico's CONABIO institute is another example of efforts to strengthen capacity, serving as a bridge between academia, government ministries and society and offering information and knowledge to decision makers and acting as a National Focal Point for CITES, SBSTTA (Subsidiary Body on Scientific, Technical and Technological Advice) and IPBES. The availability of records in open access biodiversity data initiatives such as the Global Biodiversity Information Facility (GBIF) provides an indicator of progress towards the wide sharing of biodiversity information as part of Target 19. There has been a steady rise in the total number of species occurrence records in GBIF, on species collected or observed in Latin America and the Caribbean, from around 9 million in 2007 to over 38 million in 2015 (Figure 19.1). Three of the top 25 contributors to the total collection of records in GBIF (of which 23 are countries and two are organisations) are countries in Latin America: Costa Rica (ranked 18th with just over 3 million records), Mexico (ranked 19th), and Colombia (ranked 23rd). However only 5 per cent of records added to GBIF in 2014 related to biodiversity from the LAC region, and only 2 per cent were from a publishing institution based in the LAC region. Less than 10 per cent of GBIF records from the LAC region are about biodiversity from other regions, a lower per centage than seen in any other region (GBIF 2015).

[6] *http://www.iobis.org/*

Three of the first five projects funded under the GBIF capacity enhancement programme launched in 2014 were based in Latin America: the Biodiversity Information System of Colombia (SiB Colombia[7]); a project led by the Iberoamerican Programme for Science and Technology for Development (CYTED[8]) to increase capacity for "digitizing and publishing data from scientific literature, images and multimedia"; and mentoring led by CONABIO in Mexico, using the Plinian Core Standard[9] for species information to increase the quality of available data records. Six GBIF related events were held in Brazil, Colombia and Mexico in 2014, including the Brazilian Biodiversity Information System launch event (see Box 19.1) and the fourth GBIF Latin American Nodes meeting. In 2014, Mexico requested over 10,000 data downloads from GBIF, a download rate exceeded only by the United States (GBIF 2015).

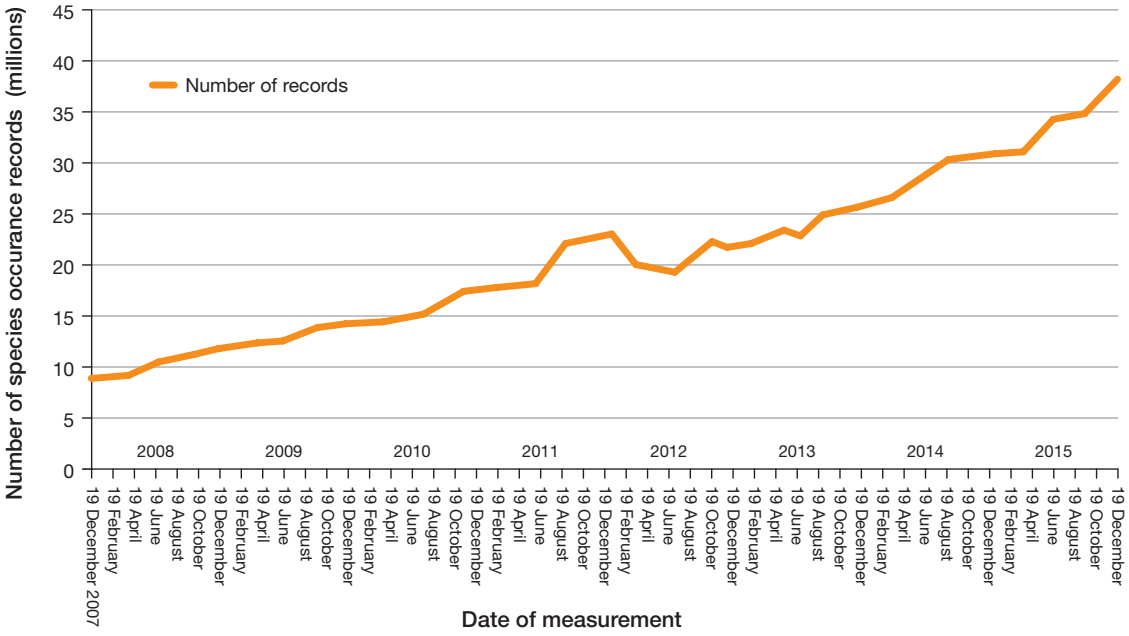


Figure 19.1: Growth in the number of species occurrence records, for species collected or observed in Latin America and the Caribbean, accessible through the Global Biodiversity Facility between 2007 and 2015 (source: GBIF 2016).

In conclusion, there has been considerable progress in recent years to make data on the biodiversity of the LAC region more widely available. This has been facilitated by global, regional and national data sharing and data availability platforms and projects, and by national initiatives for knowledge information exchange. Examples include the CaMPAM network and forum[10] designed to share information and lessons learned to inform decision-making around MPAs in the Caribbean region, and the Biodiversity and Protected Areas Management Programme (BIOPAMA)[11] which aims to address threats to biodiversity while reducing poverty, in many regions around the world, including the Caribbean. The region is now well placed to expand this work and increase the availability of relevant data for decision, although it still faces challenges in achieving sustainable financing for conservation. Given all these developments it seems that the region is on track to achieve or nearly achieve Target 19 by 2020.

[7] *http://www.sibcolombia.net/web/sib/home*
[8] *http://www.cyted.org/*
[9] *Plinian Core v2.0 Concept Definitions*
[10] *http://campam.gcfi.org/campam.php*
[11] *http://www.biopama.org/*

Box 19.1: Brazilian Biodiversity Information Systems.

The Brazilian Biodiversity Information System (SiBBr) is an initiative lead by Brazil's Ministry of Science, Technology and innovation to integrate information on biodiversity and ecosystems, with the objective of supporting scientific research and public policies. The SIBBR is already available online[12], and the first set of scientific data is currently being uploaded. The SiBBr is also the national focal point for the Global Biodiversity Information Facility (GBIF), which provides Brazil with access to technology to assist with implementation of SiBBr (Ministry of the Environment, Brazil 2015).

Another Brazilian initiative for recording biodiversity information is the Information System on Wildlife Health (Sistema de Informação em Saúde Silvestre, SISS-Geo)[13] lead by the Fundação Oswaldo Cruz (Oswaldo Cruz Foundation, known as Fiocruz) linked to the Brazil Ministry of Health. This foundation monitors wildlife and circulating pathogens occurring in natural habitats or on the borders between rural and urban environments, before they reach humans. The SISS-Geo is an online tool for recording animal observations using mobile communications devices through citizen science, with participants ranging from tourists, farmers, eco-tourism guides, birdwatchers, contractors and farmers. Based on recorded observations of animals and information on possible abnormalities (such as wounds or unusual behaviour) and characteristics of the environment in which the observations were made, the system generates alerts on incidents in wild fauna. These alerts are investigated by the technical units with the support of the Wildlife Health Laboratory Network and other specialists to confirm or rule out the pathogens potentially associated with the alert. This information is then made available to decision makers and society and provides the basis for developing prediction models, aiming to act before the diseases affect humans and other animals.

Box 19.2: Increasing Awareness of the Values of Biodiversity.

(source: Tania Urquiza Haas and Patricia Koleff)

To conserve and use biodiversity sustainably, decision makers need relevant and scientifically sound information to implement appropriate policy measures. Mexico´s ecosystem assessment (The Natural Capital of Mexico, CNM; CONABIO 2007a,b; 2010) connects science with policy-makers by providing a major synthesis of the knowledge on the components, structure, and functioning of the biodiversity, its conservation status and the threats and trajectories of anthropogenic impact, along with the policies, institutions, and instruments needed for its sustainable management. The assessment itself, and the process leading to it, have provided several important lessons that may be useful outside of Mexico, including:

1) multi-stakeholder participation of more than 700 scientists, government officers, and nongovernmental organization members participated with the support of the minister of environment will ensure that CNM will remain accepted and used for many year;

2) CNM provided and unprecedented work of data systematization, reflection, and analysis in order to provide solutions to complicated environmental problems and to highlight strategic priorities to encourage policies for the conservation and sustainable management of biodiversity; and

3) a strong scientific foundation for the development of the National Biodiversity Strategy and Action Plan. Whether this will serve to change the environmental degradation trends that Mexico continues to experience depends on the engagement of policy-makers and the support of society at large (Sarukhán et al. 2014).

One key element is to provide to society access to all information in a friendly format, through different media outlets (for example, Biodiversidad Mexicana[14]). Also, increasing the participation of people in Citizen Science programmes can help communities to increase the value of their natural capital (for example, aVerAves[15]) or to increase people's awareness of biodiversity (for example, Naturalista, CONABIO[16]).

[12] http://www.sibbr.gov.br/
[13] www.biodiversidade.ciss.fiocruz.br
[14] http://www.bioversidad.gob.mx/
[15] http://ebird.org/content/averaves/
[16] http://www.naturalista.mx/

Box 19.3: Colombia Biodiversity Information System (Sistema de Información sobre Biodiversidad de Colombia, SiB) (SiB 2016).

The Colombian Biodiversity Information System (SiB) is a country initiative designed to provide free access to information on Colombia's biodiversity, making it available to a wide variety of audiences. This initiative allows the online publication of biodiversity information which supports efficient and integrated biodiversity management.

Colombia's SiB initiative is led by the Directive Committee formed by the Ministry for Environment and Sustainable Development, five research institutes (IAvH, INVEMAR, SINCHI, IIAP and IDEAM) and Colombia's National University (UNAL). It's supported by the Technical Commission and working groups which, together, provide free online access to information through one single platform which includes metadata, reference documents and data files. The initiative is supported by GBIF. Information provided includes species population records, information on endangered species habitats and distributions, and species identification information.

The SiB actively encourages the distribution of information and knowledge related to biodiversity throughout Colombia, for example by organizing data sharing and quality assessment workshops with participants from other countries within the ALC region (e.g. Argentina, Brazil, Mexico) and outside the region too, such as Spain.

Box 19.4: Biodiversity Indicators Dashboard (NatureServe 2016).

The Biodiversity Indicators Dashboard is an online interactive dashboard developed by NatureServe and a team of expert international institutions to document, visualize and track biodiversity data in three regions of the world: the Topical Andes, the African Great Lakes, and the Mekong Basin. The dashboard monitor biodiversity trends and conservation performance in the Tropical Andes region, from 2001 to 2013, and can be used to help track progress towards conservation targets, support national and regional monitoring and reporting, inform policy and decision makers and catalyse investments in information infrastructure.

Regional scale analysis performed using the data collected by the dashboard include measuring pressure on biodiversity and rates of deforestation, state of species according to the IUCN Red List Index, conservation response measured though the network of KBAs, and benefit to human populations derived from freshwater provision (Han et al. 2014).

TARGET 20: MOBILISING RESOURCES FROM ALL SOURCES

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

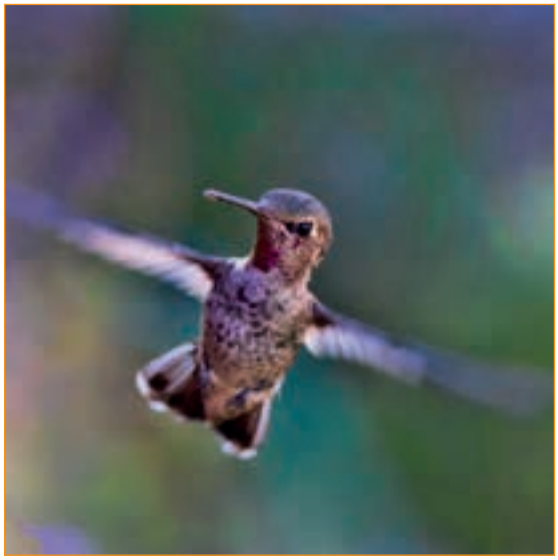
"Most countries indicated in their Fourth National Reports that limited capacity, both financial and human, was a major obstacle to the implementation of the Convention. The capacity that currently exists within countries needs to be safeguarded and increased from current levels, in line with the process laid out in the Strategy for Resource Mobilization, in order to enable countries to meet the challenges of implementing the Strategic Plan for Biodiversity 2011-2020. The fulfilment of Target 20 will have implications on the feasibility of achieving the other nineteen targets contained in the Strategic Plan." (CBD 2016c)

Financial, technical and human resources are required to implement and achieve the 20 Aichi Biodiversity Targets. This last target provides a means to track the commitment of both the countries in the region and the global agencies that support these countries in achieving the targets.

The fifth national reports to the CBD indicate that the Global Environmental Facility (GEF) is an important source of international funds for Latin America and the Caribbean, with Belize, Bolivia, Brazil, Cuba, Dominican Republic, Ecuador, Guatemala, Guyana, Mexico, and Nicaragua, among others benefiting from GEF funded projects. In most countries across the region investment in biodiversity has increased, but a significant funding gap remains. Dedicated funds are being created throughout the region, but only Ecuador and El Salvador report having a national strategy for resource mobilization in place, with another under development in Brazil (CBD 2015).

One of the constraints for effective conservation in the region is the resources available when competing with other governmental priorities. There has been significant funding provided by nations in the region as well as the international community – and this has had a measurable impact. However, there is still a need to increase the available resources using both traditional and new approaches to mainstream and include conservation planning into decision-making.

In addition, information from AidData (Tierney et al. 2011) was used to analyse the trends in the Latin America and Caribbean region on global funds committed towards environmental policy, laws, regulations and economic instruments. This data serves as a proxy for the commitment to mobilizing financial resources for the effective implementation of the *Strategic plan for Biodiversity 2011-2020*, as outlined in Target 20. Figure 20.1 shows how investment in the LAC region in environmental policy related projects has been irregular in the past decade, with a peak in 2004 of USD 0.8 billion, although an increase in committed funds was seen after 2008, the high being USD 3.7 billion in 2009. While AidData reflects the funding provided by environmental donors, it does not reflect the total investments in environmental policies and specifically the *Strategic Plan for Biodiversity 2011-2020* by national Governments or international bodies.



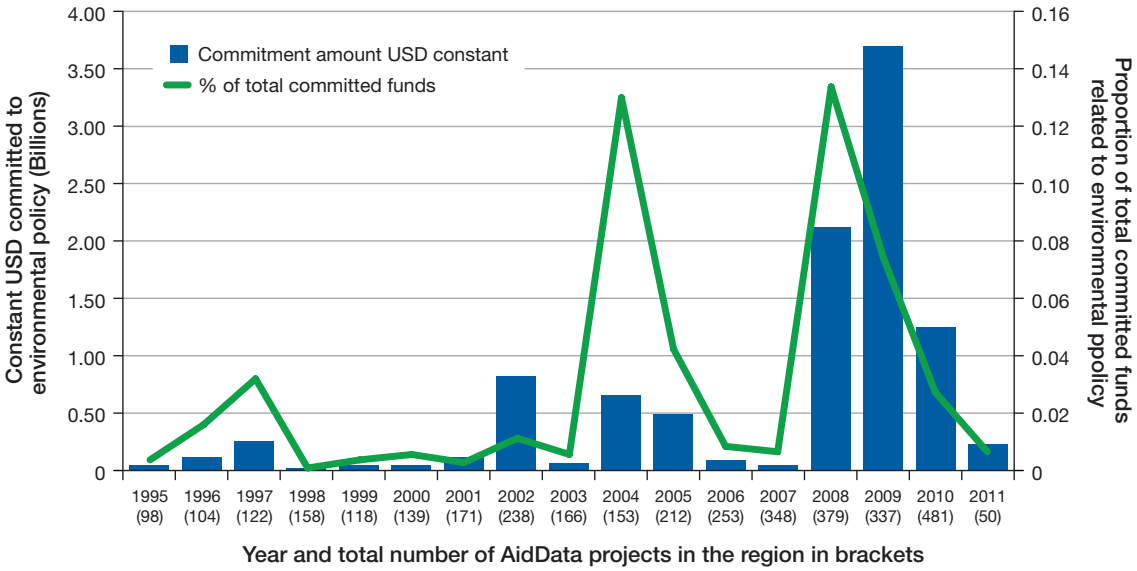


Figure 20.1. Absolute and proportional investment in Latin America and the Caribbean in environmental policy related projects by donors on AidData between 1995 and 2010 (source: Tierney et al. 2011).

Finally, the LAC region benefits from investments derived from the programmes of work of many different environmental and conservation organizations, such as WWF, Conservation International (CI), The Nature Conservancy (TNC), GEF and many others. The CBD estimated the total annual spending on conservation for the region at USD 632 million per year (2001-2008), with USD 203 million per year going to Central America, mostly from international donors and bilateral cooperation, USD 395 million per year to South America, mostly from domestic resources, and USD 33 million per year to the Caribbean, mostly from domestic resources (Bellot-Rojas 2014).

In conclusion, international commitments of funds to the region to support biodiversity conservation continued to increase up to 2010 (the latest year that data is available for). GEF allocations to the region are large and there is also international support from many international NGOs. Countries in the region also have considerable national resources for conservation and this is a priority activity for a number of countries, as their economies are underpinned by eco-tourism, or through their national commitments to the environment. Despite these efforts it seems that the region is not fully on track to meet Target 20 by its deadline in 2020, although some progress has been made, with recent set-backs due to economic challenges in a number of countries in the region.

Box 20.1: Project Finance for Biodiversity (BIOFIN).

In 2012 Project Finance for Biodiversity (BIOFIN) was implemented. A series of assessments are undertaken for the countries implementing BIOFIN in order to define the biodiversity finance gap, in part determined by the costs of implementing the country's NBSAP. Based on the outcome of the assessments, a strategy to mobilise the required financial resources is designed. BIOFIN is being implemented in 30 countries globally, including nine in the LAC region (Belize, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Mexico and Peru) (BIOFIN 2016).

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Box 20.2: Honduras Action Plan 2008-2021.

In order to integrate its implementation of various Multilateral Environmental Agreements (MEAs), including the CBD and the Ramsar Convention, the Government of Honduras has prepared an Action Plan for 2008-2021. It is based on a Self-Assessment of National Capacity to Comply with MEAs, which identified potential synergies, and national requirements for capacity building. The outputs from the GEF-funded project "Piloting Integrated Processes and Approaches to National Reporting to the Rio Conventions", which developed and piloted an efficient, integrated methodology for reporting in relation to a variety of MEAs, were heavily utilised in development of the Action Plan. The Action Plan establishes the National Environment and Natural Resources Secretariat as a central coordinator, improves the technical and scientific input into information held by the Conventions, and proposes a communication strategy which includes a strengthening of the dialogue between the government and scientists working in academia (UNEP 2015b).

6. OPPORTUNITIES AND RECOMMENDATIONS FOR THE FUTURE

Since 2010, countries in Latin America and the Caribbean have made considerable efforts to implement the *Strategic Plan for Biodiversity 2011-2020* at both the national and regional level. There are many individual examples of success from the region, and this section presents some of the main opportunities to make further progress. Some of these can be implemented and yield results before 2020, whereas others will require more time to achieve lasting results. Some areas with considerable potential to deliver outcomes are outlined below.

Mainstream biodiversity across governments and productive sectors.

Making biodiversity, in particular its existence and use values, a part of daily decision making in LAC countries requires mainstreaming within policies, institutions, laws, regulations and productive sectors such as, agriculture, fisheries, tourism and forestry. This entails placing biodiversity goals into decision making processes and the inclusion of government agencies not directly related to biodiversity, such as the Ministries of Finance, Agriculture, Infrastructure, Tourism and Education, amongst others. There are various initiatives underway in the region to do this.

In 2015, the WHO and the CBD launched the document "Connecting Global Priorities: Biodiversity and Human Health, The State of Knowledge Review" (WHO and SCBD 2015). This document presents 77 key messages containing information on the need to maintain ecosystems and species capable of providing environmental services, such as: the production of food, goods, and medicinal plants; the balance and containment of emerging diseases; the ability to adapt to global environmental and climate change; and the cultural and health benefits provided by natural habitats. Actions and synergistic global policies were introduced, as well as new tools and research needed to face the challenges identified. The development of this document stemmed from the "Capacity-building regional workshop on the interlinkages between biodiversity and health," conducted by the WHO, the CBD and the Fiocruz foundation, in Manaus (Brazil), attended by many LAC decision makers who suggested ways for this agenda to be implemented (CBD 2012).

Mainstream biodiversity into business practices

In a similar way to mainstreaming biodiversity into national accounting, there is also a need and an opportunity to work with businesses and financial institutions to ensure that biodiversity values are considered within the decisions making made by companies that are based and/or operate in the region. There are examples of voluntary certification schemes that start to address the biodiversity impact of business operations in productive sectors such as forestry, fisheries and aquaculture. Moreover, the investments into oil and gas exploration and exploitation are regulated in some companies by the International Finance Corporation under Performance Standard 6, which relates to the "Biodiversity Conservation and Sustainable Management of Living Natural Resources" (IFC 2012).

Build forest carbon conservation partnerships

Across the LAC region, forests, particularly tropical forests, provide ecosystem assets of global significance (Dickson et al. 2014). In addition to their role in storing carbon, supporting livelihoods and providing a variety of ecosystem services, forests also have a key role in conserving biodiversity. Efforts to create a financial value for forest carbon while investing in low-carbon sustainable development pathways, such as REDD+, can also contribute to achieving social and environmental benefits including the conservation of biodiversity. To fully take advantage of the opportunities there will need to be continued political commitment to the conservation, restoration and sustainable management of forests in the region in the coming years. Financing will also need to be available to back these commitments and achieve the multiple goals of climate change mitigation and biodiversity conservation. The LAC region is very well placed to benefit from forest protection mechanisms such as REDD+ as it contains huge areas of forest and countries that are committed to forest conservation and sustainable development, and have the financial and technical skills to make the financial flows from REDD+ work at national to local levels.

Share water payments scheme expertise in the region

Several of the countries in the region (Mexico and Costa Rica in particular) have developed long term and sustainable programmes of payment for ecosystem services (PES). Their expertise is considerable and to a large extent they are global leaders in these efforts, particularly around water payment schemes that provide benefits back to communities. Their experience provides guidance for other countries in the region, and can be disseminated and promoted elsewhere through South-South and Triangular cooperation efforts. Where possible, this existing expertise could be used to develop similar PES schemes as they contribute to solving the challenge of making this intervention work after the donor funding has ended.

Sustainably develop the water resources in the region

Within LAC, the broader Amazon region, the Cuenca de la Plata basin, and the Andes mountain chain in particular have great potential to contribute to the integral sustainable development through hydroelectric power generation, irrigated agricultural production, aquaculture and transportation. Capitalising on this potential to generate sustainable benefits for the region, and the millions of people who live in it, while avoiding the damages that might occur to hydrology, local populations, biodiversity and habitats requires careful planning. There have already been considerable efforts at conservation planning and integrated water and coastal areas management in many of the ecoregions and broader regions of LAC, and further implementing these plans will be a great contribution to sustainably developing critically important terrestrial, freshwater and marine areas.

Link tourism to development planning in coastal nations

Many of the island nations in the region have considerable income from tourism, often linked to the coastal environment, including coral reefs and mangroves. These values need to be better mainstreamed into the economic planning of these countries so that the benefits of a healthy environment are fully recognised in development decision making. The emerging discipline of natural resource accounting starts to make explicit links between the natural resources of a nation and its other forms of capital, considering their status and trends. This may be particularly important in the various island nations, but can also provide a broad benefit across the region by better recognising the value of natural resources and services within the national economies of the region.

Invest in raising public awareness of biodiversity values

Across the LAC region awareness of the values and importance of biodiversity varies. In some countries the awareness is higher than in other parts of the world, and this encouraging trend can be further developed elsewhere. Awareness can be raised through various means: formal education in schools; workshops at different levels; mainstreaming biodiversity into government policies; incentives; campaigns by civil society and non-governmental organizations; partnership with private sector; enhancing the training in colleges and universities; and developing national ecosystem accounting as part of mainstreaming biodiversity and ecosystem services across government. Many of these means are already being used by some countries in the region. All such efforts are key to ensure understanding and appreciation of ecosystems and natural resources, and are a fundamental requirement for taking appropriate decisions and changing behaviour.

Strengthen protected areas networks and biological corridors

Although most countries in the region have been successful in creating protected area networks, in many cases these still need strengthening to ensure that they deliver the conservation benefits that they are intended to provide. Although the protected areas and biological corridors in the region have helped stem biodiversity loss and maintained terrestrial and marine ecosystems, they also face challenges related to management effectiveness, connectivity between reserves and resource availability and sustainability. The region has also developed and designed community-managed reserves which have expanded greatly in recent years, providing an important addition to the existing protected area network.

Enhance the implementation of biodiversity-related Conventions to build institutional capacity

Evidence of enhancement and implementation of biodiversity related conventions through strategies and action plans can be seen in countries from the LAC region. Overall, there is a need to support actions for mitigation of degraded ecosystems, capacity development programmes, technology transfer, assessment of ecosystems services to strengthen the science-policy interface for decision making and building new partnerships. There is considerable potential within the region to mobilise sustainable financing from various sources including national governments, regional and global funds and private businesses, amongst others.

Enhanced environmental rule of law and regulation enforcement

Regulatory and institutional frameworks at the national level are fundamental to promote biodiversity conservation and sustainable use, including with regard to MEAs, as much of their implementation on the ground has to be done by the parties of the MEAs through domestic legislative and institutional arrangements. Furthermore, not only is the adoption and ratification of relevant MEAs and the development of appropriate legal instruments important, but the mechanisms for compliance and enforcement of such instruments are also key. This requires strengthening of capacities and enhanced cooperation and coordination between all relevant actors, in particular the enforcement community, prosecutors and judges.

Increase available resources for biodiversity

Effective and sustainable conservation practices require secure finacing and capacity, and in some countries within the LAC region there is a lack of resources available for this activity when competing with other national priorities. In the region there has been significant financing provided by donor countries and the international community and this has had a measurable impact. However, there is still a need to increase the available resources and influence policy-makers to allocate sufficient financing and budget to biodiversity conservation and sustainable use. In addition to government resources, an increase in resources used to involve and engage civil society and communities in conservation activities would also help promote the achievement of the Aichi Biodiversity Targets in the region.

Increase multi-sectoral coordination

Within the LAC region it is important that government, civil society, private sector, academia and the intergovernmental agencies improve the communication and coordination related to work on biodiversity conservation. Countries need better mechanisms to document and report on this multi-sector contribution towards the Aichi Biodiversity Targets.

Enhance the availability of data to measure the Aichi Biodiversity Targets

One of the constraints in the region is the availability of consistent and comparable data to measure progress towards a number of the targets. This is clear from the dashboard of progress presented at the start of this document, which shows some targets which cannot be reliably measured across the region. A combination of globally derived data (e.g. from remote sensing) and national data collection efforts are required to address this issue and make the targets easier to measure in the lead up to 2020.

Promote South-South and Triangular cooperation

The importance of regional and cross-continental networks and collaborations to strengthen science in the LAC region is clear (Arzt 2014). In 2014, CONABIO, Humboldt Institute and INBio signed a "Memorandum of Understanding on Cooperation in Biodiversity" in order to establish the base for cooperation to promote knowledge generation, conservation and sustainable use of biodiversity and natural resources, while improving scientific and technical exchange on issues of interest to the Parties. They developed reports about scientific and technical cooperation and their contribution in the framework of CBD.

Within the region, levels of capacity and development vary, but initiatives for capacity building have been growing in many countries; Peru is prioritising science and innovation in its National Council for Science, Technology and Technological Innovation (CONCYTEC) budget, Chile has taken examples from developed countries such as Australia to boost research and investment in coastal protection, and Venezuela is working to restore interest and funding to research by investing over 2 per cent of its GDP in science and technology over recent years (Artz 2014).

Cooperation between countries in the region is also growing and there are many examples of successful initiatives presented in the second "Report on South-South Cooperation in Ibero-America" developed by the Ibero-American General Secretariat (SEGIB) (Xalma and López 2015). South-South cooperation has been identified as a tool for the implementation of the CBD *Strategic Plan for Biodiversity 2011-2020* (CBD 2010), and is often more appropriate than collaborations with northern partners and countries with different socio-economic backgrounds.

Countries in the region which have stronger capacity building play a key role in supporting other less developed LAC countries, with five countries accounting for almost 85 per cent of all bilateral South-South and Triangular Cooperation projects analysed by the SEGIB in 2013, and Brazil and Argentina together accounting for more than 50 per cent of the total (Xalma and López 2013). In addition to their role in capacity development within the LAC region, some of the stronger countries also have a role to play in biodiversity conservation capacity building in other parts of the Southern Hemisphere, such as Africa.

7. CONCLUSION

In conclusion, the LAC region is making significant efforts to implement policies and laws and to put in place the plans and actions on the ground to achieve the 20 Aichi Biodiversity Targets. These are ambitious targets. While some, such as Targets 11, 16 and 17, appear to be on track to be met by 2020, other targets are not currently on track and will require further effort to be achieved. It is also clear that the region has developed considerable capacity and expertise in various kinds of conservation response, ranging from PES for water, REDD+ for carbon, remote sensing of forest change, eco-tourism, protected areas and community-based and private conservation approaches. These successes from the region provide the basis for regional and Triangular cooperation and South-South capacity building, with involvement from all levels of society to improve the consideration and planning for biodiversity conservation and the achievement of the Aichi Biodiversity Targets by 2020.

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8. REFERENCES

Access and Benefit Sharing Capacity Development Initiative (2016). The Caribbean. Available from http://www.abs-initiative.info/countries-and-regions/caribbean/.

Aguiar, A.P.D., Vieira, I.C.G., Assis, T.O., *et al.* (2016). Land use change emission scenarios: anticipating a forest transition process in the Brazilian Amazon. *Global Change Biology*, doi:10.1111/gcb.13134.

Aguirre-Muñoz, A.; Luna-Mendoza, L.; Samaniego-Herrera, A.; Félix-Lizárraga, M.; Ortiz-Alcaraz, A.; Rodríguez-Malagón, M.; Méndez-Sánchez, F.; González-Gómez, R.; Torres-García, F.; Latofski-Robles, M.; Hernández-Montoya, J.C.; Barredo-Barberena, J.M.; Hermosillo-Bueno, M.A.; Silva-Estudillo, N. and Soqui-Gómez, E. 2011. Island restoration in Mexico: ecological outcomes after systematic eradications of invasive mammals. In: Veitch, C. R.; Clout, M. N. and Towns, D. R. (eds.). Island invasives: eradication and management, pp. 250-258. IUCN, Gland, Switzerland.

Aide, T.M., Clark, M.L., Grau, H.R., *et al.* (2012). Deforestation and Reforestation of Latin America and the Caribbean (2001-2010). *Biotropica*, vol. 45 (2), pp. 22-271.

Alvarez-Berríos, N. L., & Aide, T. M. (2015). Global demand for gold is another threat for tropical forests. *Environmental Research Letters*, vol. 10 (1), pp. 014006.

Amazon Watch (2016). Brazil's Belo Monte Dam – Sacrificing the Amazon and its Peoples for Dirty Energy. Available from http://amazonwatch.org/work/belo-monte-dam.

Ambrus, S. (2000). Colombia Tries a New Way to Fight Water Pollution ... and It Works. *EcoAmericas*. Available from http://siteresources.worldbank.org/INTRES/Resources/469232-1321568702932/Greening_ColombiaprogramArticle.pdf.

Aquaculture Stewardship Council (2016). About the ASC. Available from http://www.asc-aqua.org/index.cfm?act=tekst.item&iid=2&lng=1.

Armendáriz-Villegas, E.J., Covarrubias-García, M. de los Á., Troyo-Diéguez, E. *et al.* (2015). Metal mining and natural protected areas in Mexico: Geographic overlaps and environmental implications. *Environmental Science & Policy*, vol. 28, pp. 9-19.

Armenteras, D., González, TM., Retana, J., Espelta, JM (2016) Degradación de bosques en Latinoamérica: Sintesis conceptual, metodologias de evaluacion y casos de stydio nacionales. Publicado por IBERO-REDD+.

Arzt, E. (2014). Capacity building: Architects of South American science. *Nature,* vol. 510, (7504), pp. 209-212.

Asthana, A.N. (2015). Sustainable Fisheries Business in Latin America: Linking in to Global Value Chain. *World Journal of Fish and Marine Sciences*, vol. 7 (3), pp. 175-184.

Austin, A.T., Busamante, M.C.C., Nardoto, G.B., *et al.* (2013). Latin America's Nitrogen Challenge. *Science*, vol. 340 (6129), p. 149.

Bailis, R., Solomon, B.D., Moser, C., *et al.* (2015). Biofuel sustainability in Latin America and the Caribbean – a review of recent experiences and future prospects. *Biofuels*, vol. 5 (5), pp. 469-485.

Balmford, A. (2012). *Wild Hope.* Chicago and London: University of Chicago Press.

Banco Central del Chile (2015). Available from: http://www.bcentral.cl/estadisticas-economicas/series-indicadores/index_aeg.htm

Bax, N., Williamson, A., Aguero, M. *et al.* (2003). Marine invasive alien species: a threat to global biodiversity. *Marine Policy*, vol. 27, pp. 313-323.

Bebbingon, A., and Bury, J., eds. (2013). *Subterranean Struggles: New Dynamics of Mining, Oil, and Gas in Latin America.* Austin, USA: University of Texas Press.

Bebbington, A., and Williams, M. (2008). Water and Mining Conflicts in Peru. *Mountain Research and Development*, vol. 28 (3/4), pp. 190-195.

Becker, C.D., Agreda, A., Astudillo, E., *et al.* (2005). Community-based monitoring of fog capture and biodiversity at Loma Alta, Ecuador enhance social capital and institutional cooperation. *Biodiversity and Conservation*, vol. 14, pp. 2695-2707.

Bellot-Rojas, M. (2014). High-level panel on global assessment of resources for implementing the Strategic Plan for Biodiversity 2011-2020: Presentation to the Regional Workshop for Latin America and the Caribbean on Resource Mobilization. Brazil: CBD. Available from https://www.cbd.int/doc/meetings/fin/rmws-2014-02/other/rmws-2014-02-presentation-hlp-en.pdf.

Betts, R.A., Malhi, Y., and Timmons Roberts, J. (2008). The future of the Amazon: new perspectives from climate, ecosystem and social sciences. *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 363 (1498), pp. 1729-1735.

Beuchle, R., Grecchi, R.C., Shimabukuro, Y.E., *et al*. (2015). Land cover changes in the Brazilian Cerrado and Caatinga biomes from 1990 to 2010 based on a systematic remote sensing sampling approach. *Applied Geography*, vol. 58, pp. 116-127.

Biodiversity Finance Initiative, BIOFIN (2016). The Biodiversity Finance Initiative (BIOFIN) develops and pilots a new approach and methodology for leveraging increased biodiversity investments. Available from http://www.biodiversityfinance.net/home.

BirdLife International (2016a). Data Zone – Species. Available from http://www.birdlife.org/datazone/home.

BirdLife International (2016b). IUCN Red List Index of species survival for birds. Unpublished data.

Bray, D.B., Merino-Pérez, L., Negreros-Castillo, P. *et al*. (2003). Mexico's Community-Managed Forests as a Global Model for Sustainable Landscapes. *Conservation Biology*, vol. 17 (3), pp. 672-677.

Brooks, T.M., Akçakaya, H.R., Burgess, N.D. *et al.* (2016). Analysing biodiversity and conservation knowledge products to support regional environmental assessments. *Scientific Data*. DOI: 10.1038/sdata.2016.7.

Burke, L., Reytar, K., Spalding, M., *et al*. (2011). Reefs at Risk Revisited. World Resources Institute.

Buschmann, A. H., Cabello, F., Young, K., Carvajal, J., Varela, D. A., and Henríquez, L. (2009). Salmon aquaculture and coastal ecosystem health in Chile: analysis of regulations, environmental impacts and bioremediation systems. Ocean & Coastal Management, vol. 52 (5), pp.243-249.

Butchart, S.H.M., Clarke, M., Smith, R.J., *et al*. (2015). Shortfalls and Solutions for Meeting National and Global Conservation Area Targets. *Conservation Letters*, vol. 8 (5), pp. 329-337.

Butchart, S.H.M., Statersfield, A.J., and Collar, N.J. (2006). How many bird extinctions have we prevented? *Oryx*, vol. 40 (3), pp.266-278.

Caballero, J., Palacios, F., Arévalos, F., Rodas, O., and Yanosky, A. A. (2014). Cambio de uso de la tierra en el Gran Chaco Americano en el año 2013. *Paraquaria Natural*, vol. 2, pp. 21-28.

Canavire-Bacarreza, G., and Hanauer, M.M. (2012). *Estimating the Impacts of Bolivia's Protected Areas on Poverty. Discussion Paper No. 6341.* Bonn, Germany: The Institute for the Study of Labor (IZA). Available from http://ftp.iza.org/dp6341.pdf.

Caribbean Challenge Initiative (2016). CCI: the Caribbean's '20 by 20' Challenge. Available from http://www.caribbeanchallengeinitiative.org/.

Caribbean Invasive Alien Species Network (2011). Restoration of Isla Cabritos for the protection of Ricord's Iguana and Rhinoceros Iguana. Available from http://www.ciasnet.org/2011/01/20/restoration-of-isla-cabritos-for-the-protection-of-ricord%E2%80%99s-iguana-and-rhinoceros-iguana/.

Carpenter, S., Walker, B., Anderies, J.M., *et al*. (2001). From Metaphor to Measurement: Resilience of What to What? *Ecosystems,* vol. 4, pp. 765–781.

Centro Nacional de Conservação da Flora (2016). Apresentação. Available from www.cncflora.jbrj.gov.br.

Cerdeira-Estrada S, López-Saldaña G. 2011. A novel Satellite-based Ocean Monitoring System for Mexico. Ciencias Marinas, vol. 37, pp. 237–247.

Chenery, A., Dixon, M., McOwen, C., *et al*. (2015). Review of the global indicator suite, key global gaps and indicator options for future assessment of the Strategic Plan for Biodiversity 2011-2020. United Nations Environment Programme World Conservation Monitoring Centre. Available from https://www.cbd.int/doc/meetings/ind/id-ahteg-2015-01/information/id-ahteg-2015-01-inf-01-rev1-en.pdf.

Cifuentes, L.A.; Vega, J.; Ko¨pfer, K.; Lave, L.B. Effect of the Fine Fraction of Particulate Matter Versus the Course Mass and Other Pollutants on Daily Mortality in Santiago, Chile. *JAWMA* 2000, 50(8), 1287-1298.

Clean Air Institute (2014). Regional Action Plan on Air Pollution, adopted by the Forum of Ministers of Environment of Latin America and the Caribbean. Available from http://www.cleanairinstitute.org/Noticias/noticias.php?pag=24&sec=316.

Comisión Nacional para el Conocimiento y uso de la Biodiversidad, and Comisión Nacional de Áreas Naturales Protegidas (2010). *Vacíos y omisiones en conservación de la biodiversidad acuática epicontinental de México: cuerpos de agua, ríos y humedales. Escala: 1:000 000.* México.

Comisión Nacional para el Conocimiento y uso de la Biodiversidad, Comisión Nacional de Áreas Naturales Protegidas, The Nature Conservancy, *et al*. (2007a). *Análisis de vacíos y omisiones en conservación de la biodiversidad marina de México: océanos, costas e islas.* México.

Commission for the Conservation of Antarctic Marine Living Resources (2016). Members. Available from https://www.ccamlr.org/en/organisation/members.

CONABIO. 2009. Manglares de México: Extensión y distribución. 2ª ed. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. México. 99 pp.

Convention on Biological Diversity (2006). Side Event: The "National Commission for the Sustainable Development of Peoples and Traditional Communities" in Brazil: an experience in the creation of public spaces for indigenous peoples and local communities". Available from https://www.cbd.int/kb/record/sideEvent/983?Event=COP-08.

Convention on Biological Diversity (2010). Decision X/2. The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets. Available from https://www.cbd.int/decision/cop/?id=12268.

Convention on Biological Diversity (2012). Regional Capacity-Building Workshop on Human Health and Biodiversity in the Americas. Available from https://www.cbd.int/health/workshops/americas/default.shtml.

Convention on Biological Diversity (2014a). Press release, Governments fulfil their commitment: Access and benefit-sharing treaty receives required number of ratifications to enter into force, 14 July 2014. Available from https://www.cbd.int/doc/press/2014/pr-2014-07-14-Nagoya-Protocol-en.pdf.

Convention on Biological Diversity (2014b). Press release, Governments recommend actions for enhancing implementation of the Strategic Plan for Biodiversity 2011-2020 20 June 2014. Available from https://www.cbd.int/doc/press/2014/pr-2014-06-20-wgri5-en.pdf.

Convention on Biological Diversity (2015). Fifth National Report Summary. Spreadsheet provided to UNEP-WCMC on 27 November 2015.

Convention on Biological Diversity (2016a). NBSAP Capacity Building Workshops for Implementing the new Strategic Plan through NBSAPs. Available from https://www.cbd.int/nbsap/workshops2.shtml.

Convention on Biological Diversity (2016b). Parties to the Nagoya Protocol. Available from https://www.cbd.int/abs/nagoya-protocol/signatories/. Accessed 21 January 2016.

Convention on Biological Diversity (2016c). Quick Guides for the Aichi Biodiversity Targets. Available from https://www.cbd.int/nbsap/training/quick-guides/.

Convention on Biological Diversity (2016d). Fifth National Reports. Available from http://www.cbd.int/reports/nr5/.

Critical Ecosystem Partnership Fund (2004). Ecosystem Profile: Northern Region of the Mesoamerica Biodiversity Hotspot: Belize, Guatemala, Mexico. Washington, D.C. Available from http://www.cepf.net/Documents/final.mesoamerica.northernmesoamerica.ep.pdf.

Critical Ecosystem Partnership Fund, CEPF (2005). Mesoamerica Hotspots: Northern Mesoamerica Briefing Book. Available from: http://www.cepf.net/Documents/final.mesoamerica.northernmesoamerica.briefingbook.pdf

Critical Ecosystem Partnership Fund (2011). Caribbean Islands Biodiversity Hotspot Ecosystem Profile Summary. Arlington, USA. Available from: http://www.cepf.net/SiteCollectionDocuments/caribbean/Caribbean_EP_Summary.pdf.

Critical Ecosystem Partnership Fund, CEPF (2015). Tropical Andes Biodiversity Hotspot. Available from: http://www.cepf.net/SiteCollectionDocuments/tropical_andes/Tropical_Andes_Profile_Draft.pdf

Critical Ecosystem Partnership Fund (2016). Atlantic Forest. Available from http://www.cepf.net/resources/hotspots/South-America/Pages/Atlantic-Forest.aspx.

Crowley, W.G. (2015). Protecting Ecosystems, Culture, and Human Rights in Chile Through Indigenous and Community-Conserved Territories and Areas. Capstone Collection. Paper 2827)

Defenders of Wildlife (2016). Combating Wildlife Trafficking from Latin America to the United States: The illegal trade from Mexico, the Caribbean, Central America and South America and what we can do to address it. Washington, D.C. Available from http://www.defenders.org/sites/default/files/publications/combating-wildlife-trafficking-from-latin-america-to-the-united-states.pdf.

Díaz, R.J., and Rosenberg, R. (2008). Spreading Dead Zones and Consequences for Marine Ecosystems. *Science*, vol. 321 (5891), pp. 926-929.

Dickson, B., Blaney, R., Miles, L., *et al.* (2014). Towards a global map of natural capital: Key ecosystem assets. Nairobi, Kenya: UNEP. Available from http://www.unep-wcmc.org/system/dataset_file_fields/files/000/000/232/original/NCR-LR_Mixed.pdf?1406906252.

Dinerstein, E., Olson, D.M., Graham, D.J., *et al.* (1995). *A Conservation Assessment of the Terrestrial Ecoregions of Latin America and the Caribbean.* Washington, D.C.: World Bank. Available from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/1995/09/01/000009265_3961219113255/Rendered/PDF/multi_page.pdf.

Dixon, M.J.R., Loh, J., Davidson, N.C., *et al.* (2016). Tracking global change in ecosystem area: The Wetland Extent Trends index. *Biological Conservation*, vol. 193, pp. 27-35.

Domestic Animal Diversity Information System (2016). DAD-IS, Food and Agriculture Organization of the United Nations. Available from http://www.fao.org/dad-is/.

Echeverría, C., Newton, A. C., Lara, A., Benayas, J. M. R., and Coomes, D. A. (2007). Impacts of forest fragmentation on species composition and forest structure in the temperate landscape of southern Chile. *Global Ecology and Biogeography*, vol. 16 (4), pp. 426-439.

Engler, M. and Parry-Jones, R. (2007). Opportunity or threat: The role of the European Union in global wildlife trade. TRAFFIC Europe, Brussels, Belgium.

Environmental Division, Government of Antigua and Barbuda (2014). *Fifth National Report to the Convention on Biodiversity*. Available from https://www.cbd.int/doc/world/ag/ag-nr-05-en.pdf.

Epple, C., Thorley, J., Güisa, M., Calderón-Urquizo, A., Walcott, J., Väänänen, E., Bodin, B., Woroniecki, S., Salvaterra, T. and Mant, R. (2014) Promoting environmental and social benefits of REDD+ in Peru through spatial analysis. How maps can support the achievement of multiple policy goals. UNEP-WCMC, Cambridge, UK.Environmental Division, Government of Antigua and Barbuda (2014). *Fifth National Report to the Convention on Biodiversity*. Available from https://www.cbd.int/doc/world/ag/ag-nr-05-en.pdf.

Etter, A., C. McAlpine, K. Wilson, S. Phinn, H. Possingham (2006). Regional patterns of agricultural land use and deforestation in Colombia. *Agriculture, Ecosystems and Environment*, 114, pp. 369–386

Etter, A., McAlpine, C.A., Seabrook, L., and Wilson, K.A. (2011a). Incorporating temporality and biophysical vulnerability to quantify the human spatial footprint on ecosystems. *Biological Conservation*, 144, pp. 1585-1594.

Etter, A., Romero, M., and Sarmiento, A. (2011b). Land use change (1970–2007) and the Carbon emissions in the Colombian Llanos. In: Hill M, Hanan NP, editors. Ecosystem Function in Savannas: measurement and modeling at landscape to global scales. Boca Raton, Florida: Taylor & Francis CRC Press. 383–402.

Falkenmark, M., and Lindh, G. (1976). Water for a starving world. Boulder, Colorado: Westview Press.

Figueroa, F., and Sánchez-Cordero, V. (2008). Effectiveness of natural protected areas to prevent land use and land cover change in Mexico. *Biodiversity and Conservation*, vol. 17 (13), pp. 3223-3240.

Finer, M., Babbitt, B., Novos, S., *et al.* (2015). Future of oil and gas development in the western Amazon. *Environmental Research Letters*, vol. 10, 024003.

Finer, M., Jenkins, C.N., and Powers, B. (2013). Potential of Best Practice to Reduce Impacts from Oil and Gas Projects in the Amazon. *PLoS ONE*, vol. 8 (4), e63022.

Finer, M., Jenkins, C.N., Blue Sky, M.A., *et al.* (2014). Logging Concessions Enable Illegal Logging Crisis in the Peruvian Amazon. *Scientific Reports*, vol. 4, 4719.

Finer, M., Jenkins, C.N., Pimm, S.L., *et al*. (2008). Oil and Gas Projects in the Western Amazon: Threats to Wilderness, Biodiversity, and Indigenous Peoples. *PLoS ONE*, vol. 3 (8), e2932.

Finlayson, M. and Van der Valk, A.G. (1995). Classification and inventory of the world's wetlands. Vegetation 118, pp. 1-128.

Florida-Caribbean Cruise Association (2013). Cruise Industry Overview – 2013: State of the Cruise Industry. Available from http://www.f-cca.com/downloads/2013-cruise-industry-overview.pdf.

Fondo Nacional de Financiamiento Forestal, FONAFIFO (2000). *El desarrollo del sistema de pago de servicios ambientales en Costa Rica.* San José, Costa Rica.

Food and Agriculture Organization of the United Nations (2004a). Harvesting Nature's Diversity. Available from http://www.fao.org/docrep/004/v1430e/V1430E00.htm#TOC.

Food and Agriculture Organization of the United Nations (2004b). *World Markets and Industry of Selected Commercially-Exploited Aquatic Species with an International Conservation Profile. FAO Fisheries Circular No. 990*. Rome. Available from http://www.fao.org/3/a-y5261e.pdf.

Food and Agriculture Organization of the United Nations (2007). *The State of the World's Animal Genetic Resources for Food and Agriculture.* B. Rischkowsky, and D. Pilling, eds. Rome. Available from ftp://ftp.fao.org/docrep/fao/010/a1250e/a1250e.pdf.

Food and Agriculture Organization of the United Nations (2011). *Coastal fisheries of Latin America and the Caribbean.* S. Salas, R. Chuenpagdee, A. Charles, *et al*., eds. Rome. Available from http://www.fao.org/docrep/014/i1926e/i1926e.pdf.

Food and Agriculture Organization of the United Nations (2014a). The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean. Available from http://www.fao.org/americas/recursos/perspectivas/en/.

Food and Agriculture Organization of the United Nations (2014b). *State of the World's Forests: Enhancing the socioeconomic benefits from forests.* Rome. Available from http://www.fao.org/3/a-i3710e.pdf.

Food and Agriculture Organization of the United Nations (2015a). Agriculture area as a % of land area, 1961-2011. *FAOSTAT.* Available from: http://faostat3.fao.org/download/E/EL/E.

Food and Agriculture Organization of the United Nations (2015b). Global average dietary supply adequacy (%), three year averages, 1990/92-2014/16. *FAOSTAT*. Available from http://faostat3.fao.org/download/D/*/E.

Food and Agriculture Organization of the United Nations (2015c). Prevalence of undernourishment, three year averages, 1990/92-2014/16. *FAOSTAT.* Available from http://faostat3.fao.org/download/D/*/E.

Food and Agriculture Organization of the United Nations (2015d). Total renewable water resources per capita 1992-2014. *Aquastat.* Available from http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en.

Food and Agriculture Organization of the United Nations (2015e). Global Forest Resource Assessments, 1990-2015. *FLUDE.* Available from http://www.fao.org/forest-resources-assessment/explore-data/flude/en/.

Food and Agriculture Organization of the United Nations (2015f). Global Forest Resource Assessment: Country Reports 2015. Available from http://www.fao.org/forest-resources-assessment/current-assessment/country-reports/en/.

Food and Agriculture Organization of the United Nations (2015g). *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture*. B.D. Scherf, and D. Pilling, eds. Rome: FAO Commission on Genetic Resources for Food and Agriculture Assessments. Available from http://www.fao.org/3/a-i4787e/index.html.

Food and Agriculture Organization of the United Nations (2016a). National Aquaculture Legislation Overview: Peru. Available from http://www.fao.org/fishery/legalframework/nalo_peru/en.

Food and Agriculture Organization of the United Nations (2016b). Roundwood production quantity 1961-2014. *FAOStat*. Available from http://faostat3.fao.org/download/F/FO/E.

Forest Carbon Partnership Facility (2015). What is REDD+? Available from https://www.forestcarbonpartnership.org/what-redd.

Forest Department, Ministry of Forestry, Fisheries and Sustainable Development, Belize (2014). *Belize's Fifth National Report to the Convention on Biological Diversity*. Available from https://www.cbd.int/doc/world/bz/bz-nr-05-en.pdf.

Forest Department, Ministry of Forestry, Fisheries and Sustainable Development, Belize (2015). National Forestry Policy, Belize. Available from http://faolex.fao.org/docs/pdf/blz149121.pdf.

Forest Stewardship Council (2015). Market Info Pack 2015. Available from https://ic.fsc.org/preview.2015-fsc-market-info-pack.a-5067.pdf.

Forest Stewardship Council (2016). Forest Management Certification. Available from https://ic.fsc.org/en/certification/types-of-certification/forest-management-certification.

Galindo-Leal, C. And Camara, I.G., 2003, *The Atlantic Forest of South America: Biodiversity Status, Threats, and Outlook*. The Centre for Applied Biodiversity Science at Conservation International. Island Press.

Garcia, G.C., and Quintero, M. (2013). The role of ecosystem services on food security and nutrition in the Amazon. Consultative Group for International Agricultural Research. Available from https://wle.cgiar.org/thrive/2013/05/22/role-ecosystem-services-food-security-and-nutrition-amazon.

García, H., Corzo, G., Isaacs, P., *et al.* (2014). Distribución y estado actual de los remanentes del bioma de Bosque Seco Tropical en Colombia: insumos para su gestión. In *El Bosque Seco Tropical en Colombia*, C. Pizano, and H. García, eds. Bogotá D.C., Colombia: Instituto de Investigación de Recursos Biológicos Alexander von Humboldt (IAvH).

Gardner, T. A., Côté, I. M., Gill, J. A., Grant, A., & Watkinson, A. R. (2003). Long-term region-wide declines in Caribbean corals. Science, vol. 301 (5635), pp. 958-960.

Gareca, E.E., Fernández, M., and Stanton, S. (2010). Dendrochronological investigation of the high Andean tree species *Polylepis besseri* and implications for management and conservation. *Biodiversity and Conservation*, vol. 19 (7), pp. 1839-1851.

Gareca, E.E., Hermy, M., Fjeldså, J. *et al.* (2010). *Polylepis* woodland remnants as biodiversity islands in the Bolivian high Andes. *Biodiversity Conservation*, vol. 19, pp. 3327-334.

Geldmann, J., Barnes, M., Coad, L., *et al.* (2013). Effectiveness of terrestrial protected areas in reducing habitat loss and population declines. *Biological Conservation,* vol. 161, pp. 230-238.

GENIVAR Trinidad and Tobago (2011). Sustainable Island Resource Management Zoning Plan for Antigua and Barbuda (including Redonda). Available from http://www.environmentdivision.info/wp-content/uploads/2012/01/NPDP-SIRMZP-2012.pdf.

Generation Transition (2015) Independent Report on Social and Environmental Impacts of Rio Doce's Contamination (Espírito Santo). Available at: http://generatietransitie.be/sites/default/files/bijlages/independent_report_on_social_and_environmental_impacts_of_rio_doces_contamination_espirito_santo_brasil.pdf.

Giri, C., Ochieng, E., Tieszen, L.L., *et al.* (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography*, vol. 20, pp. 154-159.

Global Biodiversity Information Facility (2015). *GBIF Annual Report 2014.* Copenhagen. Available from http://www.gbif.org/resource/annual_report_2014.

Global Biodiversity Information Facility (2016). Species occurrence records. Available from www.gbif.org. Accessed 31 January 2016.

Global Footprint Network (2012). Mediterranean Global Ecological Footprint Trends. Available from http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Venice/pdf/news/Mediterranean_report_final_web.pdf.

Global Footprint Network (2015). National Footprint Accounts, 2015 Edition. Available from http://www.footprintnetwork.org/en/index.php/GFN/

Goldman, R.L., Benitez, S., Calvache, A., and Ramos, A. 2010. Water funds: Protecting watersheds for nature and people. The Nature Conservancy, Arlington, Virginia.

Gómez Lozano, R., L. Anderson, J.L. Akins, D.S.A. Buddo, G. García-Moliner, F. Gourdin, M. Laurent, C. Lilyestrom, J.A. Morris, Jr., N. Ramnanan, and R. Torres. 2013. Regional Strategy for the Control of Invasive Lionfish in the Wider Caribbean. International Coral Reef Initiative, 31 pp.

Government of Grenada (2014). *Fifth National Report to the Convention on Biodiversity*. Available from https://www.cbd.int/doc/world/gd/gd-nr-05-en.pdf.

Grieg-Grann, M. (2000) Fiscal Incentives for Biodiversity Conservation: The ICMS Ecológico in Brazil. Discussion Paper 00-01, December 2000. Available at: http://pubs.iied.org/pdfs/8119IIED.pdf.

Group on Earth Biodiversity Observation Network (2015). Global Biodiversity Change Indicators - Model-based integration of remote-sensing & in situ observations that enables dynamic updates and transparency at low cost. Available from http://www.geobon.org/Downloads/brochures/2015/GBCI_Version1.2_low.pdf.

Guerrero, E. & S. Sguerra (editors). 2009. Protected Areas and Development in Latin America - From Santa Marta 1997 to Bariloche 2007 and Perspectives for a New Decade, IUCN Colombian Committee, Parques Nacionales Naturales Colombia and Fundación Natura. Bogotá, 64 pp.Guzmán, H.M., and Garcia, E.M. (2002). Mercury levels in coral reefs along the Caribbean coast of Central America. *Marine Pollution Bulletin*, vol. 44 (12), pp. 1415-1420.

Gyan, K., Henry, W., Lacaille, S., *et al*. (2005). African dust clouds are associated with increased paediatric asthma accident and emergency admissions on the Caribbean island of Trinidad. *International Journal of Biometeorology*, vol. 49 (6), pp. 371-376.

Haddad, N.M., Brudvig, L.A., Clobert, J., *et al.* (2015). Habitat fragmentation and its lasting impact on Earth's ecosystems. *Science Advances*, vol.1 (2), e1500052

Halpern B.S., Longo C., Lowndes J.S.S., *et al.* (2015). Patterns and Emerging Trends in Global Ocean Health. *PLoS ONE*, vol. 10 (3), e0117863.

Han, X., Smyth, R.L., Young, B.E. *et al*. (2014). A Biodiversity Indicators Dashboard: Addressing Challenges to Monitoring Progress towards the Aichi Biodiversity Targets Using Disaggregated Global Data. *PLoS ONE*, vol. 9 (11), e112046.

Hansen, M. C., Potapov, P. V., Moore, R., *et al*. (2013). High-resolution global maps of 21st-century forest cover change. *Science*, vol. 342 (6160), pp. 850–853.

Harfoot, M.B.J., Tittensor, D.P., Knight, S., *et al*. (2016). Present and future biodiversity risks from fossil fuel exploitation. *In preparation*

Herrera Araujo, E. (2015). Las ZIDRES another failed attempt. Colombia Support Network. Available from http://colombiasupport.net/2015/08/las-zidres-another-failed-attempt/

Herrero, M., Thornton, P.K., Gerber, P., *et al*. (2009). Livestock, livelihoods and the environment: understanding the trade-offs. *Current Opinion in Environmental Sustainability*, vol. 1, pp. 111-120.

Hijmans, R.J., Garrett, K.A., Huamán, Z., *et al*. (2000). Assessing the geographic representativeness of genebank collections: the case of Bolivian wild potatoes. *Conservation Biology*, vol. 14, pp.1755–1765.

Holmes, G. (2013). What role do private protected areas have in conserving global biodiversity? *SRI Papers*. Leeds: Sustainability Research Institute (SRI), School of Earth and Environment, The University of Leeds. Available from http://www.see.leeds.ac.uk/fileadmin/Documents/research/sri/workingpapers/SRIPs-46.pdf.

Humane Society International (2009) Combating Illegal Wildlife Trafficking in Central Trafficking in Central America. Available from: http://csis.org/files/attachments/090924_prado_presentation.pdf

ICMS Ecológico (2016). Available from http://www.icmsecologico.org.br/site/.

International Finance Corporation, IFC (2012) Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. January 2012. Available from: http://www.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES

Instituto Chico Mendes de Conservação da Biodiversidade, ICMBio (2016a). Crie Sua Reserva. Available from http://www.icmbio.gov.br/portal/servicos/crie-sua-reserva.html.

Instituto Chico Mendes de Conservação da Biodiversidade, ICMBio (2016b). Portal da Biodiversidade. Available from https://portaldabiodiversidade.icmbio.gov.br/portal/.

International Union for Conservation of Nature and United Nations Environment Programme World Conservation Monitoring Centre (2015). The World Database on Protected Areas. Cambridge, UK.

Intergovernmental Panel on Climate Change (2013). *Climate Change 2013: The Physical Science Basis: Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Stocker, T.F., Qin, D., Plattner, G.-K. *et al*. eds. Cambridge, UK, and New York, USA: Cambridge University Press.

International Coral Reef Initiative (2016). Status of and Threat to Coral Reefs. Available from http://www.icriforum.org/about-coral-reefs/status-and-threat-coral-reefs.

International Nitrogen Initiative (2014). Nitrogen Loss. Available at: http://www.initrogen.org/.

International Union for Conservation of Nature (2014a). *Consultation Document on an IUCN Standard for the Identification of Key Biodiversity Areas*. Gland, Switzerland. Available from https://portals.iucn.org/union/sites/union/files/doc/consultation_document_iucn_kba_standard_01oct2014.pdf.

International Union for Conservation of Nature (2014b). The IUCN Red List Spatial Data Download. Online. Available at: http://www.iucnredlist.org/technical-documents/spatial-data

Island Conservation, Parque Nacional Galápagos, and Charles Darwin Foundation (2016). Pinzón and Plaza Sur Islands, Galápagos. Available from http://www.islandconservation.org/2015/wp-content/uploads/2015/08/Pinzon-and-Plaza-Sur-Fact-Sheet.pdf.

Island Conservation, University of California at Santa Cruz, International Union for Conservation of Nature Species Survival Commission Invasive Species Specialist Group, *et al*. (2014). Database of Island Invasive Species Eradications. Available from http://diise.islandconservation.org.

Valiela, I., J.L., Bowen, J. K., York (2001). Mangrove Forests: One of the World's Threatened Major Tropical Environments. *BioScience*, vol. 51 (10), pp. 807-815.

Jackson, J.B.C., Donovan, M.K., Cramer, K.L., *et al*., eds. (2014). *Status and Trends of Caribbean Coral Reefs: 1970-2012*. Gland, Switzerland: Global Coral Reef Monitoring Network, International Union for Conservation of Nature.

Jameson, J.S., and Ramsay, P.M., (2007). Changes in high-altitude *Polylepis* forest cover and quality in the Cordillera de Vilcanota, Perú, 1956–2005. *Biological Conservation*, vol. 138, pp. 38–46.

Janssen, R., Rutz, D.D. (2011). Sustainability of biofuels in Latin America: Risks and opportunities. *Energy Policy*, vol. 39 (10), pp. 5717-5725.

Joint Monitoring Programme for Water Supply and Sanitation (2015a). *Refining the definitions: an ongoing process and the ladder concept*. Available from: http://www.wssinfo.org/definitions-methods/.

Joint Monitoring Programme for Water Supply and Sanitation (2015b). Access to improved water resources, 1990-2015. *WSS info.* Available from http://www.wssinfo.org/data-estimates/tables/.

Jose Luciano de Souza, Celia Lontra Vieira and Desiree Cristiane Barbosa da Silva (2015). Roteiro Metodológico para Elaboração de Plano de Manejo para Reservas Particulares do Patrimônio Natural. Instituto Chico Mendes de Conservação da Biodiversidade. Available from http://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/roteiro_metodologico_rppn_2015.pdf.

Kapos, V., Walcott, J., Thorley, J., *et* al. (2015). *Planning for REDD+ in Panama: securing social and environmental benefits.* Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre.

Kareiva, P. M. (2012). Dam choices: Analyses for multiple needs. *Proceedings of the National Academy of Sciences*, vol. 109 (15), pp. 5553-5554.

Kessler, M. (1995). Present and potential distribution of *Polylepis* (Rosaceae) forests in Bolivia. In *Biodiversity and conservation of neotropical montane forests: Proceedings of the neotropical montane forest biodiversity and conservation symposium.* S.P. Churchill, H. Balslev, E. Forero, *et al.,* eds. New York: The New York Botanical Garden.

Kirkby, C.A., Giudice, R., Day, B., *et al*. (2011). Closing the ecotourism-conservation loop in the Peruvian Amazon. *Environmental Conservation*, vol. 38 (1), pp. 6-17.

Knowles, J.E., Doyle, E., Schill, S.R., *et al*. (2015). Establishing a marine conservation baseline for the insular Caribbean. *Marine Policy*, vol. 60, pp. 84-97.

Kolb, M. (2009). *Reporte técnico del modelo prototipo de impactos a la biodiversidad Mexicana, MEXBIO*. México: Comisión Nacional para el Conocimiento y uso de la Biodiversidad.

Koleff, P., Tambutti, M., March, I.J., *et al*. (2009). *Identificación de prioridades y análisis de vacíos y omisiones en la conservación de la biodiversidad de México, en Capital natural de México, vol. II: Estado de conservación y tendencias de cambio*. México: Comisión Nacional para el Conocimiento y uso de la Biodiversidad.

Krausmann, F., Erb, K.H., Gingrich, S., *et al*. (2013). Global human appropriation of net primary production doubled in the 20th century. *Proceedings of the National Academy of Sciences of the United States of America*, vol. 110 (25), pp. 10324-10329. Data available at: http://www.uni-klu.ac.at/socec/inhalt/5605.htm.

Lack, M. (2008). *Continuing CCAMLR's Fight against IUU Fishing for Toothfish*. WWF Australia and TRAFFIC International.

Lack, M., and Sant, G. (2001). *Patagonian Toothfish: are conservation and trade measures working?* Cambridge: TRAFFIC.

Lambin, E.F., Gibbs, H.K., Ferreira, L. *et al.* (2013). Estimating the world's potentially available cropland using a bottom-up approach. *Global Environmental Change*, vol. 23 (5), pp. 892-901.

Larsen, F.W., Turner, W.R., and Brooks, T.M. (2012). Conserving Critical Sites for Biodiversity Provides Disproportionate Benefits to People. *PLoS ONE*, vol. 7 (5), e36971.

Lasso, C. A., F. de Paula Gutiérrez, M. A. Morales-Betancourt, E. Agudelo, H. Ramírez -Gil y R. E. Ajiaco-Martínez (Editores). 2011. II. Pesquerías continentales de Colombia: cuencas del Magdalena-Cauca, Sinú, Canalete, Atrato, Orinoco, Amazonas y vertiente del Pacífico. Serie Editorial Recursos Hidrobiológicos y Pesqueros Continentales de Colombia. Instituto de Investigación de los Recursos Biológicos Alexander von Humboldt. Bogotá, D. C., Colombia, 304 pp.

Laurance, W.F. (1999). Gaia's lungs: Are rainforests inhaling Earth's excess carbon dioxide? *Natural History*, vol. 108, p. 96.

Laurance, W.F., Reuben Clements, G., Sloan, S., *et al*. (2014). A global strategy for road building. *Nature*, vol. 513 (7517), pp. 229-232.

Leadley, P.W., Krug, C.B., Alkemade, R., Pereira, H.M., Sumaila U.R., Walpole, M., Marques, A., Newbold, T., Teh, L.S.L, van Kolck, J., Bellard, C., Januchowski-Hartley, S.R. and Mumby, P.J. (2014). *Progress towards the Aichi Biodiversity Targets: An Assessment of Biodiversity Trends, Policy Scenarios and Key Actions*. Secretariat of the Convention on Biological Diversity, Montreal, Canada. Technical Series 78, 500 pages.

León-Lobos, P., Way, M., Aranda, P.D., *et al*. (2012). The role of *ex situ* seed banks in the conservation of plant diversity and in ecological restoration in Latin America. *Plant Ecology & Diversity*, vol. 5 (2), pp. 245-258.

Lichtenstein, G., Oribe, F., Grieg-Gran, M., *et al*. (2002). *Manejo Comunitario de Vicuñas en Perú: Estudio de caso del manejo comunitario de vida silvestre. PIE Series No. 2.* Stevenage, UK: Earthprint Limited. Available from https://www.cites.org/eng/prog/economics/Vicunas-peru.pdf.

Liu, J., Daily, G., Ehrlich, P., *et al*. (2003). Effects of household dynamics on resource consumption and biodiversity. *Nature*, vol. 421, pp. 530–533.

Loh, J. and Harmon, D. 2014. *Biocultural Diversity: threatened species, endangered languages.* WWF Netherlands, Zeist, the Netherlands.

Magrin, G.O., Marengo, J.A., Boulanger, J.-P., *et al*. (2014). Central and South America. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, V.R. Barros, C.B. Field, D.J. Dokken, *et al*., eds. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Malhi, Y., Aragao, L.E.O.C., Galbraith, D., *et al.* (2009). Exploring the likelihood and mechanism of a climate-change-induced dieback of the Amazon rainforest. *Proceedings of the National Academy of Sciences of the United States of America*, vol. 106 (49), pp. 20610-20615.

Marine Stewardship Council (2016). *Monitoring and Evaluation*. London, UK.

Martinelli, G., and Moraes, M.A., eds. (2013). *Livro Vermelho da Flora do Brasil.* Rio de Janeiro: Instituto de Pesquisa do Jardim Botânico do Rio de Janeiro.

McRae, L., Freeman, R., and Deinet, S. (2014). The Living Planet Index in *Living Planet Report 2014: species and spaces, people and places*. R. McLellan, L. Iyengar, B. Jeffries, *et* al., eds. Gland, Switzerland: WWF.

Medaglia, J.C., Perron-Welch, F., and Phillips, F.-K. (2014). *Overview of national and regional measures on access to genetic resources and benefit sharing: Challenges and opportunities in implementing the Nagoya Protocol. Third Edition.* Centre for International Sustainable Development Law. Available from http://www.cisdl.org/aichilex/files/Global%20Overview%20of%20ABS%20Measures_FINAL_SBSTTA18.pdf.

Medeiros, R., Young, C.E.F., Pavese, H.B., *et al.* (2011). *Contribuição das unidades de conservação brasileiras para a economia nacional: Sumário Executivo.* Brazil: UNEP-WCMC.

Mejia, A. (2014). Water scarcity in Latin America and the Caribbean: Myths and reality. In *Water for the Americas: Challenges and opportunities*. A. Garrido, M. Shechter, eds. Oxford, UK: Routledge.

Mekonnen, M.M., Pahlow, M., Aldaya, M.M., *et* al. (2015). Sustainability, Efficiency and Equitability of Water Consumption and Pollution in Latin America and the Caribbean. *Sustainability*, vol. 7 (2), pp. 208-2112.

Michelson, A. (ed.) (2008). Temperate grasslands of South America. The World Temperate Grasslands Conservation Initiative Workshop Hohhot, China - June 28 & 29, 2008

Milder, J.C, and Newsom, D. (2015). *2015 SAN/Rainforest Alliance Impacts Report: Evaluating the Effects of the SAN/Rainforest Alliance Certification System on Farms, People, and the Environment.* New York, USA: Rainforest Alliance, and Mexico City: Sustainable Agriculture Network. Available from http://www.san.ag/biblioteca/docs/SAN_RA_Impacts_Report.pdf.

Miles, L., and Sonwa, D.J. (2015). Mitigation potential from forest-related activities and incentives for enhanced action in developing countries. In *The Emissions Gap Report 2015.* Nairobi: United Nations Environment Programme. Unpublished raw data.

Miles, L., Trumper, K., Osti, M., *et al.* (2013). *REDD+ and the 2020 Aichi Biodiversity Targets: Promoting synergies in international forest conservation efforts*. United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation. Available from http://www.un-redd.org/AichiBiodiversityPolicyBrief/tabid/130684/Default.aspx.

Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-Being: Current State and Trends, Volume 1.* Washington, D.C.: Island Press. Available from http://millenniumassessment.org/en/Condition.html.

Miller, G.T., and Spoolman, S.E. (2013). *Environmental Science, 14th Edition*. Belmont, USA: Brookes/Cole.

Miloslavich, P., Díaz J.M., Klein E., *et al.* (2010). Marine Biodiversity in the Caribbean: Regional Estimates and Distribution Patterns. *PLoS ONE,* vol. 5 (8), e11916.

Ministerio de Ambiente, Vivienda y Desarrollo Territorial, República de Colombia (2010). Política Nacional para la Gestión Integral del Recurso Hídrico. Available from https://www.minambiente.gov.co/images/GestionIntegraldelRecursoHidrico/pdf/Presentaci%C3%B3n_Pol%C3%ADtica_Nacional_-_Gesti%C3%B3n_/libro_pol_nal_rec_hidrico.pdf.

Ministerio de Medio Ambiente y Recursos Naturales, República Dominicana (2012). *Estrategia Nacional de Especies Exóticas*. Santo Domingo, República Dominicana. Available from http://www.ciasnet.org/wp-content/uploads/2014/06/Estretegia-Nacional.pdf.

Ministerio de Medio Ambiente y Recursos Naturales, República Dominicana (2014). *Quinto Informe Nacional de Biodiversidad de la República Dominicana.* Santo Domingo, República Dominicana. Available from https://www.cbd.int/doc/world/do/do-nr-05-es.pdf.

Ministerio del Ambiente, Ecuador (2015). *Quinto Informe Nacional para el Convenio sobre la Diversidad Biológica*. Quito, Ecuador. Available from https://www.cbd.int/doc/world/ec/ec-nr-05-es.pdf.

Ministerio del Medio Ambiente, Chile (2014). Quinto Informe Nacional de Biodiversidad de Chile ante el Convenio sobre la Diversidad Biológica (CBD). Ministerio del Medio Ambiente. Santiago, Chile, 140 pp.

Ministério do Meio Ambiente, Brasília (2006). *Espécies Exóticas Invasoras: Situação Brasileira.* Brasília. Available from http://www.mma.gov.br/estruturas/174/_publicacao/174_publicacao17092009113400.pdf.

Ministry of the Environment, Brazil (2015*). Fifth National Report to the Convention on Biological Diversity*. Available from https://www.cbd.int/doc/world/br/br-nr-05-en.pdf.

Miranda, M., Burris, P., Bingcang, P.S., *et al*. (2003). *Mining and Critical Ecosystems: Mapping the Risks.* Washington, D.C.: World Resources Institute.

Molina, M.J. and Molina, L.T. (2004). Megacities and Atmospheric Pollution, Journal of the Air & Waste Management Association, 54:6, 644-680, DOI: 10.1080/10473289.2004.10470936.

Mosquera, S.L., Nieto, O. and Tapia, C. (2015). Humedales para la gente:visions desde lo local. Available from: http://www.humboldt.org.co/es/component/k2/item/830-humedales-gente

Mulligan, M., Rubiano, J.R., Burke, S. *et al*. (2013). Water Security in Amazonia. A report for the Amazonia Security Agenda project. International Center for Tropical Agriculture and the Global Canopy Programme for the Amazonia Security Agenda. Available from http://segamazonia.org/sites/default/files/press_releases/water_security_in_amazonia.pdf.

Mulligan, M. (2015) Trading off agriculture with nature's other benefits, spatially in Zolin, C.A and Rodrigues, R de A.R. (eds) Impact of Climate Change on Water Resources in Agriculture. CRC Press ISBN 9781498706148

Mulligan, M. A. Guerry, K. Arkema, K. Bagstad and F. Villa (2010) Capturing and quantifying the flow of ecosystem services in Silvestri S., Kershaw F., (eds.). Framing the flow: Innovative Approaches to Understand, Protect and Value Ecosystem Services Across Linked Habitats. UNEP World Conservation Monitoring Centre, Cambridge, UK. ISBN 978-92-807-3065-4

Mumby, P.J., Flower, J. Chollett, I., *et al*. (2014). *Towards Reef Resilience and Sustainable Livelihoods: A handbook for Caribbean coral reef managers*. Exeter: University of Exeter. Available from http://www.marinespatialecologylab.org/force/Climate%20Change%20p.%2052-63.pdf.

Murcia, C. & M. R. Guariguata. 2014. La restauración ecológica en Colombia: tendencias, necesidades y oportunidades. Documentos ocasionales 107. CIFOR. Bogor, Indonesia.

Murcia, C., M.R. Guariguata, A. Andrade, G. Ignacio Andrade, J. Aronson, E.M. Escobar, A. Etter, F.H. Moreno, W. Ramırez, & E. Montes (2015). Challenges and Prospects for Scaling-up Ecological Restoration to Meet International Commitments: Colombia as a Case Study. Conservation Letters doi: 10.1111/conl.12199

Nascimento, J.L., and Campos, I.B. (2011). *Atlas da fauna brasileira ameaçada de extinção em unidades de conservação federais / Organizadores.* Brasília: Instituto Chico Mendes de Conservação da Biodiversidade, Icmbio. Available from http://www.icmbio.gov.br/portal/images/stories/documentos/Atlas-ICMBio-web.pdf.

National Oceanic and Atmospheric Administration (2016). Coral Reef Watch Satellite Monitoring. Available from http://www.coralreefwatch.noaa.gov/satellite/index.php.

Natural Capital Project (2016). Water Funds in Latin America: Prioritizing Investments in Watershed Services. Available from http://www.naturalcapitalproject.org/pubs/WaterFunds_Brochure.pdf.

NatureServe (2015). Biodiversity Indicators Dashboard. Available from: http://www.natureserve.org/conservation-tools/projects/biodiversity-indicators-dashboard

Newbold, T., Hudson, L.N., Hill, S.L.L., *et al.* (2015). Global effects of land use on local terrestrial biodiversity. *Nature,* vol. 520 (7545), pp. 45-50.

Newton, A.C., (2007). Biodiversity Loss & Conservation in Fragmented Forest. Landscape.s. BIddles Ltd. King's Lynn.

Obura, D., and Grimsditch, G. (2009). *Coral Reefs, Climate Change and Resilience: An Agenda for Action from the IUCN World Conservation Congress in Barcelona, Spain. IUCN Resilience Science Working Group Paper Series – No. 6.* Gland, Switzerland: International Union for Conservation of Nature. Available from https://cmsdata.iucn.org/downloads/resilience_barcelona.pdf.

Ochoa-Acuña, H.; Roberts, S.M. An Estimation of Cancer Risks Posed by Exposure to Particulate Matter in Air in Santiago, Chile. *Toxicol. Sci.* 2003, *72*(1), 1909. Ocean Health Index (2016). Ocean Health Index Data Archive. Available from http://ohi.nceas.ucsb.edu/index.html.

Olson, D.M., Dinerstein, E., Wikramanayake, E.D., *et al*. (2001). Terrestrial Ecoregions of the World: A New Map of Life on Earth. *BioScience*, vol. 51 (11), pp. 933-938.

Pagiola, S., Arcenas, A, and Platais, G. (2005). *Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America.* Washington, D.C.: World Bank. Available from http://esanalysis.colmex.mx/Sorted%20Papers/2005/2005%20USA%20-CS%20L.A.,%203F%20Social.pdf.

Pauchard, A., and Barbosa, O. (2013). Chapter 28: Regional Assessment of Latin America: Rapid Urban Development and Social Economic Inequity Threaten Biodiversity Hotspots. In *Urbanisation, Biodiversity and Ecosystem Services: Challenges and Opportunities. A Global Assessment*, T. Elmqvist, M. Fragkias, J. Goodness *et al*., eds. Dordrecht, Heidelberg, New York, and London: Springer.

Pérez-Ramírez, M., Castrejón, M., Gutiérrez, N.L., *et al.* (2015). Marine Stewardship Council certification in Latin America and the Caribbean: A review of experiences, potentials and pitfalls. *Fisheries Research*. In Press.

Peterson, A.T., Navarro-Sigüenza, A.G., Martínez-Meyer, E. *et al.* (2015). Twentieth century turnover of Mexican endemic avifaunas: Landscape change versus climate drivers. *Ecology*, vol. 1 (4), e1400071.

Piquer-Rodríguez, M., Torella, S., Gavier-Pizarro, G.,*et al.* (2015). Effects of past and future land conversions on forest connectivity in the Argentine Chaco. *Landscape Ecology*, vol. 30 (5), pp. 817-833.

Pizano, C. & H. García (2014)(Eds.). El Bosque Seco Tropical en Colombia, pp. 229-251

Polidoro, B.A., Carpenter, K.E., Collins, L., et al. (2010). The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern. PLoS ONE, vol. 5 (4), e10095.

Porras, I., Barton, D.N., Chacón-Cascante, A., *et al.* (2013). *Learning from 20 years of payments for ecosystem services in Costa Rica.* London, UK: International Institute for Environment and Development.

Porter-Bolland, L., Ellis, E.A., Guariguata, M.R. et al. (2012). Community managed forests and forest protected areas: An assessment of their conservation effectiveness across the tropics. Forest Ecology and Management, vol. 268, pp. 6-17.

Programa de las Naciones Unidas para los Asentamientos Humanos, ONU-Habitat (2012). *Estado de las Ciudades de América Latina y el Caribe 2012: Rumbo a una nueva transición urbana.* Nairobi, Kenya. Available from http://www.onuhabitat.org/index.php?option=com_docman&Itemid=538.

Rangecroft, S., Harrison, S., Anderson, K., *et al.* (2015). Climate Change and Water Resources in Arid Mountains: An Example from the Bolivian Andes. *Ambio*, vol. 42 (7), pp. 852-863.

Rayn, D., and Sutherland, W. (2011). Impact of nature reserve establishment on deforestation: a test. Biodiversity and Conservation, vol. 20 (8), pp. 1625-1633.

Reduced Emissions from Deforestation and Forest Degradation Monitor (2009). Carbon scam: the Noel Kempff project in Bolivia. Available from http://www.redd-monitor.org/2009/10/22/carbon-scam-the-noel-kempff-project-in-bolivia/.

Reef Base (2014). Global Information System for Coral Reefs, GIS & Maps. Available from http://www.reefbase.org/main.aspx. http://www.reefbase.org/gis_maps/datasets.aspx

Renctas (2001). *1st National Report on the Traffic of Wild Animals.* Brazil. Available from http://www.renctas.org.br/wp-content/uploads/2014/02/RELATORIO-INGLES_final.pdf.

República de Cuba (2014). *V Informe Nacional al Conveno sobre la Diversidad Biológica.* Available from https://www.cbd.int/doc/world/cu/cu-nr-05-es.pdf.

Romero-Ruiz MH, Flantua SGA, Tansey K, Berrio JC (2011) Landscape transformations in savannas of northern South America: Land use/cover changes since 1987 in the Llanos Orientales of Colombia. Applied Geography 32: 766–776

Ricketts, T.H., Soares-Filho, B., da Fonseca, A.B. *et al.* (2010). Indigenous Lands, Protected Areas, and Slowing Climate Change. *PLoS Biology*, vol. 8 (3), e1000331.

Riitters, K., Wickham, J., Costanza, J.K., *et al.* (2016). A global evaluation of forest interior area dynamics using tree cover data from 2000 to 2012. *Landscape Ecology*, vol. 31 (1), pp. 137–148.

Ringhofer, L., Singh, S.J., Smetschka, B. (2013). *Climate Change Mitigation in Latin America: A Mapping of Current Policies, Plans and Programs. Social Ecology Working Paper 143.* Vienna, Austria: Institute of Social Ecology, Faculty for Interdisciplinary Studies, Alpen-Adria Universitaet. Available from https://www.uni-klu.ac.at/socec/downloads/WP143_web.pdf.

Samaniego-Herrera, A.; Aguirre-Muñoz, A.; Howald, G.; Félix-Lizárraga, M.; Valdez-Villavicencio, J.; Peralta-García A.; González-Gómez, R.; Méndez Sánchez, F.; Rodríguez-Malagón, M. and Tershy B. 2009. Eradication of black rats from Farallón de San Ignacio and San Pedro Mártir Islands, México. Proceedings of the 7th California Islands Symposium, Oxnard, California, USA, February 2008, pp. 337-347.

Sanhueza, P.; Vargas, C.; Jimenez, J. Daily Mortality in Santiago and its Relationship with Air Pollution. *Rev. Medica de Chile* 1999, *127*(2), 235-242.

Sanhuenza, J.E. and Antonissen, M. (2014). REDD+ en América Latin - Estado actual de las estrategias de reducción de emisiones por deforestación y degradación forestal. Available from http://repositorio.cepal.org/bitstream/handle/11362/36810/S2014280_es.pdf?sequence=1.

Santini, L., Saura, S., and Rondinini, C. (2016). Connectivity of the global network of protected areas. *Diversity and Distributions*, vol. 22 (2) pp. 199–211.

Sarukhán, J., Urquiza-Haas, T., Koleff, P., *et al*. (2014). Strategic Actions to Value, Conserve, and Restore the Natural Capital of Megadiversity Countries: The Case of Mexico. *BioScience*, doi:10.1093/biosci/biu195.

Scherer, G. (2015). Latin American illegal wildlife trade exploding in scope and scale. Mongabay. Available from http://news.mongabay.com/2015/11/latin-american-illegal-wildlife-trade-exploding-in-scope-and-scale/.

Schlüter, R. (2001). The Impact of Tourism on the Patagonian Coast, Argentina. *International Journal of Hospitality & Tourism Administration*, vol. 1 (3-4), pp. 53-71.

Secretaria de Ambiente y Desarrollo Sustentable, Republica Argentina (2015). *Quinto Informe Nacional para la Conferencia de las Partes del Convenio sobre la Diversidad Biológica (CBD).* Available from https://www.cbd.int/doc/world/ar/ar-nr-05-es.pdf.

Secretaría General del Senado, República de Colombia (2015). Fundamento de la Política Ambiental Colombiana, Congreso de Colombia, Ley 99 de 1993, Diario Oficial No. 41.146 de 22 de diciembre de 1993. Available from http://www.secretariasenado.gov.co/senado/basedoc/ley_0099_1993.html.

Secretariat of the Convention on Biological Diversity (2011). *NBSAP training modules version 2.1 – Module 1. An Introduction to National Biodiversity Strategies and Action Plans.* Montréal.

Secretariat of the Convention on Biological Diversity (2014). *Global Biodiversity Outlook 4.* Montréal. Available from http://apps.unep.org/publications/pmtdocuments/gb04-en.pdf.

Secretariat of the Convention on Biological Diversity (2015). Notification: Capacity-building workshop for Latin America and the Caribbean on achieving Aichi Biodiversity Targets 11 and 12 Curitiba, Paraná, Brazil – 28 September to 1 October 2015. Available from https://www.cbd.int/doc/notifications/2015/ntf-2015-080-target11-en.pdf.

Secretariat of the Convention on Biological Diversity (2016). National Biodiversity Strategies and Action Plans. Available from https://www.cbd.int/nbsap/. Accessed January 2016.

Sisk, T.D., Castellanos V, A.E., Kock, G.W. (2007). Ecological impacts of wildlife conservation units policy in Mexico. Frontiers in Ecology and the Environment, vol. 5 (4), pp. 209-212.

Soares-Filho, B., Moutinho, P., Nepstad, D. *et al*. (2010). Role of Brazilian Amazon protected areas in climate change mitigation. *Proceedings of the National Academy of Sciences of the United States of America*, vol. 107 (24), pp. 10821-10826.

South Centre (2015). The Nagoya Protocol: Main Characteristics, Challenges and Opportunities. Available from http://www.southcentre.int/wp-content/uploads/2015/06/PB18_Nagoya-Protocol-Main-Characteristics-Challenges-and-Opportunities_EN.pdf.

Spalding, M., Blasco, F., and Field, C. (1997). World Mangrove Atlas. Okinawa, Japan: International Society for Mangrove Ecosystems.

Spalding, M., Kainuma, M., Collins, L. (2010). *World atlas of mangroves.* London: Earthscan.

Sutton, M.A., Bleeker, A., Howard, C.M., Bekunda, M., *et al*. (2013). *Our Nutrient World: The challenge to produce more food and energy with less pollution*. Edinburgh: Global Partnership on Nutrient Management and the International Nitrogen Initiative.

Switek, B. (2015). You Just Missed the Last Ground Sloths. Available from http://phenomena.nationalgeographic.com/2015/04/29/you-just-missed-the-last-ground-sloths/.

Tambosi, L.R., Martensen, A.C., Ribeiro, M.C. *et al*. (2014). A Framework to Optimize Biodiversity Restoration Efforts Based on Habitat Amount and Landscape Connectivity. *Restoration Ecology*, vol. 22 (2), pp. 169–177.

The Nature Conservancy (2016). Forest Conservation: Responsible Trade. Combating Illegal Logging and Advancing Responsible Forest Trade. Available from http://www.nature.org/ourinitiatives/habitats/forests/howwework/combating-illegal-logging-and-advancing-responsible-forest-trade.xml.

The Peruvian State (2002). Law No. 27811: Law introducing a protection regime for the collective knowledge of indigenous peoples derived from biological resources. Available from http://www.wipo.int/edocs/lexdocs/laws/en/pe/pe011en.pdf.

The REDD Desk (2016a). What is REDD+? Available from http://theredddesk.org/what-is-redd.

The REDD Desk (2016b). National Forestry Evaluation (Ecuador). Available from http://theredddesk.org/countries/initiatives/national-forestry-evaluation-ecuador.

Tierney, M.J., Daniel L.N., Darren G.H., *et al*. (2011). More Dollars than Sense: Refining Our Knowledge of Development Finance Using AidData. *World Development,* vol. 39 (11), pp. 1891-1906.

Tittensor, D.P., Walpole, M., Hill, S.L.L., *et al.* (2014). A mid-term analysis of progress towards international biodiversity targets. *Science*, vol. 346 (6206), pp. 241-244.

Tognelli, M. F., de Arellano, P. I. R., and Marquet, P. A. (2008). How well do the existing and proposed reserve networks represent vertebrate species in Chile?. *Diversity and Distributions*, vol. 14 (1), pp.148-158.

TNC (2005). Evaluación Ecorregional del Gran Chaco Americano/ Gran Chaco Americano Ecological Assessment. (1ª ed.). The Nature Conservancy (TNC). Fundación Vida Silvestre Argentina (FVSA), Fundación para el Desarrollo Sustentable del Chaco (desde el Chaco) y Wildlife Conservation Society Bolivia (WCS). Buenos Aires. Fundación Vida Silvestre Argentina.

TRAFFIC (2016). Timber Trade. Available from http://www.traffic.org/timber-trade/.

Uezu, A., and Metzger, J.P. (2011). Vanishing bird species in the Atlantic Forest: relative importance of landscape configuration, forest structure and species characteristics. *Biodiversity Conservation*, vol. 20 (14), pp. 3627–3643.

Undercurrent News (2014). WWF project to move Chile salmon industry toward ASC certification gets Sea Pact grant. Available from https://www.undercurrentnews.com/2014/11/18/wwf-project-to-move-chile-industry-toward-asc-certification-gets-sea-pact-grant/.

Union for Ethical Biotrade (2015). Biodiversity Barometer 2009-2015. Available from http://ethicalbiotrade.org/dl/UEBT%20-%20EN%20Barometer%202015.pdf.

United Nations Department of Economic and Social Affairs (2004). *World Population Prospects: 2015 Revision.* New York. Available from http://esa.un.org/unpd/wpp/Publications/Files/Key_Findings_WPP_2015.pdf.

United Nations Economic Commission for Europe (2016). About PRTR. Available from http://www.prtr.net/en/about/.

United Nations Educational, Scientific and Cultural Organization (2015). UNESCO Atlas of the World's Languages in Danger. Available from http://www.unesco.org/languages-atlas/index.php.

United Nations Environment Programme (2010). State of Biodiversity in Latin America and the Caribbean. Available from http://www.unep.org/delc/Portals/119/Latinmerica_StateofBiodiv.pdf.

United Nations Environment Programme (2012). Chapter 12: Latin America and the Caribbean. In *Global Environment Outlook-5: Environment for the future we want*. Valetta, Malta.

United Nations Environment Programme (2015a). Project Document: Advancing the Nagoya Protocol in countries of the Caribbean Region. Available from http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/Biodiversity/Regional%20-%20(5774)%20-%20Advancing%20the%20Nagoya%20protocol%20in%20countries%20of%20the/ABS_Project_Doc_25_05_2015__2_.pdf.

United Nations Environment Programme (2015b). *Sourcebook of opportunities for enhancing cooperation among the Biodiversity-related Conventions at national and regional levels*. Nairobi, Kenya. Available from https://www.cbd.int/doc/nbsap/unep-sourcebook-web.pdf.

United Nations Environment Programme (2016a). *Global Environmental Outlook 6 (GEO-6)*. Nairobi, Kenya. Unpublished report.

United Nations Environment Programme (2016b). UNEP Environment for Development Regional Office for Latin America and the Caribbean. Available from http://www.pnuma.org/english/AboutUNEP.php.

United Nations Environment Programme (2016c). UNEP Live – Latin America and the Caribbean. Available from http://uneplive.unep.org/region/index/LA#.VlRrSnbhCUk.

United Nations Environment Programme Regional Office for Latin America and the Caribbean (2012). *Global Environment Outlook: Policy Options for Latin America and the Caribbean.* Panama City, Panama. Available from http://www.unep.org/geo/pdfs/geo5/Brief_PES_biodiversity.pdf.

United Nations Environment Programme World Conservation Monitoring Centre (2014). *Global statistics from the World Database on Protected Areas (WDPA)*. Cambridge, UK: UNEP-WCMC.

United Nations Educational, Scientific and Cultural Organization, UNESCO (2016) Latin America and the Caribbean Region. Available from: http://whc.unesco.org/en/lac/.

United Nations Framework Convention on Climate Change (2012). NAMA for Recognition: Clean Production Agreements in Chile. Available from https://unfccc.int/files/cooperation_support/nama/application/pdf/nama_recognition_cap_chile_october_2012.pdf.

United Nations Framework Convention on Climate Change (2016). Cancun Agreements. Available from http://unfccc.int/meetings/cancun_nov_2010/items/6005.php.

United Nations Habitat (2012). The State of Latin American and Caribbean Cities 2012: Towards a new urban transition. Available from http://unhabitat.org/books/state-of-latin-american-and-caribbean-cities-2/.

United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (2015). UN-REDD Programmes Regions and Partner Countries. Available from http://www.un-redd.org/LACRegionalActivities/tabid/131892/Default.aspx.

United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (2016). About REDD+. Available from http://www.un-redd.org/aboutredd.

United Nations Water (2011). Policy Brief: Water Quality. Available from: http://www.unwater.org/downloads/waterquality_policybrief.pdf.

Valiela, I., Bowen, J.L., and York, J.K. (2001). Mangrove Forests: One of the World's Threatened Major Tropical Environments. BioScience, vol. 51 (10), pp. 807-815.

Veiga, M.M., and Hinton, J.J. (2002). Abandoned artisanal gold mines in the Brazilian Amazon: a legacy of mercury pollution. *Natural Resources Forum,* vol. 26 (1), pp. 15-26.

Villarroya, A., Barros, A.A., and Kiesecker, J. (2014). Policy Development for Environmental Licensing and Biodiversity Offsets in Latin America. *PLoS ONE*,vol. 9 (9), e107144.

Vuille, M. (2013). *Climate Change and Water Resources in the Tropical Andes. Technical note No. IDB-TN-515*. Environmental Safeguards Unit, Inter-American Development Bank. Available from http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=37571430.

Vuohelainen, A.J., Coad, L., Marthews, T.R. *et al*. (2012). The Effectiveness of Contrasting Protected Areas in Preventing Deforestation in Madre de Dios, Peru. *Environmental Management*, vol. 50 (4), pp. 645-663.

Walcott, J., Thorley, J., Kapos, V., *et al.* (2015). *Mapping multiple benefits of REDD+ in Paraguay: using spatial information to support land-use planning.* Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre. Available from http://www.un-redd.org/tabid/5954/Default.aspx.

West, P.C., Gerber, J.S., Engrstrom, P.M., Mueller, N.D., Brauman, K.A., Carlson, K.M., Cassidy, E.S., Johnston, M., MacDonald, G.K., Ray, D.K. and Siebert, S. (2014) Leverage points for improving global food security and the environment. Science, vol. 345 (6194), pp. 325-328.

Wood, R.E. (2000). Caribbean Cruise Tourism: Globalisation at Sea. *Annals of Tourism Research*, vol. 27 (2), pp. 345-370.

World Bank (2015). *Brazil – Cerrado Climate Change Mitigation: ProCerrado Federal Project*. Washington, D.C. Available from http://documents.worldbank.org/curated/en/2015/11/25465735/brazil-cerrado-climate-change-mitigation-procerrado-federal-project.

World Bank (2016). Latin America's population growth slows but region's services still insufficient. Available from http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT/0,,contentMDK:23037599~pagePK:146736~piPK:146830~theSitePK:258554,00.html.

World Finance (2012) Natural resources propel Ecuadorian recovery. February 22nd 2012. Available from: http://www.worldfinance.com/markets/energy/natural-resources-propel-ecuadorian-recovery.

World Health Organization Europe. (2005). *Air Quality Guidelines: Global Update 2005. Particulate matter, ozone, nitrogen dioxide and sulfur dioxide.* Copenhagen, Denmark. Available from http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/pre2009/air-quality-guidelines.-global-update-2005.-particulate-matter,-ozone,-nitrogen-dioxide-and-sulfur-dioxide

World Health Organization, and Secretariat of the Convention on Biological Diversity (2015). *Connecting Global Priorities: Biodiversity and Human Health. A State of Knowledge Review.* Geneva, Switzerland. Available from https://www.cbd.int/health/SOK-biodiversity-en.pdf.

World Integrated Trade Solution (2013). Latin America and Caribbean Trade Summary 2013: Latin America and Caribbean exports, imports, tariff by year. Available from http://wits.worldbank.org/CountryProfile/en/Country/LCN/Year/2013/Summarytext.

World Resources Institute (2012). An Inside Look at Latin America's Illegal Logging – Part One. Available from http://www.wri.org/blog/2012/09/inside-look-latin-america%E2%80%99s-illegal-logging-%E2%80%93-part-one.

World Resources Institute (2016). Initiative 20x20. Available from http://www.wri.org/our-work/project/initiative-20x20.

World Wide Fund for Nature (2014). *Living Planet Report 2014.* Gland, Switzerland. Available from http://ba04e385e36eeed47f9c-abbcd57a2a90674a4bcb7fab6c6198d0.r88.cf1.rackcdn.com/Living_Planet_Report_2014.pdf.

World Wide Fund for Nature (2015). Big-leaf Mahogany. Available from http://wwf.panda.org/what_we_do/endangered_species/bigleaf_mahogany/.

World Wide Fund for Nature (2016a). Southern South America: Chile and Argentina. Available from http://www.worldwildlife.org/ecoregions/nt0404.

World Wide Fund for Nature (2016b). Terrestrial ecoregions: Mangroves. Available from http://www.worldwildlife.org/biomes/mangroves.

World Wide Fund for Nature (2016c). Unsustainable and illegal wildlife trade. Available from: http://wwf.panda.org/about_our_earth/species/problems/illegal_trade/

WorldPop (2010). WorldPop continental dataset: Version 1.0 2010 estimates of total number of people per grid square, with national totals adjusted to match UN population division estimates, 2012 revision. Available from http://www.worldpop.org.uk/data

Xalma, C. and López, S. 2015). 2015 report on South-South cooperation in Ibero-America. Ibero-American General Secretariat (SEGIB) Paseo Recoletos, 8 28001-Madrid, Spain.

Yale University (2012). Proportion of the population exposed to a PM2.5 concentration of 10 micrograms per cubic metre, 2000-2012. *Environmental Performance Index.* Available from http://epi.yale.edu/content/air-quality-raw-data-file.

Zarfl, C., Lumsdon, A.E., Berlekamp, J., *et al.* (2015). A global boom in hydropower dam construction. *Aquatic Sciences*, vol. 77 (1), pp. 161-170.

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