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INTERNATIONAL COOPERATION

Quality Infrastructure for Biodiversity in Latin America and the Caribbean

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DEUTSCHE ZUSAMMENARBEIT

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Andrea San Gil is an international consultant with experience in climate change, sustainable development strategies, sustainable transport planning and sustainable cities. She has experience in linking quality infrastructure (QI) with public policy for sustainability and has worked with PTB in projects related to biodiversity, climate change and QI innovations for a green economy. She is also the founder and director of the NGO “Center for Urban Sustainability” in Costa Rica. This NGO aims to improve the quality of life in cities in developing countries through more sustainable and resilient models of development. Andrea San Gil has worked in this field with multiple stakeholders including civil society, local governments, central governments, the private sector and academia.

On behalf of the German federal government, the Physikalisch-Technische Bundesanstalt promotes the improvement of framework conditions for economic activity, thereby supporting the establishment of metrology.

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List of acronyms

AAPAD	Andes Amazon Protected Areas Database
ABNT	Associação Brasileira de Normas Técnicas / Brazilian Technical Standards Association
ANCE	Asociación de Normalización y Certificación, A.C. / Association for Standards and Certification (Mexico)
CAB	Conformity Assessment Body
CASCO	Committee on Conformity Assessment
CBD	Convention on Biological Diversity
CELAC	Community of Latin American and Caribbean States
CENAM	Centro Nacional de Metrología / National Metrology Centre (Mexico)
CEPF	Critical Ecosystem Partnership Fund
CNA	Consejo Nacional de Acreditación / National Accreditation Council (Panama)
CONACYT	Consejo Nacional de Ciencia y Tecnología / National Council for Science and Technology (Mexico)
COP	Conference of the Parties
COPANT	Comisión Panamericana de Normas Técnicas / Pan American Standards Commission
COPOLAD	Cooperation Programme on Drugs Policies
CPB	Cartagena Protocol on Biosafety
DGN	Dirección General de Normas / General Directorate for Standards (Mexico)
EMS	Environmental Management Systems
FONDONORMA	Fodo para la Normalización y Certificación de la Calidad (Venezuela)
FSC	Forest Stewardship Council
FSMS	Food Safety Management Systems
GHG	Greenhouse Gases
GMO	Genetically Modified Organisms
GSTC	Global Sustainable Tourism Council
HACCP	Hazard Analysis and Critical Control Points
HPLC	High-performance liquid chromatography
IAAC	Inter American Accreditation Cooperation
IABIN	Inter-American Biodiversity Information Network
ICONTEC	Instituto Colombiano de Normas Técnicas y Certificación / Colombian Institute for Standards, Technology and Certification
ICSU	International Council for Science
IDB	Inter-American Development Bank
IEC	International Electrotechnical Commission
INDOCAL	Instituto Dominicano para la Calidad / Dominican Institute for Quality (Dom. Republic)
INEN	Servicio Nacional de Normalización / National Service for Standards (Ecuador)
INMETRO	Instituto Nacional de Metrologia, Qualidade e Tecnologia / National Institute for Metrology, Quality and Technology (Brazil)
INN	Instituto Nacional de Normalización / National Institute for Standards (Chile)
IRAM	Instituto Argentino de Normalización y Certificación / Argentinian Institute for Standards and Certification
ISO	International Organisation for Standardisation
IUCN	International Union for Conservation of Nature
JANAAC	Jamaica National Agency for Accreditation

KPK	Knowledge Partnership Korea Fund for Technology and Innovation
LAC	Latin America and the Caribbean. The 33 members of CELAC are considered LAC countries
LEED	Leadership in Energy and Environmental Design
LMMC	Like-Minded Megadiverse Countries
LP Gas	Liquefied Petroleum Gas
MIFIC	Ministerio de Fomento, Industria y Comercio / Ministry for Promotion, Industry and Commerce (Nicaragua)
MLA	Multilateral Recognition Arrangement
MSC	Marine Stewardship Council
NAB	National Accreditation Body
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organisation
NMI	National Metrology Institute
NSB	National Standards Bodies
OAA	Organismo Argentino de Acreditación / Argentinian Organism for Accreditation
OAS	Organization of American States
OGA	Organismos Acreditados / Accredited Organisms (Guatemala)
OHA	Organismo Hondureño de Acreditación / Honduran Organism for Accreditation
ONARC	Órgano Nacional de Acreditación / National Accreditation Organ (Cuba)
OSA	Organismo Salvadoreño de Acreditación / Salvadorian Organism for Accreditation
OUA	Organismo Uruguayo de Acreditación / Uruguayan Organism for Accreditation
PCR	Polymerase Chain Reaction
PEFC	Programme for the Endorsement of Forest Certification Schemes
PTB	Physikalisch-Technische Bundesanstalt / National Metrology Institute (Germany)
QI	Quality Infrastructure
QMS	Quality Management Systems
SAE	Servicio de Acreditación Ecuatoriano / Ecuadorian Service for Accreditation
SDG	Sustainable Development Goals
SFI	Sustainable Forestry Initiative
SIM	Sistema Interamericano de Metrología / Inter-American Metrology System
SME	Small and Medium Entrepreneurs
STAR	Sustainability Tools for Assessing and Rating Communities
TC	Technical Committee
TIES	The International Ecotourism Society
TTBS	Trinidad and Tobago Bureau of Standards
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Science and Culture Organization
WG	Working Group
WWF	World Wide Fund for Nature

Preface

This study was carried out within the framework of the **Regional Fund Quality Infrastructure for Biodiversity and Climate Protection** in Latin America and the Caribbean, starting in 2014. Its objective is to strengthen the capabilities of the quality infrastructure (QI) institutions in Latin America and the Caribbean in order to develop and supply new and innovative services in the fields of biodiversity and climate protection.

The project has a fund structure, which provides an optimum gearing of the support measures to the different national and sub-regional framework conditions. National and regional QI institutions submit joint project proposals with respect to biodiversity and climate protection. These are assessed and selected by a Project Steering Committee (PSC), according to well-defined criteria. This structure allows the committee to address the different needs of the QI institutions with the necessary flexibility, to implement trendsetting projects exemplarily and to strengthen different QI elements, both in the individual countries and in the region.

The project is implemented by the Technical Cooperation for Latin America and the Caribbean of the Physikalisch-Technische Bundesanstalt (PTB). The lead political partner is the Organization of American States (OAS). The regional organisations of standardization (Pan American Standards Commission, COPANT), metrology (Inter-american Metrology System, SIM) and accreditation (Inter American Accreditation Cooperation, IAAC) and their member organisations are directly involved in the implementation. Representatives from the regional organisation form part of the PSC. Considering the thematic focus of the project, this study concentrates on policies on biodiversity, the current state of QI services related to biodiversity and needs in the area of QI and biodiversity in Latin America and the Caribbean (as of 2016).

Thus, with the aim of guiding the actions carried out in the project and also offering orientation for decision makers in the institutions influencing QI regarding biodiversity, this study has been prepared and made available to society. It was elaborated by Andrea San Gil León and revised by the PSC members consisting of representatives from OAS, SIM, COPANT, IAAC and PTB.

I. Executive summary

The region of Latin America and the Caribbean (LAC) has been called a "superpower" in terms of biodiversity, as it contains countries categorised amongst the most biodiverse in the world. Most of the economic activities in the region, for instance agriculture, fishing or tourism, rely on biodiversity, and are also closely linked to history and culture, especially that of the indigenous peoples who originally inhabited these lands. If properly managed and protected, and if the region adopts a sustainable model of development, its rich biodiversity can be a source of socio-economic growth and well-being.

Quality infrastructure refers to all aspects of metrology, standardisation, testing and quality management including certification and accreditation. An internationally recognised quality infrastructure serves objectives in terms of safety, environment, health and consumer protection. In developing countries and emerging economies, it also contributes to sustainable economic, ecological and social development. However, few developing countries have the resources or technical capacity to develop QI on their own. Hence the importance of technical cooperation to strengthen QI with the purpose of improving consumer protection and achieving a more sustainable development.
This paper presents the main findings from an exploratory study which sought answers to the following questions:

1. What are the most relevant international, regional and national policies, agreements and cooperation programmes regarding biodiversity conservation in Latin America and the Caribbean?
2. How is quality infrastructure currently supporting the conservation of biodiversity in the region?
3. What areas of the quality infrastructure in Latin America and the Caribbean can be strengthened and developed to better comply with international commitments on biodiversity conservation, and support the transition of countries in this region towards a green economy?

UNDP's Sustainable Development Goals and the 2020 Biodiversity Targets or Aichi Biodiversity Targets were analysed as the most relevant international policies that can be linked to biodiversity and QI. There is no common policy document or agreement to address biodiversity at a regional level. Each country is therefore left to design and develop its own policy to address biodiversity challenges according to its priorities, circumstances and capabilities. Most countries in the region are parties to the Convention on Biological Diversity (CBD) and the Cartagena Protocol on Biosafety (CPB), with the exception of countries such as Haiti, Chile and Argentina, which are only CBD parties. National Biodiversity Strategy and Action Plans (NBSAP) have been or are being developed by most countries. These NBSAPs were analysed as the most relevant national biodiversity policies.
International and national policy documents were analysed and categorised in thematic areas that could later be linked to QI, such as:

- Knowledge/awareness
- Biodiversity Value
- Incentives
- Production and consumption
- Measurement
- Monitoring
- Categorisation
- Management
- Finance

The analysis of international and national policy for biodiversity conservation shows that the areas of knowledge/awareness, management, categorisation and monitoring can be considered as having the most potential for QI development according to the goals and targets addressed by these policy documents.

An analysis of the participation of LAC countries in QI regional structures and the QI services present in these countries in terms of standardisation, metrology, accreditation, testing and certification was conducted to determine the status of QI infrastructure in the region. Approximately half of the countries have QI services that could be used as a platform for biodiversity conservation. There is still a lot of potential for developing new QI services in countries that have none, in addition to strengthening and expanding existing QI to orient it towards biodiversity conservation goals.

Venezuela, Central American countries and Caribbean countries are the places where biodiversity conservation is the most relevant, and where, at the same time, QI is the least developed. In South America, other highly biodiverse countries such as Ecuador and Peru could benefit from support in developing standards to strengthen biodiversity protection. These countries should be considered as a priority for developing and strengthening QI related to biodiversity. Existing QI institutions and schemes already developed for testing laboratories, inspection bodies and product certification bodies can be used to expand these services towards biodiversity conservation. Certification of persons could also be an area for expansion to support biodiversity conservation. There is potential for clarifying how tourism should be assessed internationally and further developing QI related to this sector, as it is being assessed differently in different national QI systems.

To determine the areas of potential development of QI, the results of the mapping of international and national biodiversity policy were considered, in addition to those from the QI mapping in LAC. A number of recommendations for QI development in the LAC region are provided in Section 3 of this report. Some of these services are already being offered by CABs and laboratories in the region. However, none of them are present in more than half of the countries in LAC and still have potential for being strengthened and improved. Should the suggested QI services be adopted and widened, each country would also have to expand their metrology services and develop/adopt standards that are adequate for such services.

There is plenty of space for QI to expand and grow in LAC. Each country should look at the specifics of its biodiversity policy, as well as at the species that it hosts, such as those that are endemic, endangered and biologically diverse, and the elements that threaten them. Based on this, it should create or adopt regulation and standards that will help protect relevant species while at the same time regulating and reducing what threatens them, and monitor the performance of these two elements. With regulation and standards for biodiversity conservation, new QI for this purpose will not be difficult to develop. Considering the important role of the areas of knowledge and finance in international biodiversity policy, both financial and technical international cooperation, as well as South-South learning between countries with similar species, threats and realities, will help as enablers towards improving QI for biodiversity conservation in the region.

II. Introduction

Biodiversity is defined by the World Wide Fund for Nature (WWF, 2015) as the variety of life on Earth: "the variety within and between all species of plants, animals and micro-organisms and the ecosystems within which they live and interact". Biodiversity is explored at the level of genetic diversity, species diversity and ecosystem diversity. Humankind is increasingly aware of the important relationship between biodiversity and sustainable development, especially the importance of ecosystems for creating wealth and maintaining health and well-being (Convention on Biological Diversity [CBD] 2014). The region of Latin America and the Caribbean (LAC) has been called a "superpower" in terms of biodiversity, as it contains countries categorised amongst the most biodiverse in the world. At the same time, most of the economic activities in the region, for instance agriculture, fishing or tourism, rely on its biodiversity. The region's biodiversity is closely linked to its history and culture, especially that of the indigenous peoples who originally inhabited these lands. If properly managed and protected, and if the region adopts a sustainable model of development, its rich biodiversity can be a source of socio-economic growth and well-being (UNDP, 2010).

The planet's biodiversity, however, is in danger due to diverse reasons and threats. Amongst these are what Jared Diamond referred to, as early as 1984, as an 'evil quartet' of trends that were the main threats to biodiversity, generating the most biodiversity loss and resulting in the extinction of many species: overhunting (overexploitation), habitat destruction, introduced species and co-extinctions (chains of linked extinctions or trophic cascades). Other authors such as Edward Wilson (1985) described the reasons for biodiversity loss with the acronym HIPPO in order of magnitude of impact to biodiversity: habitat destruction, invasive species, pollution, human over-population and over-harvesting by hunting and fishing (UNESCO, 2010). More recent scientific findings indicate that biodiversity is affected by climate change. According to the Millennium Ecosystem Assessment, climate change is and will continue to be a major driver of biodiversity loss by the end of the century (CBD, 2015e). This makes efforts for conserving and sustainably managing biodiversity critical to addressing climate change and vice versa. These elements were a reality almost 30 years ago and continue to be threats today, a key difference being that biodiversity loss has not decreased or reverted but accelerated dramatically in the last decades (Bottiglieri et al, 2007:32). This leads us to the question of what can be done to reverse these trends.

"Quality infrastructure refers to all aspects of metrology, standardisation, testing and quality management including certification and accreditation. This includes both public and private institutions and the regulatory framework within which they operate" (Sanetra and Marbán 2007:13). An internationally recognised quality infrastructure (QI) serves objectives in terms of safety, environment, health and consumer protection. In developing countries and emerging economies, it also contributes to sustainable economic, ecological and social development. However, few developing countries have the resources or technical capacity to develop QI on their own. Hence the importance of technical cooperation to strengthen QI with the purpose of improving consumer protection and achieving more sustainable development (Physikalisch-Technische Bundesanstalt (PTB) 2014). From the perspective of QI, a new question arises: How can QI institutions and their services support international and national efforts to reduce biodiversity loss? And how can QI be strengthened in the LAC region specifically to achieve this?

This has been the starting point for this study, which addresses international and national policy related to biodiversity, identifies the coverage of QI services for biodiversity in the region of Latin America and the Caribbean and propose recommendations on areas that could be further developed to support the fight against biodiversity loss.

This study has been carried out within the scope of the regional cooperation project "Regional quality infrastructure fund for biodiversity and climate protection in Latin America and the Caribbean". This project aims to improve the QI services which serve the protection of biodiversity and of the climate in LAC countries through a fund-type structure. The funding volume of the project amounts to 2 000 000 euros from 2013 to 2017. As part of the project, national and regional QI institutions are to submit project proposals with respect to both sets of topics "Biodiversity" and "Climate Protection", which are assessed and selected by a Project Steering Committee (PSC). The fund-type structure of the

project allows the different needs of the QI institutions to be addressed with more flexibility, trendsetting projects to be implemented exemplarily and different QI elements to be used along the value chains in the countries and in the region. The lead executing agency is the Organization of American States (OAS). The regional organisations in charge of standardisation (Pan American Standards Commission, COPANT), metrology (Inter-American Metrology System, SIM) and accreditation (Inter American Accreditation Cooperation, IAAC) act primarily as strategic partners, their member organisations being directly involved in the implementation of the project funds.

III. Objectives and research questions

Main objective: To deliver an exploratory study on quality infrastructure for biodiversity in Latin America and the Caribbean.

Research questions:

1. What are the most relevant international, regional and national policies, agreements and cooperation programmes regarding biodiversity conservation in Latin America and the Caribbean?
2. How is quality infrastructure currently supporting the conservation of biodiversity in the region?
3. What areas of the quality infrastructure in Latin America and the Caribbean can be strengthened and developed to better comply with international commitments on biodiversity conservation and support the transition of countries in this region towards a green economy?

IV. Methodology

In order to respond to the research questions, the study included the following activities:

1. The mapping of biodiversity-related international, regional and national policy. That includes:
   a. Identifying main international agreements, regulations, cooperation programmes, etc
   b. Identifying and coding specific areas for biodiversity conservation under these frameworks
3. The mapping of existing QI services being offered in the region and the participation and recognition of QI institutions in international bodies such as the Inter American Accreditation Cooperation (IAAC), Inter-American Metrology System (SIM) and the Pan American Standards Commission (COPANT).
4. Identification of areas for potential development of QI in Latin America and the Caribbean.
   a. Identification of gaps between areas of biodiversity conservation found in the policy mapping and QI services currently offered in the region.
   b. Identification of existing QI services and schemes in other regions (e.g. Europe, USA, etc.) that might suggest best practices or serve as guidelines for developing similar schemes in LAC.
3. Summary of findings and elaboration of final report.

V. Results of the exploratory study

This exploratory study aimed to map out how international, regional and national policies propose to carry out biodiversity conservation and then identify specific areas of biodiversity whose conservation could be supported by QI in order to comply with international goals. These two aims are covered in Section 1 of this Chapter. This study also sought to identify the status of QI with relation to biodiversity conservation in LAC, which is examined in section 2. Finally, by cross-analysing tendencies in international and national policy with existing QI services in the region, the study presents recommendations of potential QI services that could be developed through the regional cooperation project “Regional Fund Quality Infrastructure for Biodiversity and Climate Protection in Latin America and the Caribbean” in Section 3 of this Chapter.

1 Mapping biodiversity-related international, regional and national policy

1.1 Most relevant international policy

There are seven international conventions that focus on biodiversity issues:

- The Convention on Biological Diversity (entered into force in 1993)
- The Convention on Conservation of Migratory Species (1985)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975)
- The International Treaty on Plant Genetic Resources for Food and Agriculture (2004)
- The Ramsar Convention on Wetlands (1971)
- The World Heritage Convention (1972)
- The International Plant Protection Convention (1952)

Each of these conventions works to implement actions at the national, regional and international level with the aim of reaching shared goals of conservation and sustainability (CBD, 2015d). As the Convention on Biological Diversity works as an umbrella agreement with goals that address and are compatible with those of other conventions, it was chosen as the main international policy document used for this study.

In light of increasing recognition of the threats to species and ecosystems caused by human activities, in 1992, during the Earth Summit in Rio de Janeiro, Brazil, the **Convention on Biological Diversity (CBD)** was opened for signature and came into force in 1993 (CBD, 2015a). Through the CBD, different countries sought to ensure the conservation and sustainable use of diverse species, habitats and ecosystems, in addition to the fair and equitable sharing of the benefits derived from genetic resources. In 2000, the **Cartagena Protocol on Biosafety (CPB)** was adopted by the CBD parties. It sought to protect biological diversity and human health from the potential risks of living modified organisms. The most recent[1] international policy regarding biodiversity is the 2010 **Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization**. Through this protocol, the parties defined a strategic plan with the 2020 Biodiversity Targets or Aichi Biodiversity Targets, which aim to reduce the pressures on biodiversity, safeguard biodiversity, enhance the benefits provided by biodiversity and provide for capacity-building. 2011-2020 was thus declared as the United Nations Decade on Biodiversity, with the primary goal of reducing biodiversity loss (European Commission (EC), 2015).

One of the most recent international policies, which is not directly linked to biodiversity policy but is relevant to the subject, is UNDP's **2030 Agenda for Sustainable Development**, which contains the **Sustainable Development Goals (SDGs)**. The SDGs consist of 17 goals and targets for each of those goals, amongst which several can be related to biodiversity and quality infrastructure.

Appendices 1 and 2 show an analysis of the Aichi Biodiversity Targets and the SDGs, respectively, coded into areas that could possibly be linked to and supported by QI. Potential areas for QI development are derived from these international policy documents and identified by the following categories. These categories are related to measures proposed by the policy documents and their relation for QI is explained as follows:

- **Knowledge/awareness:** Awareness and knowledge about environmental issues can lead to more responsible citizens and consumers. Informed decisions can lead to an increased trust and even demand for labels, certifications and quality in the different stages of the value chain of the goods and services that people acquire. In addition to this, beyond the consumer perspective, informed decision makers can apply their knowledge about environmental

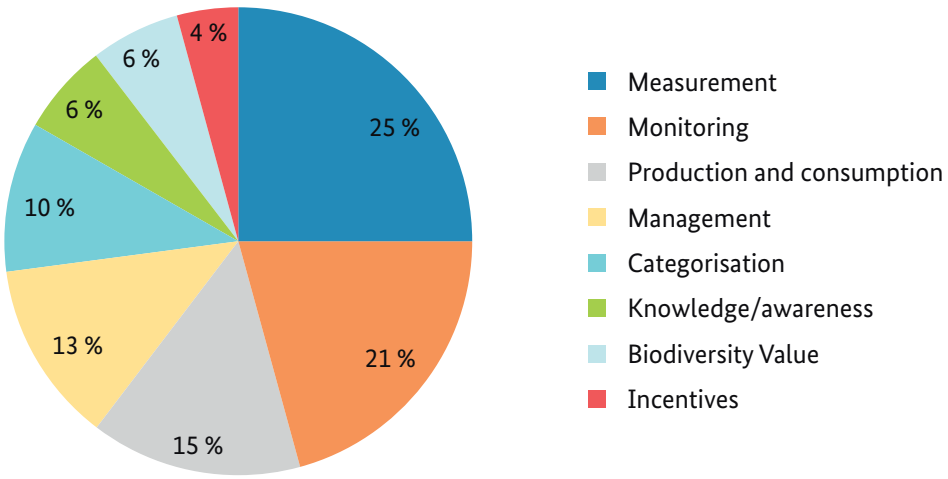
1 The Conference of the Parties (COP) is the governing body of the Convention on Biological Diversity. The 2012 COP11 and the 2014 COP12 resulted in decisions that were action-oriented, but no new policy documents were agreed upon. Although more recent than the 2010 COP proceedings, these are therefore not cited as policies.

issues and QI in order to improve their own work, for instance at the government, industry, business, non-governmental organisation (NGO) or Small and Medium Entrepreneurs (SME) levels.

- **Biodiversity value:** Standardisation and/or certification could contribute to biodiversity conservation through assigning value to ecosystem services and contribute to the well-being of surrounding communities who protect them and manage them responsibly.
- **Incentives:** Incentives can be directed towards products, processes, services, etc. that comply with biodiversity conservation criteria that can be defined and assessed by QI services such as standardisation, metrology, inspection, testing, certification, etc.
- **Production and consumption:** QI can contribute to setting the criteria, supporting and assessing best practices and more responsible ways of producing and consuming that can contribute to biodiversity conservation.
- **Measurement:** QI services, especially metrology and testing, can assist the measurement of elements of interest for biological conservation, such as pollution levels, genetic diversity, nutritional or chemical properties, climatologic elements that affect biodiversity, etc.
- **Monitoring:** The calibration of equipment for monitoring, making sure measurements taken are trustworthy, best practices for measurement when monitoring, etc., are all related to established and internationally agreed QI mechanisms.
- **Categorisation:** The categorisation and control of invasive species or Genetically Modified Organisms (GMOs), for instance, can be supported through standards, regulation, inspection, certification and testing that needs to be accurate and trustworthy (thus the importance of metrology).
- **Management:** Sustainable management and best practices can be supported by QI such as through standards and certification.
- **Finance:** As in the case of incentives, finance can be directed towards products, processes, services, etc. that comply with biodiversity conservation criteria that can be defined and assessed by QI. On the other hand, finance can also support the development of QI that will contribute towards biodivversity protection.

Graph 1 was developed by analysing both the Aichi Targets and the SDGs. The analysis was carried out by interpreting the documents and identifying potential areas for QI development, which were classified into the categories outlined above. The graph shows how many times these categories were detected in these documents to help identify priority areas that could have the most potential for QI to support international biodiversity conservation goals and policies. Areas such as **measurement, monitoring, production and consumption and management** were found to have the most potential for QI to support the achievement of the goals and targets defined by international biodiversity policy.

Graph 1 Areas with potential for QI development to support biodiversity conservation



1.2 Relevant Regional and National Policies

The region of Latin America and the Caribbean is the most biologically diverse area in the planet. It holds more than half of the world's tropical forests, 30 % of the world's available freshwater, 40 % of its renewable water resources (generated through the hydrological cycle), 33 % of its mammals, 35 % of reptiles, 41 % of birds and 50 % of amphibians, many of these species being unique (endemic, only to be found in the region). However, in addition to the threats of a changing climate, recent reports suggest that the region's biodiversity is endangered, being lost or seriously threatened by human activities (UNEP, 2010). This is why policies that respond to these threats and that are also in line with international goals are crucial for Latin America and the Caribbean.

Many studies and reports have assessed the state of biodiversity in the LAC region and results of biodiversity policies being implemented in different countries in the region (e.g. ICSU, 2010; UNEP, 2010; UNDP, 2010). There are also several projects and initiatives related and linked to biodiversity, supported regionally by organisations such as the World Bank and the Organization of American States (OAS). Example of these are shown in the table below.

Table 1 Examples of biodiversity-related initiatives that have been implemented in the region through OAS

Initiative	What it proposes	Code
IABIN, Inter-American Biodiversity Information Network	Generate, share and make accessible information related to biodiversity	Knowledge
Sustainable Cities of the Americas Sustainable Communities in Central America and the Caribbean	Action plan to encourage cities and countries to improve policy on: – Public Transport – Cycling and Walking – Sustainable Urban Development – Waste Management – Climate, Energy and Transport Policy – Traffic Reduction – Outreach and Awareness – Resilience to natural hazards	Production and Consumption Awareness Measurement
ReefFix	Coral reef restoration and integrated coastal zone management in the Caribbean	Biodiversity value Knowledge/awareness Measurement Monitoring
AAPAD, Andes Amazon Protected Areas Database	Online database about the state of protected areas in the Andes Amazon region.	Measurement Monitoring Knowledge

Updated: Dec. 2015

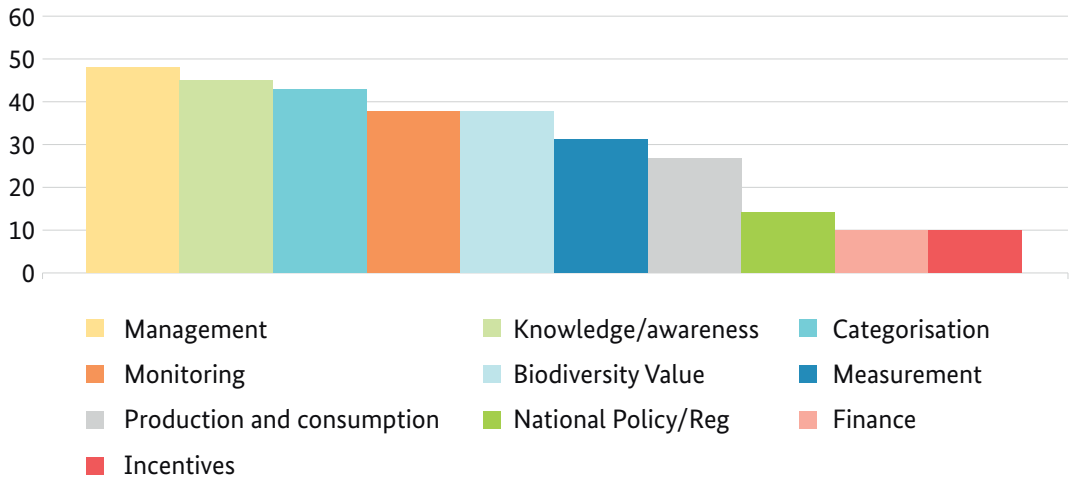
All national legislation and regulation in countries that have adhered to CBD has to be consistent with international policy. However, national policy and regulation is country-specific and its priorities and focus might vary. Hence the importance of identifying relevant regional and national policies in LAC addressing biodiversity. All countries in the region currently acknowledge environmental protection in their constitutions in some way (O'Toole, 2014). There is, however, no common policy document or agreement at the regional level to address biodiversity on its own as is the case for instance in Europe. Each country is therefore left to design and develop its own policy to address biodiversity challenges according to its priorities, circumstances and capabilities. Most countries in the region are both CBD and CPB parties, with the exception of countries such as Haiti, Chile and Argentina, which are only CBD parties (CBD,

2015b). Due to their commitment to the CBD and the Aichi Target 17, which aims for every CBD party to have developed an updated National Biodiversity Strategy and Action Plan (NBSAP), most countries have developed or are in the process of developing NBSAPs. A more detailed list of countries and their participation in each of these biodiversity policies is shown in Appendix 3.

Although most countries have NBSAPs, for the purpose of this study, it is of interest to identify the most recent tendencies, commitments and priority areas in national policy in order to support and respond to these through QI. Appendix 4 shows a sample analysis of the NBSAPs of 10 countries that were selected due to them being listed on the CBD's website of the most recent NBSAPs since the COP 10. Since the NBSAPs are supposed to be aligned to the Aichi targets, in this case, the analysis sought to identify particularities of each country's focus on how it would adapt and prioritise the targets.

The analysis showed that some countries limited themselves to establishing standardised goals and targets that imitated the Aichi Targets. Others, however, made more elaborate targets with goals specifically related to national habitats, species, sectors, etc. Appendix 3 shows two tables analysing how national goals established by each country respond to the Aichi Targets and also the particular, non-standard, country-specific goals they propose. The analysis first counted the number of times a specific Aichi Target was addressed by the NBSAP. After that, it used the categories defined in Section 1.1 of this report to analyse the content of the goal and identify areas for potential development of QI. Finally, Graph 2 displays the total number of times an Aichi Target in an NBSAP was assigned to each of these categories. For instance, the code "Management" was assigned to Aichi Target numbers 11, 7, 18, and 6. These targets each appeared 18, 14, 10 and 6 times in the NBSAPs analysed, therefore "Management" received a score of 48. The scores were used to determine which areas for potential QI development are being prioritised in the sample of NBSAPs. These are areas such as **management, knowledge/awareness, categorisation monitoring, and biodiversity value**.

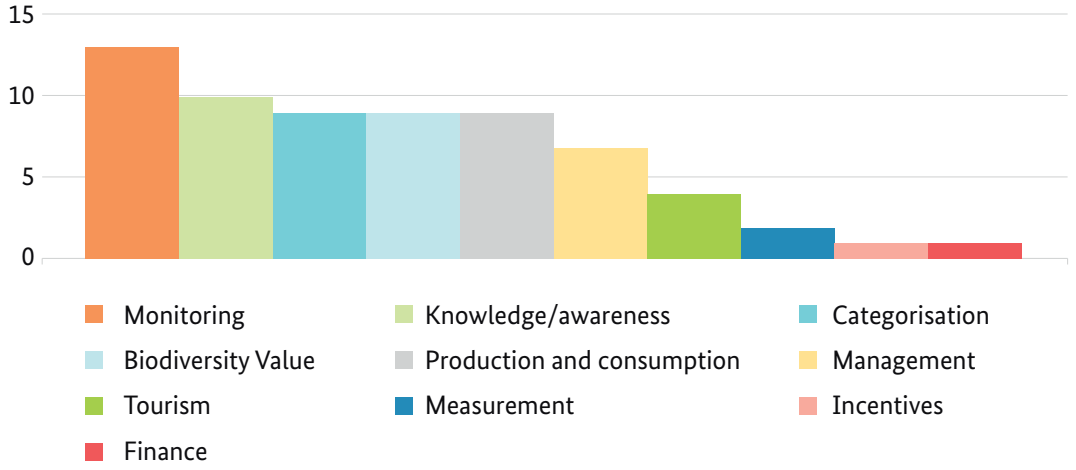
Graph 2 Areas for potential QI development detected in a sample of 10 NBSAPs from LAC countries



The content of the NBSAPs was then analysed based on country-specific goals and the categories from 1.1 were again used to classify the goals for each country. For instance, goals such as maintaining biodiversity inventories or keeping track of endangered species, carbon stock, illegal trafficking of species or fisheries, were coded under "Monitoring". Others related to the management of national parks, agriculture, fisheries and protected areas, were coded under "Management". Some goals were categorised using more than one code if applicable. Graph 3 shows the number of times each code was assigned to a country-specific goal. The areas with most potential for QI development are identified as those with the highest scores: monitoring, knowledge and awareness, categorisation, biodiversity value and production and consumption. Although it was not present in all the NBSAPs, tourism was found to be a new potential

area for development in addition to those identified in the previous section. In this sector, QI could be used to support a model of sustainable tourism that will help conserve biodiversity instead of destroying it. An example of this is the existence of sustainable tourism certification schemes that include testing services to determine the quality of wastewater or biodegradability of cleaning and shower products used in hotels.

Graph 3 Areas for potential QI development to support biodiversity protection from country-specific goals in a sample of 10 NBASPs from LAC countries



1.3 Conclusions from the mapping of international and national biodiversity policies

After combining the results of the analysis of international and national policies for biodiversity conservation, the areas of **knowledge/awareness**, **management**, **categorisation and monitoring** are those that can be considered as having the most potential for QI development according to the goals and targets addressed by these policy documents. **Knowledge and awareness** becomes the most important area to develop, as it is necessary for different stakeholders (government, NGOs, civil society, academia, industrial sector, etc) to understand the importance and value of biodiversity, to be aware of international and national goals, and also, to have the technical knowledge and sufficient awareness to make decisions that will support biodiversity conservation. **Management** is the area with the second highest combined score. It takes on relevance in terms of introducing biodiversity conservation and awareness into the economy and productive system, making systems more inclusive and sustainable, following guidelines to protect endangered species, adopting traditional knowledge, working with local communities, etc. **Categorisation** allows for better control, identification and/or protection of endangered species, invasive species, species contributing to genetic diversity, zoning, protected areas or areas with particular importance for biodiversity. This area can have a strong link with areas such as measurement and monitoring, as countries could categorise species based on tests (coded as Measurement) in order to protect or control them, or be able to set up databases of their biodiversity and better quantify their advances in reducing its loss (coded as Monitoring). **Monitoring** is the fourth-ranked area with the most potential for QI institutions and their services to support biodiversity conservation. Depending on the area or the target to be monitored, monitoring could involve, for instance, taking precise measurements to determine elements such as genetic properties in species, meteorological conditions in ecosystems or biomass content in vegetation (involving laboratories and metrology), or developing methodologies, standards or protocols for this purpose (involving standardisation). QI institutions have been working in areas such as the ones mentioned previously for years, but evidently there is still space for improving, diversifying and adapting to the needs of each country and its biodiversity. More examples of how these areas could be developed specifically for biodiversity are covered in Section 3 of this Chapter.

2 Mapping existing QI services in Latin America and the Caribbean

2.1 General QI analysis

QI services are based on the following essential components and services that are linked to one another in different ways:

- **Standardisation** – Standards provide a reference framework or a common technical language between suppliers and their customers.
- **Metrology** – Measurements are not a natural phenomenon. They have to be defined, described, made known and disseminated to end users. These are the tasks of metrology institutes. They assure that measurements are trustworthy and comparable in space and time.
- **Conformity Assessment** – Conformity assessment is based on systematic testing to determine whether a product or process complies with the requirements specified in standards or other normative documents.
  - **Testing** – Regulations and standards cannot fulfil their purpose unless testing is carried out to ensure that they are being complied with. Testing can include other activities such as measurements and calibration. It also provides the basis for other forms of conformity assessment such as inspection or product certification.
  - **Inspection** – An inspection consists of an examination of materials, products, installations, plants, processes, work procedures or services to determine whether they conform to standards, regulations, inspection schemes, specifications or contracts, on the basis of professional judgement, and report these results to clients or authorities. Inspection can be a first, second or third party attestation.
  - **Certification** – A certification is a third party attestation confirming that products, materials, services, systems or people measure up to the specifications of a relevant standard or technical regulation. The results of testing and inspection can be used as evidence for a certification.
- **Accreditation** – Accreditation is a process by which an independent, third party authoritative body gives formal recognition, based on international standards, that a body or person is competent to carry out specific tasks. Accreditation provides confidence in the work and results of conformity assessment bodies such as testing and calibration laboratories; inspection, certification and verification bodies, etc.
  (Sanetra and Marbán, 2007; ISO, 2013).

As observed above, standardisation and metrology are basic pillars for any other type of quality infrastructure service. Standards will set the criteria that must be followed and complied with, while metrology will contribute to ensuring the comparability of measurements and tests that are needed for a trustworthy and precise conformity assessment. Finally, accreditation will assess conformity assessment bodies to determine whether they comply with the requirements and best practices (including a management system, competence, structure, avoiding conflict of interest, etc.) defined by international and national standards or rulings.

The following sections present a mapping of the participation of LAC countries in different areas of QI such as standardisation, metrology and accredited conformity assessment services. Developing a complete mapping of QI services available in the region would require much more intensive research and a longer timeframe than was designated for this report. Therefore, the study has focused on identifying the current QI capacity in LAC in terms of:

a. Which countries in the LAC region are Inter American Accreditation Cooperation (IAAC) members, which of these participate in the Inter-American Metrology System (SIM) and the Pan American Standards Commission (COPANT)? How and under which conditions are they participating (general QI analysis)
b. A deeper analysis on those countries in the region that harbour the most biodiversity and therefore are considered as priority areas in terms of biodiversity conservation

2.1.1 Standardisation

The Pan American Standards Commission, COPANT, is a civil non-profit association. It is the reference for technical standardisation and conformity assessment for the countries of the Americas, for its members and international peers, and promotes the development of its members. It comprises the National Standards Bodies (NSB) of the Americas, which currently has 34 active members and 10 adherent members. NSBs in all countries in LAC except for Venezuela are active members in COPANT. FONDONORMA of Venezuela is an adherent member.

Table 2 below shows the participation of NSBs in LAC countries in different standardisation groups in COPANT (selected due their relevance and links to biodiversity policy and goals analysed in previous sections). From this table, it is evident that **leadership on standardisation related to biodiversity in LAC is located mostly in countries in South America and Mexico**. This suggests that **more support and cooperation is needed for NSBs in countries in Central America and the Caribbean** to strengthen standardisation for biodiversity conservation, oriented towards the priority areas and context of each country.

Table 2 Participation of LAC NSBs in COPANT technical committees, working and focal groups

Standardisation Group	Convenors	Countries where NSB member is from
CT 152 – ENERGY EFFICIENCY AND RENEWABLE ENERGIES	Fabian Yaksic (ABNT) Luis Iván Hernández (ANCE)	Brazil Mexico
COPANT GT RS – WG RS – SOCIAL RESPONSIBILITY	Adriana María Alonso (ICONTEC) Adriana Rosenfeld (IRAM)	Colombia Argentina
COPANT GT ENJP – EDUCATION, STANDARDS AND YOUNG PROFESSIONALS PROGRAMS	Wolfram Palacio (INEN)	Ecuador
COPANT GT PYME – WG SME – SMALL AND MEDIUM ENTERPRISES	Martha Castro (ICONTEC) Leonardo Martins (ABNT)	Colombia Brazil
FOCAL GROUP – GF CASCO (Conformity Assessment)	Claudia Cerda (INN) Germán Lombana (ICONTEC)	Chile Colombia
FOCAL GROUP – GF 207 (Environment)	María Aurora Agullo (IRAM)	Argentina
FOCAL GROUP – GF 228 (Touristic Services)	Rosario Graham (DGN)	Mexico

Updated: Dec. 2015

The International Organization for Standardization (ISO) is an international standard-setting body composed of representatives from various national standards organisations. A search through all of ISO's technical committees (TC) was performed using the same selection criteria as used for COPANT's groups above (selected due their relevance and links to biodiversity policy and goals analysed in previous sections) to map out LAC countries' participation in standardisation groups that are relevant for biodiversity conservation. This search found 39 ISO TCs related to environment, biodiversity and QI that could contribute to biodiversity conservation, all with at least one LAC country participating in them, sometimes as active members, sometimes as observers.

Table 3 summarises the results from this analysis and Appendix 5 shows the complete analysis indicating the name and code of each committee and whether the country participates as an observer or participant. The results for this analysis were consistent with those from Table 2 in that most of the participation in standardisation is coming from South American countries (with the exception of Guyana, Paraguay, Suriname and Venezuela) and Mexico. However, it presented additional findings on **Caribbean and Central American countries that have considerable participation in standardisation that could be linked to biodiversity conservation such as Cuba, Trinidad and Tobago, Costa Rica,**

Jamaica, Panama and Barbados. Most highly biodiverse countries have a higher participation in these TCs, however, **Ecuador and Peru could benefit from support** in this area, in addition to **Venezuela, which has no participation whatsoever** in these TCs.

Table 3 Participation of LAC countries in ISO TCs related to biodiversity

Country	# of TC it participates in (out of 39 sampled)	Region
Argentina	36	SA
Colombia	29	SA
Chile	24	SA
Cuba	24	C
Mexico	19	NA
Brazil	18	SA
Trinidad and Tobago	14	C
Costa Rica	12	CA
Jamaica	12	C
Panama	10	CA
Barbados	9	C
Uruguay	9	SA
Ecuador	8	SA
Peru	8	SA
Bolivia	4	SA
Dominican Republic	4	C
Dominica	3	C
El Salvador	3	CA
Bahamas	2	C
Haiti	1	C
Honduras	1	CA
Saint Lucia	1	C
Belize	0	CA
Granada	0	C
Guatemala	0	CA
Guyana	0	SA
Nicaragua	0	CA
Paraguay	0	SA
Saint Kitts and Nevis	0	C
St. Vincent and Grenadines	0	C
Suriname	0	SA
Venezuela	0	SA
Antigua and Barbuda	0	C

* Countries highlighted in blue are megadiverse countries (LMMC, 2002)
** Codes for region are the following: NA for North America, SA for South America, C for Caribbean and CA for Central America
Updated: Dec. 2015

2.1.2 Metrology

The Inter-American Metrology System (SIM) is an organisation that seeks to:

- Raise standards of basic metrology in each country in the hemisphere
- Contribute to the measurement infrastructure required to promote equity in commercial transactions
- Foster competitiveness and quality in the manufacturing sector in order to promote commercial transactions
- Identify sectors and institutions that can conduct specific multinational activities in metrology support
- Contribute to the metrological infrastructure required to protect the environment, to control the accelerated use of resources and to promote the general well-being of the population, including its health and safety (SIM, 2015)

Figure 1 shows how all the countries in the region have a national metrology institute and are included in the sub-regions defined by SIM.

Figure 1 The SIM and its sub-regions in the Americas

The results of a mapping of the participation of LAC countries in SIM projects whose objectives[2] can be linked to biodiversity conservation are shown in Table 4 below. The **results once again indicate the prominence and strength of QI in countries like Brazil and Mexico**, while the variety of beneficiary countries does not show any tendency. From this mapping, it is also noticeable that even though the existing projects can indirectly contribute to it, **there have been no projects specifically focused on biodiversity conservation**.

Table 4 Participation of LAC countries in SIM projects related to biodiversity conservation

Project	Entities/Countries Leading Project	Subject	Beneficiary Countries
Quality Infrastructure Services for Renewable Energies and Energy Efficiency (R3E) in Latin America and the Caribbean (2011–2016)	PTB – Germany, SIM, COPANT, IAAC, OAS	Renewable Energy and Energy Efficiency	SIM members
Triangular Cooperation: Metrology for Natural Gas in Latin America (1st phase: 2007–2011, 2nd phase: 2011–2015)	PTB – Germany, OAS, SIM, INMETRO – Brazil, CENAM – Mexico	Metrology for Natural Gas	Bolivia Peru
Regional Cooperation for Environmental Protection and Food Safety in Latin America and the Caribbean (1st phase: 2002–2008, 2nd phase: 2008–2012)	PTB – Germany, OAS, SIM, IAAC	Food Safety and Environmental Protection	SIM and IAAC members

Source: SIM, 2016

A 2001 project funded by the Inter-American Development Bank (IDB) aimed at improving the Inter-American Metrology System towards the Free Trade Area of the Americas provided evidence of the need for support, mainly in Caribbean and Central American countries (Mariante, 2001). This is consistent with a 2009 joint project carried out by IDB in partnership with PTB and the Knowledge Partnership Korea Fund for Technology and Innovation (KPK). The joint project focused on strengthening capacities and metrology infrastructure especially in Central America and the Dominican Republic (Solís, 2009). The OAS reports the project to have concluded with an assessment of the metrological capabilities of Central American countries and the Dominican Republic and the development of a feasible national and regional action plan. The plan should attend the **need to strengthen metrology infrastructure in Central American and Caribbean countries**. This created the baseline for projects to follow.

2.1.3 Conformity assessment and accreditation

The Inter American Accreditation Cooperation (IAAC) is an association of accreditation bodies and other organizations related to conformity assessment in the Americas. Table 5 below shows which LAC countries are IAAC members, under which conditions they have signed multilateral recognition arrangements (MLAs) or whether they have conformity assessment services available albeit without international recognition[3].

2 Projects whose specific objectives were, for instance improving the quality of life, improving QI or metrology for free trade, improving legal metrology, etc. were not included in this mapping.

3 Clinical laboratories have been excluded from the analysis as they are not relevant to the scope of this study.

Table 5 Mapping of conformity assessment services in LAC Countries based on IAAC membership[4]

Country	IAAC member type	Scope and areas potentially relevant to biodiversity			
		Management ISO/IEC 17021	Product ISO/ IEC 17065	Inspection ISO/ IEC 17020	Labs ISO/IEC 17025
Antigua and Barbuda	–	–	–	–	–
Argentina	MLA	X EMS QMS	X	X	X Testing Calibration
Bahamas	–	–	–	–	–
Barbados	–	–	–	–	–
Belize	–	–	–	–	–
Bolivia	Associate	X QMS	X	X	X Testing Calibration
Brazil	MLA	X QMS EMS FSMS	X	X	X Testing Calibration
Chile	MLA	X QMS EMS	X	X	X Testing Calibration
Colombia	MLA	X QMS EMS FSMS	X	X	X Testing Calibration
Costa Rica	MLA	X QMS EMS FSMS	X	X	X Testing Calibration
Cuba	MLA	–	–	X	X Testing Calibration
Dominica	–	–	–	–	–
Suriname	–	–	–	–	–

4 Sources: CNA, 2015; CONACYT, 2015; IAAC, 2015; INDOCAL, 2015; INMETRO, 2015; INN, 2015; JANAAC, 2015; MIFIC, 2015; OAA, 2015; OGA, 2015; OHA, 2015; ONARC, 2015; OSA, 2015; OUA, 2015; SAE, 2015; TTBS, 2015

Country	IAAC member type	Scope and areas potentially relevant to biodiversity			
		Management ISO/IEC 17021	**Product ISO/ IEC 17065**	**Inspection ISO/ IEC 17020**	**Labs ISO/IEC 17025**
Dominican Republic	Associate	X QMS EMS FSMS (offers certification services through international cooperation with other accredited CABs)	X (offers certification services)	–	X Calibration (offers calibration services)
Ecuador	MLA	X QMS FSMS EMS	X	X	X Testing Calibration
El Salvador	MLA	–	–	X	X Testing
Grenada	–	–	–	–	–
Guatemala	MLA	–	–	X	X Testing Calibration
Guyana	–	–	–	–	–
Haiti	–	–	–	–	–
Honduras	FULL	–	–	–	X Testing Calibration
Jamaica	MLA	–	–	–	X Testing
Mexico	MLA	X QMS EMS FSMS	X	X	X Testing Calibration
Nicaragua	MLA	–	–	X	X Testing
Panama	FULL	X QMS EMS	X	X	X Testing Calibration
Paraguay	MLA	–	X	X	X Testing Calibration
Peru	MLA	X QMS	X	X	X Testing Calibration

Country	IAAC member type	Scope and areas potentially relevant to biodiversity			
		Management ISO/IEC 17021	**Product ISO/ IEC 17065**	**Inspection ISO/ IEC 17020**	**Labs ISO/IEC 17025**
Saint Lucia	–	–	–	–	–
Saint Kitts and Nevis	–	–	–	–	–
St. Vincent and Grenadines	–	–	–	–	–
Suriname	–	–	–	–	–
Trinidad and Tobago	Full	X QMS EMS (offers certification services)	X (offers certification services)	–	X Testing
Uruguay	MLA	X QMS EMS FSMS	X	–	X Testing Calibration
Venezuela	–	–	–	–	–
Data Analysis	45 % of the countries have QI entities with MLAs 60 % of countries have some type of IAAC membership	42 % of the countries have accreditation programmes or bodies that offer QMS certification services, but only 27 % of countries have QMS under an MLA 33 % of the countries offer EMS certification services but only 21 % of countries have EMS under an MLA 12 % of the countries offer FSMS certification services, but only 3 % have FSMS under an MLA	42 % of the countries have product certification bodies, only 23 % have product certification under an MLA	45 % of countries have inspection bodies, only 30 % of countries have inspection under an MLA	57 % of countries have accreditation programmes for testing labs, only 45 % of countries have testing under an MLA 48 % of countries have calibration labs, but only 30 % of countries have calibration under an MLA

Notes:

1 – Countries highlighted in blue are categorised as megadiverse

2 – Scopes and QI services highlighted in light blue are only those comprised under MLA recognition. Those in white are being offered by entities, but have yet to gain international recognition in those scopes.

Updated: March 2016

The general analysis of accreditation and conformity assessment services based on IAAC information for the LAC region shows that **60 % of the 33 countries have QI organisations**[5] **currently involved in IAAC** in some way, while **only 45 % of the countries have NABs or CABs with internationally recognised agreements (MLA) for the services they offer**. This shows that although there is still work to be done, there have been significant advances in establishing national QI in the region. In terms of scopes, it is evident that accreditation programmes for t**esting laboratories are the most developed in LAC**: 57 % of countries have accreditation programmes for testing laboratories, and 45 % of countries having accredited testing services under an MLA. Accreditation programmes for **calibration laboratories are present in 48 % of the countries**, but are only recognised under an MLA in 30 % of them. Accreditation programmes for **product certification bodies are available in 42 % of the countries**, however they are only recognised by MLAs in 23 % of them. Accreditation programmes for **inspection bodies are present in 45 % of the countries** but only 30 % of them are recognised internationally. In the case of management systems certification bodies, **42 % of the countries have accreditation programmes for QMS certification bodies**, however only 27 % of the countries have these programmes covered under MLAs. Only **33 % of them have accreditation programmes for Environmental Management Systems (EMS) certification bodies according to ISO 14000**, and only 21 % are under MLAs. EMS certification could be considered as having a lot of potential to support biodiversity conservation as it has been created with the specific purpose of reducing and managing environmental impacts. Strengthening EMS development in LAC countries could be a way of enhancing biodiversity conservation. Finally, **12 % (4) of the countries have accreditation programmes for certification bodies for Food Safety Management Systems (FSMS)**, but only 1 of them is under an MLA recognition.

These figures show that there is still potential for increasing the number of accreditation programmes for CABs in the region, especially for supporting the assessment of standards and regulation oriented towards biodiversity conservation. Most accreditation scopes are present in nearly half of the countries, but the only type of QI that surpasses this percentage is testing laboratories. It is important to consider that some accreditation schemes, however, are not yet fully developed or have no need for an MLA. There is also the case of QI services that demonstrate their competence through other means, such as inter-lab comparisons. There is also potential for improving and strengthening existing testing, conformity assessment and accreditation schemes so they can be recognised under MLAs, as there is currently a gap of 11 % or more in the difference between the percentage of countries with specific accreditation programmes and the percentage that have programmes currently recognised under an MLA.

2.2 QI in megadiverse and biologically relevant countries

Megadiverse countries were marked in blue to stand out in the general analysis. These countries are particularly relevant to this study because they are home to approximately 70 % of the earth's biodiversity. In the LAC region, these countries are Brazil, Colombia, Ecuador, Mexico, Peru, Venezuela and Costa Rica (Like-Minded Megadiverse Countries (LMMC) 2002). An important element to notice from the previous analysis is that most of these megadiverse countries have already gained international recognition of large parts of their QI services: all of them have National Metrology Institutes, all are MLA signatories in all or at least most of the accreditation schemes shown in Table 5 and all participate significantly in ISO TCs related to biodiversity. The exception is Venezuela, which does not present any MLAs according to IAAC and does not participate in any of the ISO TCs related to biodiversity conservation. If it were possible to overcome the difficulties posed by the economic and political situation in this country, Venezuela could present an opportunity (and almost a priority because of its megadiversity) for QI to support international biodiversity conservation goals (the country is both a CBD and CPB party). In addition to this, **widening the variety of standards and conformity assessment, testing and calibration services under those current QI scopes to protect biodiversity in these countries would have a significantly positive impact** on achieving national and international biodiversity targets.

Another element that is important from this analysis is that most Caribbean countries have QI systems that are less developed than those in other countries in Latin America and the Caribbean. Some participate in the standardisation

5 Either conformity assessment bodies (CAB) or national accreditation bodies (NAB)

TCs but are not involved in providing internationally recognised QI services through IAAC. Although they are not megadiverse countries, they are specifically relevant for biodiversity for several reasons. Firstly, their conservation may have an enormous impact on global biodiversity and they are home to a number of endangered species. Secondly, these countries also have economies that are very reliant on agriculture, mining and tourism, which tend to be a threat to biodiversity if not sustainably managed (Critical Ecosystem Partnership Fund (CEPF) 2015). Furthermore, tourism specifically has emerged as an area where these countries and their businesses are aiming to be more sustainable, opening up a potential area for QI to develop. Examples of this include a policy document by Trinidad and Tobago designed to integrate biodiversity conservation into the tourism sector (Shand, 2001), a 2003 meeting which brought together approximately 100 leaders from Caribbean tourism businesses, academia, government and civil society organisations to share experiences and commit to further actions to protect biodiversity and maintain the Caribbean's competitiveness as a premier tourism destination (Conservation International, 2008), and the publication of guidelines for building and operating biodiversity-friendly hotels in the Caribbean (IUCN, 2012). It would be important, therefore, for the regional project to take these countries into consideration as places with potential to develop QI services serving biodiversity and supporting international biodiversity goals. However, when developing or strengthening QI services in these countries, their needs and context must be taken into consideration, and QI must be developed in a way that is feasible for them.

2.3 Specific analysis of QI services in LAC countries

Appendix 6 shows a listing of biodiversity-related QI services being offered in the LAC region. To compile this information, the accreditation services of different entities were analysed. As mentioned before, due to time constraints, it was impossible to analyse all the scopes of CABs and laboratories in all LAC countries. Therefore, sampling was performed using the web pages of those accreditation entities that were the most user-friendly and allowed the researcher to determine what the accreditation scope was for these bodies without having to open each web page individually. The examples listed in the table derive from information found in the pages of accreditation entities from Argentina, Brazil, Chile, Colombia, Cuba, Ecuador and Mexico.

The analysis shows that the **area with the most diversity of services related to biodiversity conservation is testing laboratories**. This should be expected, as testing contributes to other QI areas such as inspection and certification. The most common areas in testing laboratories related to biodiversity include scopes such as testing in water and wastewater, soils and the detection of chemicals (specifically toxic ones) in different media. An interesting area covered by certain testing laboratories is that of the nutritional values of foods, which could be combined with testing for biodiversity characteristics in order to potentiate the consumption of agricultural products that contribute to biodiversity conservation and improve nutrition, thereby contributing to compliance with SDG #2, which aims to: "End hunger, achieve food security and improved nutrition, and promote sustainable agriculture and small farmers. Implement resilient agricultural practices. Maintain generic diversity of seeds, plants and animals".

Following testing laboratories, and consistent with the results from the general analysis, the **area with the second greatest diversity of scopes is inspection**. However, the scopes found are very diverse and vary a lot depending on the country. This could be explained by the fact that inspection tends to be based less on international standards and more on specific national regulation. Therefore, it will vary according to the country's interests and priorities. Many of these scopes are directly related to those found in testing laboratories, and many others are related to the inspection of agriculture goods.

Product Certification (including processes and services), is the area with the third highest diversity of scopes that could be related to biodiversity, ranging from organic agriculture to cleaner production. Most products certified in the region are agricultural products, which is consistent with many of these countries being agrarian economies. There are also countries that have product certification QI, none of which is currently related to biodiversity.

It is worth mentioning that, consistent with the findings in the mapping of priorities of national biodiversity policy, **tourism re-appears as part of different QI areas such as certification systems, inspection and even independent national schemes**. This also leads to identifying a lack of consensus on what type of conformity assessment infrastructure/scheme can be used to assess tourist services, as depending on the country, a different type of CAB is used to assess this sector. In general, even if they are not directly linked to biodiversity, the fact that these different QI areas are already in place is an advantage, since this existing QI can be expanded to cover new scopes and products that are biodiversity-related.

There are QI areas such as Proficiency Testing (ISO/IEC 17043), Greenhouse Gases (GHG) Validation/Verification (ISO 14065) or Certification of Persons (ISO/IEC 17024) that are not yet under an IAAC MLAs but are being provided in several countries. In mapping biodiversity-related QI services provided in the LAC region, Certification of Persons, for instance, becomes relevant for biodiversity conservation when it offers the certification of tourism guides. So far, not many certification schemes have been developed to certify persons in relation to biodiversity. However, considering that Aichi Targets take knowledge and capacity building as key elements for biodiversity conservation, **there is potential for the Certification of Persons to expand beyond what it is currently being offered in the region**. GHG Validation/Verification has not been analysed in this report due to it being under the scope of Climate Protection, which has been analysed in a separate report. For Proficiency Testing, on the other hand, only Mexico and Cuba had a variety of scopes with the potential to be related to biodiversity (listed in Table 16), which have clearly been developed in response to the type of services offered by testing laboratories in that country.

It must be taken into consideration that all the mapped QI services in this section, however, have the support of standardisation and metrology as part of each country's national QI. These allow for traceability and consistency in measurements, methods, sampling, procedures, etc. Therefore, attempting to expand and strengthen QI services for biodiversity protection in the region must also involve strengthening and expanding standardisation and metrology.

2.4 Conclusions from the mapping of QI in LAC countries

From the mapping of QI in LAC countries, several findings stand out:

a. Approximately half of the countries have accredited conformity assessment services that could be used as a platform for biodiversity conservation. This means that there is still a lot of potential for developing new accreditation and conformity assessment scopes, achieving recognition between countries that could share QI services and strengthening and expanding existing QI to orient it towards international and national biodiversity conservation goals.
b. Venezuela, Central American countries and Caribbean countries are the places where biodiversity needs the most conservation, and where, at the same time, recognised QI services are not sufficiently available. In South America, other highly biodiverse countries such as Ecuador and Peru could benefit from support in developing standards to strengthen biodiversity protection. These countries should be considered as a priority for developing and strengthening QI related to biodiversity.
c. Existing QI institutions and schemes already developed for testing laboratories, inspection bodies and product certification bodies can be used to expand these services towards biodiversity conservation. Certification of persons could also be an area for expansion to support biodiversity conservation.
d. There is potential for clarifying how tourism should be assessed internationally and further developing QI related to this sector.

Based on these findings and those of the previous section, the following section will provide a series of recommendations of areas and schemes that could be developed in the LAC region for biodiversity conservation.

3 Areas of potential development for QI in LAC

To determine the areas of potential development of QI services, first, the results of the mapping of international and national biodiversity policy were considered, followed by those of the QI mapping in LAC. For the first mapping, Table 6 shows examples of areas mentioned in the Aichi Targets and SDGs that could be covered by QI. Areas such as the monitoring and measurement of pollution, for instance, could be (and currently are) supported by testing laboratories and national metrology institutes (NMI).

Table 6 Areas with potential for QI development in relation to the Aichi Targets and SDGs

Areas for development present in international biodiversity policy	**Specific areas mentioned in policy documents that could be linked to QI**
Monitoring	– Biodiversity accounting – Pollution – Genetic diversity – Water availability – Water quality – Impacts to biodiversity from energy generation/distribution – Air quality in cities – Biodiversity in cities – Loss of biodiversity due to climate change – Marine biodiversity
Measurement	– Pollution (in water, air, soil) – Genetic diversity/properties – Carbon stocks – Nutrition values of food – Genetic biodiversity of food – Medical properties of biodiversity – Land degradation/soil properties – Water availability – Water quality (freshwater and in oceans) – Toxic chemicals and pollutants present in energy devices – Air pollution in cities – GHG
Management	– Fisheries/Aquaculture – Agriculture – Protected areas: equity and efficiency – Inclusion of traditional knowledge and local groups – Sustainable water management – Sustainable forest management
Categorisation	– Invasive species – Areas of particular importance for biodiversity – Threatened species – According to genetic diversity – Nutrition values

Areas for development present in international biodiversity policy	Specific areas mentioned in policy documents that could be linked to QI
Production and consumption	– Using traditional knowledge – Sustainable agriculture – Small farming – Resilient agricultural practices – Sustainable fisheries – Sustainably sourced medicines – Sustainable energy production
Knowledge/awareness	– Value of biodiversity – Traditional knowledge – Data and technology
Biodiversity value	– Ecosystem services – Biodiversity accounting
Incentives	– For conservation – For sustainable use of natural resources

Other sources and authors have studied biodiversity in the region or have developed tools for biodiversity conservation that can help support these findings and guide recommendations on how QI could support international biodiversity conservation. For instance, Blackman et al (2014) proposed five specific lines of practical action for conserving LAC biodiversity, based on: green agriculture; strengthening terrestrial protected areas and co-management; improving environmental governance; strengthening coastal and marine resource management. Dudley and Stolton (2009), for example, established a methodology under the World Wide Fund for Nature (WWF) to assess the value of protected areas in terms of values related to food, nature conservation, management practices, values related to water, environmental services, health and recreation, as a source of knowledge and extraction of materials, amongst others. This suggests a potential role for QI to be used to assess these types of values to assist decision makers in maintaining control of protected areas and how they perform in terms of conserving biodiversity. Finally, ICSU (2010) recommended the following as priority themes for research and action: agricultural production, relationships between biodiversity and infectious diseases, provision of ecosystem services for mitigation and adaptation to climate change, agrobiodiversity and traditional rural communities.

Based on these findings and guidance, in addition to international schemes and best practices studied to support them, the following sections propose a number of recommendations for QI development in the LAC region. They specify which type of QI service is involved and which of the international biodiversity policy categories these potential development areas could fit into. Some of these services are already being offered by certain CABs and laboratories in the region, however, it should be noted that none of these are present in more than half of the countries in the region and may still have potential for being strengthened and improved. Should the suggested QI services be adopted and widened, each country would also have to expand its metrology services and develop/adopt standards that are adequate for such services.

3.1 Recommended areas for potential development of services in testing laboratories for biodiversity conservation

Test	Areas with potential/need for QI development according to international policy
• Water quality • Air quality • Soil quality and composition analysis • Detection of toxic substances in species or products • Genetic properties of seeds, plants and animals (wild and agricultural species) • Nutritional properties of agricultural products • Toxic substances in products • Medical properties of plant species	Monitoring Measurement Categorisation

3.2 Recommendations for potential development of calibration and metrology services

Services	Areas with potential/need for QI development according to international policy
• Calibration of equipment needed for any of the testing and measurement related to the QI services suggested in the previous and following sections • Calibration of gas mixtures to assess air quality • Reference materials for biodiverse or nutritional products • Reference materials to assess toxic or microbiological components in water, soil, products, species, etc. • Calibration and metrology controls for sensors monitoring water quality, air quality, meteorological data, etc. • Improve measurement traceability and reduce uncertainty in measurements related to the environment and biodiversity.	Monitoring Measurement Categorisation

3.3 Recommendations for potential development of inspection services for biodiversity conservation

What could be inspected	Areas with potential/need for QI development according to international policy

• Compliance with sustainability requirements for animal-safe or biodiversity friendly:
  ◦ Road construction
  ◦ Electricity generation/distribution systems (especially near protected areas)
	Categorisation
	Monitoring
	Production and Consumption

• Urbanism:
  ◦ Sustainable buildings
  ◦ Biodiversity-friendly public spaces
  ◦ Sustainable city/community (e.g. LEED, STAR, which are often called 'certifications' but are closer to an inspection scheme)	

• Inspection of entry of people and products via harbours and airports, to determine the presence of invasive species	

3.4 Recommendations for the potential development of certification of persons schemes for biodiversity conservation

Type of profile	Areas with potential/need for QI development according to international policy
• Hunting license • Protected Areas Manager • Sustainable Tourism Guide • Auditors for different sustainability certification schemes	Knowledge/awareness

3.5 Recommendations for the potential development of management systems certification schemes for biodiversity conservation

Type of profile	Areas with potential/need for QI development according to international policy

• Strengthening existing schemes:
  • EMS (ISO 14001 or national schemes)
  • FSMS
	Management

• National Park Management System • Including elements of inclusivity, gender equality, ethnic and traditional inclusion in decision making, social responsibility (could this integrate elements of QMS and EMS)	
• Sustainable tourism (e.g. TIES requirements)	

3.6 Recommended areas for potential development of product/process/service certification schemes that would involve inspection/testing for biodiversity conservation

Certification	QI development areas according to international policy

• Sustainably sourced/legal/not damaging endangered species product labelling:
  • Wild food
  • Medical plants
  • Products related to endangered species, e.g. skin, eggs, etc.
  • Fishery products
  (e.g. Initiative proposed by Dominican Republic's national biodiversity policy)
  (e.g. MSC)
  • Forestry products
  (e.g. FSC, PEFC, SFI certifications)
  • Other materials such as shells, coral, minerals or grass.
  • Clothes, textiles
	Categorisation
	Production and Consumption
	Biodiversity Value

• Labelling of sustainable/toxin-free products such as
  • Toys
  • Food containers and cutlery
  • Paint
  • Electrical appliances and lamps	

• Seed certification (e.g. Ireland's scheme in response to EU Seeds Directives and Regulations)	
• Biodiversity categories for protected areas (according to the # of endangered species, or total # of species or elements of biodiversity value in the area)	
• Sustainable tourism service (e.g. different national schemes, or GSTC requirements)	

• Sustainable practices
  • Agriculture
  (e.g. organic, fair trade)
  • Fisheries
  • Forestry	

• Labelling of food products
  • Biodiverse
  • Nutritious
  • GMO free	

3.7 Conclusions from the recommendations of areas of potential development of QI in LAC

There are several considerations that must be taken into account in order to implement the above recommendations in different countries. First of all, before implementing any of these potential QI services, there must be national regulation and standards in place to define the requirements and expected characteristics of products or services. If there are no national standards or regulation, or if there are already international ones for the area to be developed, these should be adopted. In many cases, the QI services are developed to respond to international regulation or standards. In the case of measurements, the necessary calibration and metrology services also need to be developed to support these schemes, ensure the precision of the obtained results and provide their traceability.

Some of the schemes proposed (for example sustainable tourism certifications or different management systems certifications) do not necessarily fit into international QI schemes since they could not be assessed or accredited under existing international standards. In this case, an alternative is the development of national standards and schemes that can be assessed locally. However, they would not be applicable for an MLA recognition. On the other hand, depending on their focus or how they are assessed, some of these recommended schemes could fit into one or another type of existing QI service (e.g. product certification or inspection). This is the case with a lot of international "certifications" that do not exactly fit into management, product certification schemes or inspection schemes, but could be adjusted to one or the other depending on what is to be assessed, the interest, existing infrastructure and capacities of the country.

A final consideration that should be made by QI entities in LAC countries derives from the experience of the implementation of different biodiversity policies in the region. One of the main things that have to be considered is the need to be consistent with the SDGs and ICSU's focus on small farmers and the inclusion and conservation of the knowledge of traditional rural communities. Countries must therefore seek to support and be inclusive of traditional local knowledge, small and medium enterprises and producers who might be threatened or wiped out by standardisation or economic instruments that benefit economies of scale (Torres, 2002; Mundo Acuícola, 2011). Another is that some studies stress the importance of applying the precautionary principle of the CBD. For example, in the case of GMO policy, where there are still unknown risks and threats to biodiversity, some stakeholders argue that it should be enough to restrict the use of GMOs until there is more available knowledge on threats and risks of GMOs to biodiversity (Wilmar et al, 2003). The same authors also warn about the lack of knowledge and experience in terms of establishing national regulation for such issues, which in turn results in these countries adopting European regulation as a precaution, which sometimes is not applicable for the country's reality, or there might not be enough infrastructure, technical capacity or knowledge to comply with it. Finally, a lack of traceability and capacity of government environmental agencies often reduces the effectiveness of policy efforts (Sarmiento, 2013b). Therefore, these entities should be supported in any type of project that will require introducing new regulation or monitoring.

In conclusion, there is a lot of space for QI to expand and grow in LAC. Each country should look at the specifics of its biodiversity policy, as well as at the species that it hosts, such as those that are endemic, endangered and biologically diverse, and the elements that threaten them. Based on this, it should create or adopt regulation and standards that will help protect relevant species while at the same time regulating and reducing what threatens them, and monitor the performance of these two elements. With regulation and standards for biodiversity conservation in place, new QI for this purpose might be easier to develop. Finally, considering the important role of the areas of knowledge and finance in international biodiversity policy, it must be mentioned that both international cooperation that can provide support through finance and best practices, as well as South-South learning between countries with similar species, threats and realities, will help as enablers of improving QI for biodiversity conservation in the region.

Appendices

Appendix 1 Coding and analysis of the Aichi Biodiversity Targets and areas with potential links to QI

Table 7 Aichi Biodiversity Targets and potential links to QI

Target	Categories
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	
1. 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.	Knowledge/awareness
2. 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 accountability, as appropriate, and reporting systems.**	Biodiversity value Monitoring
3. By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise 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.	Incentives
4. By 2020, at the latest, governments, business 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 natural resource use well within safe ecological limits.	Production and consumption
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use	
5. 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**.	Measurement
6. 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.	Production and consumption Management
7. By 2020 areas under agriculture, aquaculture and forestry **are managed sustainably**, ensuring conservation of biodiversity.	Management
8. By 2020, **pollution**, including from excess nutrients, **has been brought to levels that are not detrimental** to ecosystem function and biodiversity.	Measurement Monitoring
9. By 2020, invasive alien species and pathways are **identified and prioritised**, priority species are **controlled or eradicated**, and measures are in place to manage pathways to prevent their introduction and establishment.	Categorisation-Control

Target	Categories
10. By 2015, the multiple anthropogenic **pressures** on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.	Monitoring
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	
11. By 2020, at least 17 per cent of terrestrial and inland water, and 10 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.	Categorisation Management Biodiversity value
12. 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.	Categorisation Monitoring
13. 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 **minimising genetic erosion and safeguarding their genetic diversity**.	Categorisation Measurement Monitoring
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services	
14. 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.	Biodiversity value
15. By 2020, ecosystem **resilience and the contribution of biodiversity to carbon stocks** has been enhanced, through conservation and **restoration**, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to **climate change mitigation and adaptation and to combating desertification.**	Measurement
16. By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, **consistent with national legislation**.	NA National Policy/Regulation

Target	Categories
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building	
17. 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**.	NA National Policy/Regulation
18. 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.	Production and consumption Management Knowledge/awareness
19. 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**.	Knowledge/awareness
20. By 2020, at the latest, the **mobilisation 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 Mobilisation, 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.	Finance

Appendix 2 Analysis of the SDGs and how they could be linked to biodiversity and QI

Table 8 SDGs and analysis of how they could be linked to biodiversity and QI

SDG	What it proposes	Link to biodiversity	Categories
2. Zero hunger	End hunger, achieve **food security and improved nutrition**, and **promote sustainable agriculture** and small farmers Implement **resilient agricultural practices** Maintain **generic diversity of seeds, plants and animals**	Implement resilient agricultural practices. Maintain generic diversity of seeds, plants and animals	Production and consumption Measurement Categorisation
3. Good health and well-being	Make sure everyone has health coverage and access to **safe and effective medicines and vaccines**	Medical research and exploration of **medicinal properties of flora and fauna**. Production of medicines and pharmaceuticals	Measurement Production and consumption
8. Clean water and sanitation	Ensure **availability and sustainable management** of water and **sanitation** for all	Protection of water sources (wetlands, rivers) Reduced water quality can impact ecosystems	Management Measurement Monitoring
7. Affordable and clean energy	Ensure access to **affordable, reliable, sustainable and modern energy** for all	**Impact on biodiversity from energy generation and distribution:** e.g. endangered fish species due to hydroelectric power projects, loss of fauna species due to electrocution in distribution lines, loss of biodiverse crops due to monocultures destined for biofuels Use of **toxic compounds** (such as heavy metals) in energy devices such as light bulbs, solar panels, etc.	Production and consumption Measurement Monitoring
11. Sustainable cities and communities	Make **cities inclusive**, **safe**, **resilient** and sustainable	Urban growth and pollution leads to loss of biodiversity	Measurement Monitoring
12. Responsible consumption and production	Ensure **sustainable consumption and production** patterns Consume in a way that preserves our natural resources	Loss of biodiversity can occur from unsustainable production patterns and the disposal of unsustainable products	Production and consumption
13. Climate action	Take urgent action to **combat climate change and its impacts**	Loss of biodiversity due to climate change	Monitoring Measurement

SDG	What it proposes	Link to biodiversity	Categories
14. Life underwater	**Conserve and sustainably use** the oceans, seas and marine resources for sustainable development	Loss of marine biodiversity due to **pollution and unsustainable fishing practices**	Measurement Monitoring Production and consumption
15. Life on land	**Protect, restore and promote sustainable use** of terrestrial ecosystems, **sustainably manage** forests, combat desertification, and halt and reverse **land degradation and biodiversity loss**	Loss of biodiversity, ecosystems and land degradation	Incentives Management Measurement Monitoring

Note 1: Analysis of SDGs related to climate change and GHG emissions (such as in the energy, sustainable cities and climate action SDGs) have not been included here in order to avoid duplication of work and data, as these are considered to correspond to the climate protection scope of the project, not the biodiversity one.

Note 2: For all QI examples involving analysis and testing, calibration of measurement instruments should be considered as part of the QI infrastructure that will be needed.

Appendix 3 LAC Countries that are CBD, CPB parties and have NBSAP[6]

Table 9 List of LAC countries and how each participates in international biodiversity policy

Country	CBD Party	CPB Party	Has NBSAP	Post-2010 (Nagoya Protocol) NBSAP
Antigua and Barbuda	X	X	X	X
Argentina	X	–	X	–
Bahamas	X	X	X (in revision)	–
Barbados	X	X	X	–
Belize	X	X	X	–
Bolivia	X	X	X	–
Brazil	X	X	X	–
Chile	X	–	X	–
Colombia	X	X	X	X
Costa Rica	X	X	X	–
Cuba	X	X	X	–
Dominica	X	X	X	X
Dominican Republic	X	X	X	X
Ecuador	X	X	X	–
El Salvador	X	X	X	X
Grenada	X	X	X	–
Guatemala	X	X	X	X
Guyana	X	X	X (action plan only)	X
Haiti	X	–	–	X (under development)
Honduras	X	X	X	–
Jamaica	X	X	X	–
Mexico	X	X	X	–
Nicaragua	X	X	X	–
Panama	X	X	X	–
Paraguay	X	X	X	–
Peru	X	X	X	X
Saint Kitts and Nevis	X	X	X	–
Saint Lucia	X	X	X (under revision)	–

6 CBD: Convention on Biological Diversity, CPB: Cartagena Protocol on Biosafety, NBSAP: National Biodiversity Strategy and Action Plan

Country	CBD Party	CPB Party	Has NBSAP	Post-2010 (Nagoya Protocol) NBSAP
Saint Vincent and the Grenadines	X	X	X	–
Suriname	X	X	X (strategy)	X (action plan)
Trinidad and Tobago	X	X	X	–
Uruguay	X	X	X	–
Venezuela	X	X	X	X

Appendix 4 Analysis of sample of 10 national biodiversity strategies from LAC countries

Table 10 Identification of prioritised Aichi Targets in a sample[7] of 10 NBSAPs from LAC countries

Aichi Target	Categories defined in Appendix 2	Number of times mentioned in national policy targets
19	Knowledge/awareness	19
11	Categorisation Management Biodiversity value	18
1	Knowledge/awareness	16
7	Management	14
4	Production and consumption	11
2	Biodiversity value Monitoring	10
13	Categorisation Measurement Monitoring	10
14	Biodiversity value	10
18	Production and consumption Management Knowledge/awareness	10
20	Finance	10
15	Measurement	9
9	Categorisation-Control	8
16	National Policy/Regulation	8
5	Measurement	7
12	Categorisation Monitoring	7
6	Production and consumption Management	6
10	Monitoring	6
17	National Policy/Regulation	6
3	Incentives	5
8	Measurement Monitoring	5

7 The NBSAPs from these 10 countries were selected due to their being listed in the CBD's website (by Dec. 2015) containing the most recent NBSAPs since the COP-10. The countries presenting the NBSAPs were: Antigua and Barbuda, Colombia, Dominica, Dominican Republic, El Salvador, Guatemala, Guyana, Peru, Suriname and Venezuela

Table 11 Specific country policies to respond to Aichi Targets from a sample of 10 LAC countries

Country, year	What NBSAP proposes that is specific to the country	Categories
Antigua and Barbuda (2014)	Target 5 – **Monitoring of critical habitats –** mainly **forests, mangroves and coral reefs –** to reduce biodiversity loss Targets 7 and 20 – **Strengthen capacity** of governmental natural resources management institutions as well as non-governmental organisations, to support the objectives and achieve the overall aim of the NBSAP Target 12 – Protection measures for **species: racer snake, marine turtles, Redonda dwarf gecko, Redonda ground lizard, threatened plants, and threatened birds.** Target 13 – **maintain genetic diversity of local plants** by storing germ stocks for re-population should current stocks become contaminated. **Maintain stocks of deer** in Barbuda to ensure no mixing of breeds	Monitoring Knowledge/awareness Categorisation
Colombia (2012)	Focus on ecosystem services Long term goals: – **Conservation** of ecosystem services – Society recognises biodiversity and ecosystem services as a **public value** – Increased investments in the areas of biodiversity and its ecosystem services in the national agendas and CT&I (**scientific research, promotion of traditional knowledge**, publication and innovation [national patents]) Short term priorities – Land **Zoning** – **Preventing deforestation** – **Indemnities** for biodiversity loss – Inter-sectorial pact for **legal timber** – Strategy to prevent **illegal trafficking of wild species** – Internationally promoting Colombia as an **environmentally attractive country** – **Biodiversity inventories** – **Improve management of national natural parks** – agreements with ethnic groups – Tools for **identification and valuation of ecosystem services** – Ecosystem services as **comparative market advantage in production**	Biodiversity value Knowledge/awareness Categorisation Production and consumption Monitoring Tourism Management

Country, year	What NBSAP proposes that is specific to the country	Categories
Dominica (2013)	Declaration of Dominica as **the "Nature Isle"** National Priorities: – By 2020 at the latest, **all residents of the Commonwealth of Dominica will be aware of the value of biodiversity** and the steps they can take to conserve and use it sustainably – By 2020, at least 15 % of areas under **agriculture, aquaculture and forestry are managed sustainably**, ensuring conservation of biodiversity – By 2020, at least 20 % of terrestrial, inland water and 15 % of coastal and marine areas, especially **areas of particular importance for biodiversity and ecosystem service, are conserved through comprehensive ecologically representative and well-connected systems of effectively managed protected areas** and other means, and integrated into the wider land and seascape – By 2020, ecosystem resilience and the **contribution of biodiversity to carbon stock** has been enhanced, through conservation and restoration, including **restoration of at least 15 % of degraded ecosystems**, thereby contributing to climate change mitigation and adaptation, and to combating desertification	Tourism Awareness Management Categorisation Biodiversity value Monitoring
Dominican Republic (2011)	Target 6 – By 2016, the application of **fisheries regulations is strengthened** at the national level, particularly those related to **threatened populations, species or ecosystems**, including the application of the **Code of Conduct for Responsible Fisheries** Target 7 – By 2016, the development of **sustainable agriculture, aquaculture and forestry** is promoted for reducing pressure on biodiversity Target 13 – By 2016, complete a national **inventory on the genetic diversity of species** of cultivated plants, farm animals and wild relatives, with the view to develop actions to safeguard the genetic diversity of other priority species of socioeconomic value, animal species and selected wild plants Target 14 – By 2016, the connectivity between protected ecosystems and the level of local participation, **taking into account the participation of women in management** and derived benefits, have increased	Monitoring Production and Consumption Knowledge Categorisation Management

Country, year	What NBSAP proposes that is specific to the country	Categories
El Salvador (2013)	Particular emphasis is placed **on soil and land uses** Priority areas: 1. **Biodiversity mainstreaming** in the economy (agriculture, fisheries and aquaculture, tourism) 2. **Restoration and conservation, including critical ecosystems** (mangroves and beach ecosystems, rivers and wetlands, gallery forests and other forest ecosystems) 3. Biodiversity for the people (rescue of **traditional conservation practices** for genetic resources, **rights of use** of biological resources, local economic options)	Categorisation and control Knowledge and awareness Monitoring Management
Guatemala (2012)	Focus on **mainstreaming biodiversity in support of socioeconomic development** Five thematic areas: 1. Biodiversity **knowledge and valuation** 2. Biodiversity **conservation and restoration** 3. **Sustainable use** of biodiversity and ecosystem services 4. Role of biodiversity in **climate change mitigation and adaptation** 5. Policy implementation – **Biodiversity value as a national priority** for integrated and intergenerational human development – Mechanisms for **sustainable use of biodiversity and ecosystem services** in different State levels, as well as the national, regional and municipal-local level – Focus on **community and traditional knowledge along scientific one**	Production and consumption Knowledge Biodiversity value Monitoring Management Measurement
Guyana (2015)	– **Promote conservation, sustainable use and value of biodiversity into key productive sectors used for growth**, expansion and diversification of the economy – Improve national implementation, **monitoring and reporting** for Multilateral Environmental Agreements (MEAs) and other bilateral commitments. – **Substantially improve biodiversity monitoring** at the national level and within key productive sectors.	Production and Consumption Incentives Monitoring
Peru (2014)	– **Conservation plans for endangered species** – **Sustainable use and management** of genetic species that are endemic to Peru – Competitive b**io-enterprises and bio-commerce** – Added value **benefits** for the use of genetic resources – **Control, supervision and assessment** of biodiversity use – **New knowledge** of its genetic diversity and richness – **Intercultural, equal, socially inclusive participation**	Categorisation Management Production and consumption Incentives Knowledge Management

Country, year	What NBSAP proposes that is specific to the country	Categories
Suriname (2013)	– **Responsible mining** with minimisation of damage to the environment and biodiversity, environmental restoration – Spread **of dangerous objects, substances or organisms in natural ecosystems limited and under control** – **Sustainable fisheries, forestry, use of wildlife, agriculture, biotechnology** – **Responsible tourism**, particularly nature and ecotourism – **Ecosystems valued** for the services they supply – **Regulated access to genetic material** associated to traditional knowledge, in indigenous territories and other areas, with fair and equitable sharing of derived benefits – **Raised awareness at the national level, in local communities, fisheries sector** – **Sustainable international financing**	Production Monitoring Measurement Tourism Categorisation and control Biodiversity value Knowledge/awareness
Venezuela (2011)	– **Identification, prevention, control and/or eradication of invasive or potentially invasive species** – **Regulate activities with GMOs**, with a view to avoiding adverse effects on Biological Diversity, promoting food sovereignty and enduring Supreme Social Happiness – **Prevention and management of illegal trafficking of species**, based on **research, monitoring, rapid response actions and rehabilitation** systems for living organisms	Categorisation and control Monitoring Knowledge

Source: CBD, 2015c

Appendix 5 Mapping of participation of LAC countries in ISO TCs that could contribute to biodiversity conservation

Table 12 Participation of LAC countries in ISO TCs that could contribute to biodiversity conservation

ISO TC	LAC countries participating in TC	LAC countries as observers
ISO/TC 297 Waste management, recycling and road operation service	–	Argentina Cuba
ISO/TC 282 Water re-use	Peru	Argentina Colombia
ISO/PC 277 Sustainable procurement	Argentina Barbados Brazil (Secretariat) Chile Colombia Costa Rica Mexico	-
ISO/TC 276 Biotechnology	–	Argentina Ecuador Mexico
ISO/TC 275 Sludge recovery, recycling, treatment and disposal	–	Argentina
ISO/TC 268 Sustainable development in communities	Chile Mexico	Argentina Brazil Colombia Trinidad and Tobago
ISO/TC 265 Carbon dioxide capture, transportation and geological storage	–	Argentina
ISO/PC 248 Sustainability criteria for bioenergy	Brazil (Secretariat) Colombia Argentina	–
ISO/TC 238 Solid biofuels	–	Argentina Colombia
ISO/TC 229 Nanotechnologies	Brazil Colombia Mexico Peru	Argentina

ISO TC	LAC countries participating in TC	LAC countries as observers
ISO/TC 228 Tourism and related services	Argentina Bahamas Barbados Colombia Dominica Ecuador Jamaica Mexico Panama Saint Lucia Trinidad and Tobago	Chile Costa Rica Cuba El Salvador
ISO/TC 211 Geographic information/ Geomatics	Chile Peru	Argentina Colombia Cuba
ISO/TC 207/SC 7 Greenhouse gas management and related activities	Argentina Brazil Chile Colombia Costa Rica Mexico Panama	–
ISO/TC 207/SC 5 Life cycle assessment	Argentina Brazil Chile Costa Rica Cuba Mexico Panama	Colombia Trinidad and Tobago
ISO/TC 207/SC 4 Environmental performance evaluation	Argentina Brazil Chile Costa Rica Cuba Mexico Panama	Colombia Jamaica Trinidad and Tobago
ISO/TC 207/SC 3 Environmental labelling	Argentina Brazil Chile Colombia Costa Rica Cuba Mexico Panama Uruguay	Trinidad and Tobago

ISO TC	LAC countries participating in TC	LAC countries as observers
ISO/TC 207/SC 2 Environmental auditing and related environmental investigations	Argentina Brazil Chile Colombia Costa Rica Cuba Mexico Panama Uruguay	Jamaica Trinidad and Tobago
ISO/TC 207/SC 1 Environmental management systems	Argentina Brazil Chile Colombia Costa Rica Cuba Jamaica Mexico Panama Peru Uruguay	Trinidad and Tobago
ISO/TC 207 Environmental management	Argentina Barbados Brazil Chile Colombia Costa Rica Cuba Jamaica Mexico Panama Peru Uruguay	Bolivia Ecuador
ISO/TC 190 Soil quality	–	Argentina Colombia Cuba Jamaica
ISO/TC 180 Solar energy	Argentina Barbados Chile Jamaica	Cuba Mexico Trinidad and Tobago Uruguay

ISO TC	LAC countries participating in TC	LAC countries as observers
ISO/TC 176 Quality management and quality assurance	Argentina Barbados Brazil Chile Colombia Costa Rica Cuba Dominican Republic Ecuador El Salvador Honduras Jamaica Mexico Panama Peru Trinidad and Tobago Uruguay	Bolivia
ISO/TC 147 Water quality	Chile Jamaica Mexico Uruguay	Argentina Colombia Cuba Trinidad and Tobago
ISO/TC 146 Air quality	Colombia Jamaica	Argentina Barbados Chile Cuba
ISO/TC 86 Refrigeration and air-conditioning	Barbados	Argentina Chile Colombia Cuba Trinidad and Tobago
ISO/TC 81 Common names for pesticides and other agrochemicals	–	Brazil Colombia Cuba
ISO/TC 70/SC 8 Exhaust gas emission measurement	–	Brazil
ISO/TC 59/SC 17 Sustainability in buildings and civil engineering works	Chile Mexico	Argentina Colombia
ISO/TC 54 Essential oils	Argentina	Chile Cuba Dominica

ISO TC	LAC countries participating in TC	LAC countries as observers
ISO/TC 34/SC 17 Management systems for food safety	Argentina Bolivia Brazil Chile Colombia Costa Rica Cuba Jamaica Panama Peru	Dominican Republic Ecuador
ISO/TC 34/SC 18 Cocoa	Colombia Cuba Ecuador Jamaica	Argentina Mexico
ISO/TC 34 Food products	Argentina Bahamas (Correspondent member) Barbados Chile Colombia Cuba Dominica Dominican Republic Ecuador Haiti (Correspondent member) Panama Peru Uruguay	Bolivia Costa Rica El Salvador Mexico Trinidad and Tobago
ISO/TC 34/SC 11 Animal and vegetable fats and oils	Argentina Chile	Colombia Cuba
ISO/TC 34/SC 9 Microbiology	Argentina Chile Colombia Panama	Brazil Cuba Trinidad and Tobago
ISO/TC 34/SC 3 Fruits and vegetables and their derived products	Chile Dominican Republic Jamaica	Argentina Colombia Cuba Ecuador Mexico Trinidad and Tobago Uruguay
ISO/TC 28/SC 7 Liquid biofuels	Argentina Brazil Uruguay	–

ISO TC	LAC countries participating in TC	LAC countries as observers
ISO/TC 12 Quantities and units	Colombia Cuba	Chile
ISO/REMCO Committee on reference materials	Brazil Mexico	Argentina Barbados Cuba Peru
ISO/IEC JTC 1/SC 39 Sustainability for and by information technology	–	Argentina

* **Note:** The TCs sample was selected due to them being directly concerned with or related to biodiversity (e.g. concerned specifically with animals, plants or their derivates), or indirectly (e.g. some of them specify their relationship with sustainability, to SDGs, to QI, or possible impacts to biodiversity)

Appendix 6 Mapping of biodiversity-related QI services offered in a sample of 7 LAC countries[8]

Table 13 Examples of accredited services provided by testing laboratories in the LAC region

Physical and chemical tests and sampling in water and wastewater	Sediment analysis	Chemicals in soil, sediments, sludge, leaves, etc.
Phthalates by HPLC	Physical-organoleptic test for hydro biological products	Environmental radioactivity
Noise in vehicles	Physical and chemical tests for air and gases (fixed sources, environmental, etc.)	Phytoplankton taxonomy in water systems
Safety in electronic devices and lamps (chemical components)	Physical and chemical tests for biomass	Taxonomy and sampling for water sediments
Physical-chemical tests in soils and sediments	Physical-chemical tests for soil and solid waste	Hydrocarbons in gas
Determination of metals in water	Physical-chemical tests, microbiology and sampling for sludge, compost and ashes	Dust and inorganic fibres in air
Determination of lead in paint	Particulate matter in air	Bacteria in organic fertilisers
Physical-chemical and rheological properties of seeds, flours, cereals, etc.	Microbiological testing for hydro biological products	Veterinary medicine residue in biological samples
Germination potential and botanic purity in seeds	Microbiological testing for livestock products	Aflatoxins in animal food
GMO detection through PCR	Fish sampling and pathology (virus and bacteria)	Determination of toxins, viruses and bacteria in biological tissues
Microbiological testing in water and wastewater	Chemistry for air pollution devices	Determination of organophosphate pesticides in honey
Hydrocarbons in water and wastewater	Chemistry for fertilisers and pesticides	Physical and chemical testing in foods
Safety of toys (chemical components)	Chemicals in biological fluids	Microbiological testing in food
Determination of toxic chemicals (in water, wastewater and other media)	Chemicals for fruits and vegetables	Environmental acoustics
Bio testing for marine toxins	Chemicals in diverse products of consumption: e.g. toys, food, furniture, etc.	Immunity testing for animal diagnosis
Physical and chemical testing, sampling and biochemistry for biological tissues	Chemicals in livestock products	Inoculation tests for animal diagnosis
Biotechnology for agriculture and livestock species	Chemicals in toxic waste	Heavy metals in wood preservatives
Vehicle emissions testing		

8 Argentina, Brazil, Chile, Colombia, Cuba, Ecuador and Mexico.

Table 14 Examples of accredited services provided by inspection bodies in the LAC region

Testing ponds for toxic substances	Labelling of clothes, shoes, furniture and party products	Inspection of agriculture food products: honey, tobacco, coffee, tea, sugar cane, eggs, cereals, beans, rice, peas, vegetable oil, noodles, dairy, fruits, meat, etc.
Testing ponds for corrosive substances	Hydrocarbon quality	Fish products and derivates of fisheries: fish, lobster, claria, sponges, fresh product, fish flour
Testing samples water	Compliance of environmental requirements for transportation of dangerous chemical substances	Environment and Natural Resources
Sampling to determine waste from pharmaceutical products, toxic waste or pollutants	Vehicle efficiency	Animal health
Sampling for physical and chemical and organoleptic and biological tests in water	Environmental auditing	Tourist services and accommodation (categories)
Sampling for chemical, physical, microbiological, organoleptic and bio testing in fishing products	Energy efficiency	Vegetable cleanliness
Water meters	Natural gas	Tourism
Crocodile skin inspections	LP gas	Veterinary medicine residue in biological samples

Table 15 Examples of accredited services provided by product certification bodies in the LAC region

Organic agriculture and organic products	Agriculture, silviculture and fishing	Agricultural products
Testing ponds for toxic substances	Non-transformed agriculture vegetable and animal products	Pharmaceutical products deriving from fresh agriculture products
Forest products and forest exploitation	Processed agricultural products deriving from vegetable and animal products	Hotels and restaurants for camping and short stays
Livestock	Coffee (different types)	Socio-environmental florist certification
Ponds for corrosive substances	Cleaner production	Alternative Development Label (COPOLAD)
Healthy markets	Energy efficiency	Vegetable cleanliness

Table 16 Examples of areas for accredited services offered by proficiency testing providers in the LAC region

Physical-chemical tests in water	Calibration and testing for mass, pressure, temperature, volume, pH, flow	Physical-chemical and mechanical tests in soil
Physical-chemical tests in food	Chromatography in waste	Testing for agriculture sanitation requirements (microbiology, immunity, spectrophotometry, chromatography)

* These services are only available in Mexico and Cuba

Table 17 Examples of accredited services under other scopes in the LAC region

Calibration laboratories	Certification of persons	Systems certification	OTHER
Metrology: acoustic, flow, radiation, dimensions, humidity, temperature, pressure, mass, electric magnitude, pH, optic, force, density, viscosity, volume, conductivity, tension	Tourist guides	Forestry	Tourism certifications (national standards)
Water meters		Tourism	
Energy meters		HACCP	
Gas meters			

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