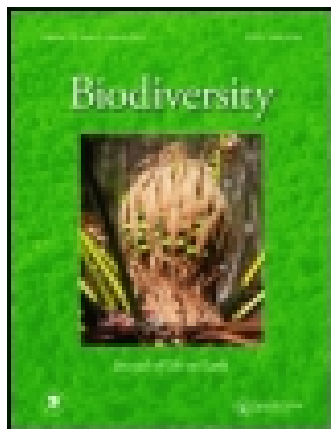


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## Community-based monitoring and information systems (CBMIS) in the context of the Convention on Biological Diversity (CBD)

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Community-based monitoring and information systems (CBMIS) refer to initiatives by indigenous peoples and local community organisations to monitor their community's well-being and the state of their territories and natural resources, applying a mix of traditional knowledge and innovative tools and approaches. A newly emerging CBMIS network of indigenous peoples and local communities is now active in pilot communities in at least a dozen countries, with monitoring activities on the health of biodiversity, climate change impacts, effects of unsustainable/illegal activities and also implementation of international agreements such as the CBD at the national or local level. By showcasing illustrative examples, this article highlights the importance of indigenous peoples and local communities' CBMIS activities towards achieving the Aichi biodiversity targets and monitoring their implementation. It is found that target 18 is central and cross-cutting, given that traditional knowledge and innovations are fundamental in monitoring progress and challenges under all other targets.

**Keywords:** Convention on Biological Diversity; community-based monitoring; CBMIS; indigenous peoples; participatory mapping; biodiversity targets

### 1. Introduction

As we are approaching the midpoint of the Convention on Biological Diversity (CBD)'s 2020 mandate to take effective and urgent action to halt the loss of biodiversity, an interesting development has been taking place in terms of monitoring its implementation: should a limited number of government agencies and scientists continue to be responsible for carrying out this task or should the array of players and methods be enlarged to allow citizens, especially those who directly live in constant touch with biodiversity on a daily basis, to play a role in monitoring and providing data? Recent deliberations in the CBD and the wider United Nations system seem to support and encourage the latter option. And this is matched by civil society action, especially by indigenous peoples, who in recent years have been developing and establishing community-based monitoring and information systems (CBMIS). At the same time, several recently published research studies provide strong evidence of the sophistication and effectiveness of this kind of community monitoring, as will be described later in the paper (Danielsen, Pirhofer-Walzl et al. 2013).

Before we provide more information on this global trend and how international recognition is growing, we will address what 'community-based biodiversity monitoring' is, including some methodologies and tools that are generally applied. The core of the article focusses on why CBMIS has the potential to play an important role in monitoring progress

towards the Aichi biodiversity targets, and suggests that it is in fact already starting to play a contributing role. This will be illustrated with some case study examples. We will then look at the growing international support for such community-based activities and conclude with the main challenges and suggested ways forward.

### 2. What is community-based monitoring and who is doing it?

In different regions of the world, indigenous peoples and local communities have developed or are developing their own monitoring approaches related to biodiversity, ecosystems, land, water and other resources, as well as human well-being, based on traditional knowledge and a holistic view of people and the environment.

In itself, this kind of community-based monitoring is nothing new; indigenous peoples and local communities have been doing it for ages, as a way of remaining up to date about the health of their traditional territories and the abundance or scarcity of vital species for their livelihoods and culture, and for early identification and addressing of problems or changes. More recently monitoring was also done to keep track of (outside) pressures on their areas and the potential impacts or threats these represent.

A fairly new element to this is the fact that many indigenous peoples and local communities are nowadays

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often using and adapting new technologies and innovative tools and approaches, and their work is becoming more visible because of the use of the internet and social media, which is also helping indigenous and local groups to network with each other and exchange information. At the same time, indigenous peoples are becoming more active in national and international arenas to call attention to their concerns and situations, and also to highlight and celebrate their own advances and initiatives.

For example, several indigenous and community-based organisations that have been engaging in the CBD and the United Nations Framework Convention on Climate Change (UNFCCC) processes have created an initial loose network on CBMIS and organised technical global workshops for practitioners since 2013 to exchange information on tools and methodologies. These workshops aimed to consolidate existing work on CBMIS in the context of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the Strategic Plan for Biodiversity 2011–2020 and its Aichi biodiversity targets, as well as the UNFCCC (particularly monitoring implementation of Reduced Emissions from Deforestation and Forest Degradation (REDD) projects) and other global and national commitments. Another workshop specifically focussed on community-based mapping experiences and methods (de Chavez 2013; Forest Peoples Programme 2013). The process is expected to continue in order to consolidate approaches, develop a toolkit that communities can use and adapt and to develop ways to aggregate data from the bottom up.

Approaches to CBMIS are very diverse and can range from technically simple and basic to very technologically advanced ones. Some of the methodologies and processes that have so far been presented in the CBMIS network mentioned above include community mapping, resource inventories, eco/agri-calendars and biodiversity registers. The tools being used include questionnaires and forms (hard copies), cameras, GPS, participatory video, smartphones and tablets, community radio, measurement kits (e.g. for water and soil samples) and testimonies. Many communities work with selected software to link their data to maps and computer databases. There are currently many free or cheap (open access) web-based and data collection tools available that communities can consider using (e.g. EpiCollect, Sapelli, ODK, GIS Cloud, OpenStreetMap).

Another example is the accountability network of indigenous peoples and local communities currently in the process of being activated as an outcome of the International Workshop on Deforestation and the Rights of Forest Peoples, in Palangka Raya, Central Kalimantan, Indonesia, in March 2014. In this meeting, more than 60 representatives of indigenous and other forest communities from Africa, Asia and Latin America, and supportive environmental, human rights and social non-

governmental organisations came together to share experiences and seek solutions to the unrelenting destruction of forests around the world and the risks to forest peoples' rights, well-being, forest territories and cultural heritage. The delegates issued the Palangka Raya Declaration and committed to act in solidarity in a global accountability network to monitor, document, challenge and denounce forest destruction and associated human rights violations, while supporting international and country-specific best practice approaches to prevent deforestation (Forest Peoples Programme 2014).

While generally the first aim of the data collection and monitoring is to strengthen the local knowledge base for territorial resource management and community development, the contribution of case studies and complementary data for monitoring of international processes and agreements is an important added value of CBMIS initiatives, which is gaining increasing acknowledgement, recognition and support from international policymakers, conservation and development agencies and academia (CBD 2013b), which will be described more extensively later in the article.

### 3. How can CBMIS contribute to better tracking of the CBD 2020 targets?

Because of the focus of CBMIS on the local (micro) level, and the profound knowledge and connection to the areas being monitored, indigenous peoples and local communities can make important contributions to global assessments and monitoring initiatives that usually work on larger scales, and where other organisations or institutions do not have the capacity to collect detailed, disaggregated data. In this paper we focus on CBMIS relevance to monitoring the implementation of the 2011–2020 Strategic Plan for Biodiversity (CBD 2010).

All 20 Aichi biodiversity targets are relevant to indigenous peoples and local communities (for more information on the targets see: CBD 2013a). Monitoring progress in implementation at the national and local level, and collecting data and information on status and trends, including local initiatives and their impacts, will give a more comprehensive picture of the question: *are we on track to achieve the 2020 mission to take effective and urgent action to halt the loss of biodiversity?*

The CBMIS network has already provided substantial input in the peer review process of the *Global Biodiversity Outlook 4*, GBO-4 (CBD 2014a), the fourth edition of the CBD's flagship publication. The GBO-4 also includes several examples based on CBMIS (e.g. a case from Tinoc in the Philippines and a case from Northern Thailand) with half a page being dedicated to the advances made by CBMIS in the chapter on target 18 (Leadley et al. 2014, 412). Substantial efforts were also made to comment during the peer review process of the

drafts of the complete GBO-4 report, executive summary and technical background papers, providing information, comments, reference materials and suggested actions to enhance progress towards the targets. Several of these inputs were incorporated, making GBO-4 more balanced and starting to recognise and appreciate the contributions of community-level initiatives.

The case studies presented below will illustrate existing CBMIS initiatives and practices. For the purpose of this publication the authors have linked the actions to a number of Aichi targets to show how these initiatives (can) generate invaluable data to assess what progress is being made and where improvement and adjustment is needed to comply with the requirements to achieve these targets. However, we note that none of the current initiatives are set up specifically as contributions to an Aichi biodiversity target, so these are the authors' additions, which are no attempt to distort or lose sight of communities' core reasons or motivations for pursuing this work.

### 3.1. Case 1: reducing pollution from oil spills through community-based monitoring in Peru

This first case is about community-based monitoring of damage to the environment by oil pollution, and using monitoring data to hold oil companies and the Peruvian government to account for the impacts of oil exploitation in Northern Peru. In 2012, over 80% of the Peruvian Amazon was covered by oil and gas concessions, overlapping 66% of recognised indigenous territories. In Northern Peru, where to date most of the oil operations

have been located, the use of antiquated oil pipelines and other irresponsible practices have led to frequent oil spills and the dumping of billions of barrels worth of toxic waste into rivers (see Figure 1), which have severely degraded the environment and the health of local communities (Valqui, Feather, and Espinoza Llanos 2014). Given the grave situation and the denial of any contamination by the relevant oil companies and authorities, affected communities on the Corrientes, Pastaza and Tigre rivers took action and started their own indigenous monitoring programmes in 2006, called '*Programa de Vigilancia Territorial Indígena Independiente*' (FEDIQUEP 2015).

One of these cases is directed by FEDIQUEP, a local indigenous federation representing Quechua communities of the Pastaza, which has trained about ten indigenous monitors to track and document the impacts of oil exploitation activities in the 17 Quechua communities of the Pastaza Basin. The first participatory maps of the impacts of the oil exploitation were finalised in 2009, which led to the official recognition of the indigenous monitors as strategic allies in the monitoring of resources and territories by regional government agencies (Observatorio Petrolero 2015).

Joint advocacy activities between four indigenous federations representing communities along the Pastaza (FEDIQUEP), Tigre (FECONAT), Corrientes (FECONACO) and Marañón (ACODECOSPAT) rivers used the information gathered by monitors to push for the first state-led environmental assessment of the soils, water and sediments of the Pastaza basin in 2012. The evi-



Figure 1. Oil spills in the Peruvian Amazon (e.g. in Río Marañón in 2000) degrade natural habitats, contaminate drinking water and have serious impacts on the health of local communities, fishing and animals (Photo by PUINAMUDT).

dence gathered by monitors was used to hold relevant authorities and companies to account in local and national legal processes as well as to highlight the situation in local, national and international media, resulting in several high profile news stories on national media outlets which triggered public outrage in Peru. The indigenous monitors also played a crucial role in the formal investigations by guiding government officials to the areas most impacted by the exploitation activities (Observatorio Petrolero 2015). Chino Dagua, the president of FEDIQUEP, commented in an interview in 2014:

There are now more than 500 km of oil pipelines and many roads in areas where our people have traditionally hunted for food. This has changed the landscape and the way of life of our communities, who have to go further to hunt. The government has now acknowledged that our territories are contaminated, but little action has been taken. Our fundamental and urgent demand is the restoration of our territories. (Interview with FPP, February 2014)

Thanks to the communities' monitoring and advocacy activities, the severity of the situation was officially recognised in 2013 when the State of Peru declared the Pastaza Basin and other areas an Environmental and Health Emergency (Observatorio Petrolero 2015).

As this case demonstrates, indigenous and local communities play a crucial role in highlighting environmental and social impacts of environmental pollution, and this type of community-based monitoring can be considered as one of the most efficient and effective tools for achieving Aichi target 8: by 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity (CBD 2010). Firstly, as the Quechua's experience shows, community monitors have a better knowledge of the area and can guide state-led assessments to the most affected areas. Secondly, involvement of community monitors can prevent social and environmental conflicts caused by company misconduct or the absence of State control in remote areas. Thirdly, community-based monitoring empowers local communities to become active in advocating against further pollution and demanding the restoration of degraded lands, thus also contributing to achieving Aichi target 15.

Similar to case study 3 from Indonesia, where communities are impacted by palm oil expansion (see below), the Quechua's data and information on the extent of the areas they use for their livelihoods, and the adverse effects they are encountering concerning their health and existence, are essential to support progress in Peru on Aichi target 14: to restore and safeguard ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, taking into account the needs of women,

indigenous and local communities and the poor and vulnerable (CBD 2010).

### ***3.2. Case 2: development of a collective territorial management plan and a community-based land use monitoring system by the Wapichan people in Guyana***

In 2012, Wapichan communities in Guyana (South America) adopted a comprehensive land use management plan setting out principles, goals, priority actions and inter-community agreements for securing legal rights over their customary land, and ensuring the sustainable use of natural resources in their territory. The plan was developed by 17 communities over four years. Planning work involved repeated and extensive village-level consultations and collective inter-village meetings, which were facilitated by a community-based organisation staffed by a local multilingual Wapichan team (see Figure 2). Alongside customary laws on the 'sensible'



Figure 2. The Wapichana in Guyana use smartphones and other data collection tools to monitor ecosystem health, land use change and external threats (e.g. rights violations by illegal mining and logging) with the aim of ensuring sustainable use and management of their customary lands (Photo by Tom Griffiths).

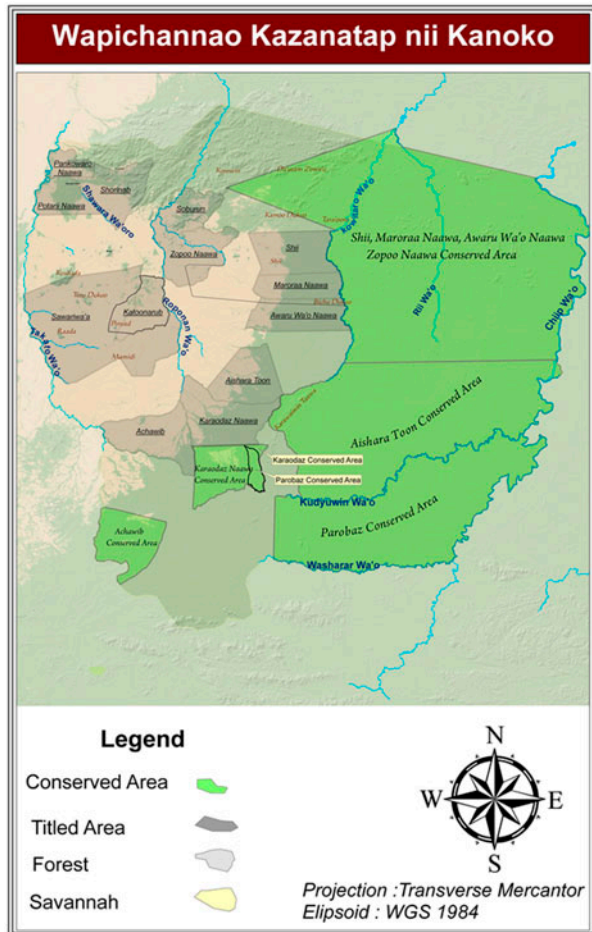


Figure 3. This community generated map shows the customary Wapichan territory, the currently fragmented land titles and their proposed Wapichan conserved forest (area shaded in darker green and covering 1.4 million ha), which is a core part of their traditional territory (Map credit: South and South Central Rupununi District Toshao Council).

use of the land and forest, mountain, grassland and wetland ecosystems, the plan is built on over 100 inter-community agreements on collective actions for sustainable land use, customary sharing of resources and community development. It includes a proposal to establish a *Wapichan Conserved Forest* of over 1.4 million hectares of tropical forest (see Figure 3). The plan also details hundreds of local wildlife sites for community protection (District Toshao Council 2012).

Agreed actions in the innovative plan are already being implemented. One priority activity now underway is the development of a community controlled system for monitoring ecosystem health (e.g. water quality), land tenure security, land use change (forest cover etc.), damaging development and rights violations across the Wapichan territory. As well as detecting external threats, the system is also intended to monitor over 100 internal

inter-village agreements on the collective sustainable use and the care of sensitive habitats and cultural heritage sites already agreed and identified in the land use plan (e.g. community conserved forests, wildlife sites, fish spawning grounds, ancient petroglyphs, etc.). A key purpose of the grassroots monitoring initiative is to detect and document illegal mining and logging and to generate evidence on the illegal encroachment of cattle rustlers and commercial hunters entering Wapichan territory (mostly via river crossings on the international border with Brazil along the Takatu River).

Monitoring activities are undertaken by a local monitoring team self-selected by the communities, and monitoring trips are conducted at the request of the villages. Findings are reported directly to statutory Village Councils and to traditional authorities in order to inform community decision-making and strengthen community governance of land and natural resources. Information may be used by a specific village or collectively by a cluster of villages that are all affected by damaging resource use (e.g. water pollution caused by mining). Monitoring reports are also shared with the District Toshao Council (DTC) representing all 17 communities at their quarterly meetings. On review of information, collective decisions may be taken on actions needed to address environmental threats and rights abuse, including formal complaints to relevant government authorities and agencies.

Monitoring work in support of village land title extension applications involves the collection of photographic and geo-referenced information on traditional occupation and use of the land, including GPS data on new homesteads, farms and ranches established by Wapichan families on their customary lands. At the request of Village Councils, a local mapping unit (Wapichan mapping person, a digital GIS database and a map printer) provides bespoke maps for inclusion in formal community land claims.

The monitoring team received training with international NGO partners in 2013 and have successfully developed their own customised community monitoring forms on smartphones, initially using ODK and Formhub tools. In 2014, with assistance from NGO allies, field monitors built and tested an Unmanned Aerial Vehicle (UAV) called *Kwadad* (osprey – in Wapichan) to monitor extractive activities in remote areas of their territory (MacLennan 2014). Testing and refinement of the UAV tool has continued in 2015. The first pilot flight to photograph and map destructive mining in forest areas was successfully completed in April 2015. The information is now being processed for presentation to the District Toshao Council.

A key related action being implemented under the community territorial plan is the construction of a website owned and controlled by all the Wapichan

villages, which is being designed to host monitoring information and include an interactive map with public mapping data and locations as well information on social, cultural and community development. Communities are developing proposals for moderation of the content of the website, including the use of a *Community Information Sharing Protocol* to agree and separate public information from private data. The aim is to integrate the website with other tools to allow communities to add geographic information (satellite images, points, geo-referenced photos, survey forms, boundary data, etc.), which they can use to make and print maps of their lands and show what is happening in their territory.

While the website is being developed with Wapichan-specific content, the intention is to build an open source tool that will allow communities to easily view, manage and publish geographic data that could be adapted for use by other communities in other parts of the world. It could also become part of the suite of monitoring tools to be considered by the emerging CBMIS network.

The work being carried out by the Wapichan is a clear example of how the initiative of a people (or community) directly and significantly contributes to a number of Aichi targets, particularly to:

- Target 4 (as they have developed their own community-based sustainable use plan and are keeping the impact of use of natural resources within safe ecological limits)
- Target 5 (as their monitoring programme aims to address and control direct drivers of forest loss)
- Target 11 (e.g. Wapichan Conserved Forest and Community Conserved Wildlife Sites)
- Target 12 (as their monitoring system include the endangered red siskin bird)
- Target 18 (as their management system and monitoring work is rooted in traditional knowledge and customary sustainable use)

### **3.3. Case 3: community-based monitoring as a tool to restore and safeguard ecosystems in Indonesia**

Aichi target 14 requires Parties and others to restore and safeguard ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, taking into account the needs of women, indigenous and local communities and the poor and vulnerable (CBD 2010). This is a typical target that usually requires contributions, such as data, information and monitoring by communities in order to clarify what these essential services are, which areas this target applies to, and what kind of progress or

challenges are encountered on the way to achieving this target.

Participatory mapping is a key method that many indigenous peoples apply in order to collect this kind of information and to use it in dialogues with governments and companies. A good example is Indonesia, where many communities are advancing on their community maps and using these to tackle various situations where their health, livelihoods and well-being are at risk.

As an example, palm oil has become the most important deforestation driver in Indonesia. Deforestation and peat swamp conversion linked to palm oil expansion not only lead to significant greenhouse gas emissions and loss of highly biodiverse and vulnerable ecosystems such as peat swamps and primary forests (Forest Peoples Programme 2014), but also violate communities' rights to their lands and result in massive land grabs, which again has consequences for access to essential ecosystems and their services on which communities depend. This is partly due to the insufficient recognition of communities' customary rights, resulting in palm oil and timber concessions overlaying community lands without regard to the impacts on local livelihoods (Colchester and Chao 2013a).

As a response, communities have increasingly engaged in participatory mapping activities in order to document their customary lands (to which they hold customary rights) and their livelihood connections to these lands to governments and companies. These participatory community maps are an important tool in ensuring that communities' voices are adequately represented in the gazettelement process of forest boundaries and rights to the forests, which Indonesia's government is preparing to address as a response to the recognised threat to Indonesia's ecosystems by monoculture plantations such as palm oil and acacia (Anderson 2014). A key priority has been the consolidation of indigenous communities' mapping activities as tens of millions of hectares of currently unmapped customary lands leave communities open to encroachment by palm oil and pulp and paper companies and other development projects. The hope is that this will influence the implementation of Indonesia's One Map Policy and recent Constitutional Court Decisions relevant to indigenous peoples; e.g. No. 35/PUU-X/2012, No. 45/PUU-IX/ 2011 and Law on Villages (Colchester, Anderson, and Chao 2014).

These mapping activities would represent major progress towards achieving target 14 in Indonesia, particularly as recommended actions and milestones to achieve this target include a sound distribution and recognition of property rights, including traditional and customary rights (as to ensure adequate and equitable access to ecosystem services).

Clearly, the data that communities are collecting in their territories and using for their maps provide significant information for a range of other Aichi targets as well:

- Participatory community maps are an important tool for communicating communities' social and cultural values of biodiversity and, as such, contribute directly to target 2 and will help to monitor to what extent biodiversity values (including non-monetary such as spiritual or cultural values) have been integrated into national and local development and poverty reduction strategies and planning processes, and are being incorporated into national accounting and reporting systems.
- The maps also play an important role in monitoring targets dealing with direct drivers of biodiversity loss, such as palm oil and deforestation (e.g. target 5), as well as targets addressing indirect drivers, such as harmful or positive incentives, subsidies, policies or laws, including land tenure systems (e.g. target 3).
- Similarly, by monitoring compliance with RSPO standards by Indonesian palm oil companies in their territories, the communities keep close track of target 4 on sustainable production and consumption (including Social Corporate Responsibility).
- Participatory mapping and community-based monitoring have also become increasingly important for prioritising and identifying conservation sites and areas within existing concessions through approaches such as the High Conservation Value (HCV) and High Carbon Stocks (HCS) frameworks (Colchester and Chao 2013b). As such they also contribute to targets aimed at conservation, restoration and reversing degradation like targets 5, 11, 12 and 15.
- Participatory maps have allowed communities in Indonesia to input into national biodiversity conservation and development strategies, and the documentation of customary sustainable land use and community protection and management of natural resources has highlighted the importance of indigenous and local communities as allies in biodiversity conservation (targets 17 and 18).
- Participatory maps have become a fundamental part of land use planning in Indonesia, allowing communities to take informed decisions about their future. As such, participatory mapping has also become an essential part of processes to obtain the free, prior and informed consent (FPIC) of communities for projects affecting their lands and rights (target 16).

Participatory maps are an important part of obtaining legal land titles for communities, and an increasing amount of local government budgets are dedicated to supporting

community mapping activities. However, it still remains very challenging to get community maps integrated into government systems (Darus and Sabandar 2015).

### 3.4. Case study reflections

These three case studies are only a selection of the many examples that are available globally on CBMIS activities and contributions, and we have shared some reflections on how they relate to a number of relevant Aichi targets. It is often impossible to select one particular key target because of the strong interactions and overlaps between the Aichi biodiversity targets; as such the community-based monitoring activities will usually generate information that is relevant for multiple targets. The GBO-4 recognises that 'The Aichi targets are deeply interconnected' and that 'these interactions will vary with national circumstances and they can be positive or negative for biodiversity depending on the types of actions taken' (CBD 2014a, 132f).

Target 18 on the traditional knowledge, innovations and practices of indigenous and local communities, and their customary use of biological resources, is a central target in this paper's discussion about the relevance of CBMIS. It is an important cross-cutting target, given that traditional knowledge and innovations are fundamental in monitoring progress and challenges related to all other targets, in particular with a strong focus on local level implementation of the Strategic Plan. At the same time, the CBD technical series (Issue 78) acknowledges that target 18 is extremely complex to measure and that information is variable across countries and communities and frequently not easily accessible (Leadley et al. 2014, 407). Indigenous peoples and local communities will therefore have to do most of the work themselves, generating and providing the data and information. This also holds true specifically for target 2 (biodiversity values), target 14 (ecosystems services, livelihood and health) and target 16 (implementation of the Nagoya protocol on access and benefit-sharing).

The International Indigenous Forum on Biodiversity (IIFB) formed its own working group to formulate indicators under target 18, and accepted to take the lead in monitoring their progress and further refining and testing them as well as to contribute to collecting data relevant to other Aichi targets. Complementing this work, a report will be launched at the First Meeting of the Subsidiary Body for Implementation in May 2016, based on data and information from indigenous peoples and local communities highlighting the direct activities and contributions of indigenous peoples and local communities to the implementation of the Strategic Plan of the CBD (preliminarily called *Outlooks on Biodiversity: Indigenous Peoples and Local Communities' contributions to*



the implementation of the Strategic Plan for Biodiversity 2011-2020. A complement to the fourth edition of the Global Biodiversity Outlook).

However, it is important to keep in mind that communities' motivation for monitoring the implementation of certain Aichi targets primarily derives from the fact that communities are facing a direct threat, or feel forced to demonstrate the sustainable nature of their lifestyles, or want to use the data for their own planning processes. While the collected data is relevant to the achievement of several Aichi targets, it is still a challenge to integrate these inputs into national CBD planning and reporting (see Section 5).

#### 4. Growing (international) recognition and support for CBMIS

CBMIS approaches and methods have become increasingly acknowledged for their effectiveness and level of sophistication by independent academic institutions. Recent research to assess monitoring possibilities for the CBD 2020 indicators, and those of 11 other international environmental agreements, concluded that of the 186 indicators in these 12 environmental agreements, 69 (37%) require monitoring by professional scientists, whereas 117 (63%) can involve community members as 'citizen scientists' and that promoting 'community-based and "citizen-science" approaches could significantly enrich monitoring progress within global environmental conventions' (Danielsen, Pirhofer-Walzl et al. 2013). Similar analyses by the same research team, showed that communities living alongside the world's tropical forests can estimate an area's carbon stock as effectively as hi-tech systems, and that local communities are able to monitor forest biomass up to the highest standards of the Intergovernmental Panel on Climate Change (Danielsen, Adrian et al. 2013).

In line with this growing international appreciation and recognition of community-based and 'citizen-science' approaches, the Twelfth Meeting of the Conference of the Parties to the CBD (COP-12) has welcomed the work done on CBMIS so far and encourages the further exploration of how CBMIS can further contribute to monitoring the implementation of the 2011–2020 Strategic Plan for Biodiversity and the achievement of the Aichi biodiversity targets.<sup>1</sup> Other CBD bodies have also been recommending the recognition of the contribution of CBMIS:

Citizen and community-based initiatives have an important and growing role to play in helping deliver *in situ* monitoring. (SBSTTA-17, annex 1; CBD 2013b)

At the International Training Workshop on Community-Based Monitoring, Indicators on Traditional Knowledge

and Customary Sustainable Use and Community Protocols, within the Strategic Plan for Biodiversity 2011-2020 organised by the CBD in June 2015 in Guatemala, it was proposed to include CBMIS in the regional training programmes for the Latin America, Africa, Asian and Pacific regions in 2016 and participants discussed priority areas for community monitoring and about their capacity-building needs to support community efforts.

While this article focusses on the contribution of CBMIS to the CBD, it should be noted that CBMIS equally applies to other global processes, including the post-2015 Sustainable Development Goals (SDGs), the UNFCCC and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). With regard to the SDGs, this year the UN General Assembly will agree a global transformative agenda on sustainable development with the vision of 'leaving no one behind'. Equally important to the post-2015 sustainable development plan will be the monitoring and accountability mechanisms being established to benchmark progress being made and to inform further action for implementation. To date, the efforts have been focussed on the UN Statistical Commission and government actions to monitor progress, but the 'Data Revolution' concept (UN Data Revolution 2015) being promoted by Secretary General Ban Ki Mon raises the potential for widespread citizen involvement in this crucial activity, with tools being available for widespread data-generation, management and use.

Likewise, in December 2015, the UN Framework Convention on Climate Change is expected to adopt binding commitments to mitigate and adapt to climate change. The CBMIS network already includes communities working on climate mitigation, and therefore CBMIS could be well poised to contribute to the monitoring of implementation of post-2015 climate commitments.

The attention for community-based monitoring and research fits into the recent global trend to include different sources of knowledge, including local and indigenous knowledge, and different knowledge holders into assessments that are of relevance to biodiversity and human well-being, instead of domination by conventional scientific contributions. The IPBES process is a good example of a global assessment process that has embraced CBMIS to complement conventional science. One of the subsidiary bodies of IPBES, the Multidisciplinary Expert Panel (MEP), is required to 'explore ways and means to bring different knowledge systems, including indigenous knowledge systems, into the science-policy interface' (IPBES 2012, appendix 1, §15 g). Also, the work programme is required to 'develop an understanding of how to effectively integrate local and traditional knowledge' (IPBES 2012, §20). IPBES has formed a Task Force on Indigenous and Local Knowledge to develop and test approaches and procedures for working with different

knowledge systems, although this is still in the initial stages of work.

### 5. CBMIS: gains, challenges and ways forward

While the gains from CBMIS in the context of tracking progress towards the CBD 2020 targets are obvious from the above sections, there are a number of challenges involved. Not all conventional scientists agree that citizen-science and local knowledge should complement their data and research, and point at methodological differences regarding peer review and empirical testing, differences in scope and level (micro to macro) and in potential for data aggregation to compile information on global statuses and trends.

Working with and using traditional knowledge also raises questions related to intellectual property, FPIC and benefit-sharing for local groups feeding into global or national assessments and contributing valuable knowledge and time. Several meetings have recently taken place to look at these specific challenges, and to identify methodologies and guiding principles such as:

- the International Expert Workshop on Indigenous and Local Knowledge in IPBES in June 2013 (Thaman et al. 2013)
- dialogues and expert meetings facilitated by the Resilience and Development Programme (Swedbio) at Stockholm Resilience Centre (Tengö and Malmer 2012)
- an expert workshop on connecting diverse knowledge systems in the context of IPBES on the Isle of Vilm, Germany (Feit, Korn, and Paulsch 2013)

Building on the outcomes of these meetings, the IPBES task force on indigenous and local knowledge systems has proposed approaches and procedures to facilitate linkages between indigenous and local communities and scientists (IPBES 2014). These documents also provide useful guidance and suggestions for accommodating CBMIS more widely in national and international CBD monitoring and reporting processes. This is also acknowledged by the CBD:

Local knowledge and monitoring efforts are often a critical source of information, complementing scientific approaches and frequently covering different temporal and spatial scales. Respect, trust, equity and transparency are essential for enabling monitoring that draws on combinations of indigenous, traditional and scientific knowledge systems. (SBSTTA 17, annex 1; CBD 2013b)

A challenge related to this increased interest to work with local and community-generated data and information, is that community organisations who are already engaged in monitoring initiatives are concerned that there

might be a steep increase in the demands/requests placed on indigenous networks or groups, while many of them are struggling to find funding or support for their local level work. The priority from the community's point of view is for resource mobilisation to continue and for their monitoring and data-gathering work to be carried out, because their ongoing community monitoring is vital to keep track of changing realities on the ground that determine their livelihoods. Many communities face daily threats and are in need of increased financial and technical assistance.

On the other hand, despite growing (international) interest and appreciation for CBMIS and its potential to track biodiversity goals and programmes, at the country level there is, in many cases, still a gap between governments and research institutions developing and implementing biodiversity plans and working on CBD reporting frameworks, and the activities of communities at the local level. While national CBD planning and reporting are supposed to be carried out in participatory ways, including with civil society and other stakeholders, the information available in CBD resources points out that the participatory mechanisms are not fully operative yet and especially that indigenous peoples and local communities' participation and inputs are limited.<sup>2</sup> Feedback from indigenous and local community organisations confirms that communication and involvement with CBD focal points is sometimes difficult and limited, although in many countries some improvements have been reported.

In some governments the lack of (financial and human) resources is hampering participatory approaches. Nevertheless, inclusive processes involving consultation and participation of community representatives from different corners of the country have to be budgeted for. Submitted information and reports by communities or organised events or presentations, must be used and attended. In some countries, support for CBMIS is still limited or there is not enough awareness or recognition of its potential contribution. Sometimes issues of (political) will also play a role. A crucial step is for key relevant departments and authorities to fully accept and accommodate the communities' products and data, such as their maps, research data and management plans or proposals. This challenge was raised in all three case studies.

It takes time to build up credibility for community scientists and monitors, who are often struggling to mobilise resources to acquire technical support and equipment for their work. In many cases, conflicting and unresolved land claims, legal landscapes, or high economical stakes, are impeding on friendly working relationships with authorities or companies. Getting full support (including financial or technical where needed) is a next step that eventually will determine the full

acceptance and incorporation of community-based monitoring at (sub-) national levels and may require a paradigm shift. Through enhanced participatory processes, solutions and advances by indigenous peoples as well as recommendations and concerns can be inputted into National Biodiversity Strategy and Action Plan (NBSAP) processes and national indicators systems. National reporting would also benefit from using diverse sources of knowledge, including community-generated data and monitoring.

Some countries are already doing this and it is important to showcase such positive examples. The Philippines is an example of a country where the NBSAP process was based on collaboration and consultation with local organisations. For instance, the Philippine Traditional Knowledge Network (PTKN) and Tebtebba Foundation coordinated with the National Focal Point of the CBD about updating the NBSAP and associated TK indicators, based on pilot community work. Drawing on these pilots, the PTKN also submitted a list of traditional occupations to the Philippine National Statistical Coordination Board (PNSCB) for consideration in the revision process of the Philippine Standard Classification of Occupations (PSOC), resulting in the incorporation of some of the submitted traditional occupations.

## 6. Conclusion

While monitoring activities by communities at the local level have taken place for a long time, the recent initiatives of networks of indigenous peoples and local communities to focus on CBMIS is sharpening the role that community monitoring can play at local, national and international levels to track statuses and trends of biodiversity and community well-being, to protect communities and the resources on which they depend from unwanted external pressures and potentially unsustainable activities.

The three case studies demonstrate how CBMIS can be used to contribute data and information that are relevant for monitoring the implementation of the CBD Strategic Plan. While the CBD has already taken significant steps in acknowledging and supporting CBMIS, and there is also growing recognition of the value of CBMIS by international researchers and policymakers (including some of those involved in SDGs, climate processes and IPBES), the CBMIS contributions can become even stronger with increased recognition and support.

In particular at the national level of biodiversity planning, monitoring and reporting, bridges still have to be built and crossed to achieve full and effective participation of indigenous peoples and local communities, as well as inclusion of their community-based information in these processes. This also requires careful navigation around the specific challenges mentioned in this article

concerning working with various knowledge systems, relating to trust, property rights and distribution of benefits. It is recommended that Parties increase their dialogues with communities and take steps to create legal and policy landscapes that embrace and recognise community-based monitoring and information systems, and support these initiatives in practical terms.

From their perspective, indigenous networks will continue their monitoring work and continue to strengthen their approaches and tools and exchange information, to spread awareness and capacity within the indigenous movement and to become increasingly proactive in engaging with the CBD process.

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## Notes

1. For instance Decision XII/12, para. A 6 and 9: ‘Welcomes the work carried out under the Working Group on Indicators of the International Indigenous Forum on Biodiversity and other international organisations, in particular the Community-Based Monitoring and Information System approach (...) to assess progress towards implementing the Strategic Plan for Biodiversity 2011–2020 and achieving the Aichi biodiversity targets’, and encourages Parties and indigenous and local communities to consider how indigenous and local communities might effectively participate in the development, collection and analysis of data, including through Community-Based Monitoring, and further explore how indigenous and local communities’ Community-Based Monitoring and Information Systems can contribute to monitoring of Aichi Target indicators (CBD 2014b).
2. See for instance WGRI5 documents and GBO-4 on the revised NBSAPs that have so far been submitted (CBD 2014a; WGRI 5 2014).

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