

UN-REDD PROGRAMME INFO BRIEF



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Spatial analysis: a tool for integrated land use planning for REDD+

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KEY MESSAGES

1. Integrating results from spatial planning into REDD+ strategies and action plans allows countries to explicitly identify geographical and thematic areas of focus for national strategies, including additional environmental and social benefits rather than only carbon ones.
2. Participatory approaches to spatial planning facilitate greater buy-in from policy makers and the generation of more solid and robust data.
3. Integrating non-carbon benefits and risks into REDD+ strategizing and planning, also contributes to addressing the Cancun safeguards for REDD+.
4. Reliability of spatial data, timing of the spatial analyses, clarity of goals of such analysis, relevance of their results to policies and stakeholder involvement, are all factors identified as enabling the integration of spatial planning and benefits and risks analysis into REDD+ strategies and plans.

READ THIS BRIEF IF...

- You are involved in REDD+ planning, particularly in the development of a National Strategy/Action Plan or investment/implementation plan.
- You want to learn about non-carbon benefits and their relevance to REDD+.
- You want to learn about other countries' experiences in integrating spatial analyses into their REDD+ strategies and plans.

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This brief brings together country experiences to identify the critical success factors in the development of spatial analyses to inform REDD+ implementation, and their uptake into national REDD+ strategy and implementation plans. It aims to provide information and lessons learned to those countries that are still preparing their national REDD+ strategies or action plans (NS/APs), as well as to those who have already approved a NS/AP and that are now in the process of developing investment or implementation plans for specific REDD+ jurisdictions, policies or measures.

This brief:

1. Identifies how countries have used the results from spatial analyses of non-carbon benefits¹ to develop their national and sub-national REDD+ strategies and planning documents.
2. Discusses the common critical success factors that have enabled the use of integrated spatial planning in these REDD+ strategy and planning documents.
3. Presents country examples from three regions, in which spatial analyses have been successfully integrated into REDD+ strategy and planning.

The value of spatial planning and of an integrated land-use planning approach in a REDD+ context

Spatial analyses for REDD+ planning can be used to help identify suitable locations for specific interventions, taking into account spatial variation in the resulting non-carbon benefits and risks [1]. Maps can be produced to support the visual communication to and inform policy makers, as well as a range of other stakeholders. Information generated through spatial analyses of non-carbon benefits and potential risks can also be a useful contribution to addressing and respecting REDD+ safeguards, as captured in a country's safeguard information system [2].

An integrated land-use planning approach involves a systematic process, using spatial analyses and stakeholder

engagement, which aims to identify and spatially express the different kinds of land uses in a landscape. Competing sectoral goals, such as agricultural production, urban development, biodiversity conservation, etc., can then be optimised through spatial analyses coupled with stakeholder participation. The approach takes into account as many as possible of the competing interests on land and

Box 1: Strengths and limitations of spatial analysis for REDD+ strategizing and planning

Strengths

- Provides an evidence base to inform decision making and planning processes
- Can be used as an input for participatory processes or to strengthen their results
- Identifies the location of areas under current or future pressures
- Identifies where interventions are feasible and the desired benefits that can be achieved
- Identifies where REDD+ implementation risks are higher
- Maps are an effective visual communication tool to inform policy makers
- Can help to speed up REDD+ planning process

Challenges/limitations

- Technical capacity required (GIS expertise and tools needed in the REDD+ national teams)
- Availability of spatial data at adequate resolution
- Appropriate time needs to be factored in the planning of the preparation of REDD+ national strategies to have the results of the studies on time.
- Not all relevant factors are available in spatially explicit format (e.g. changes made to fiscal policies)
- Complex maps can cause confusion
- Institutional barriers in sharing data
- Scale of work / planning

Source: Adapted from [4]

¹ *Non-carbon benefits is a term referring to the contributions of REDD+ beyond carbon storage and carbon sequestration. Types of non-carbon benefits are: Improved forest governance, ecosystem services provision, climate change adaptation, improved economic and livelihoods, supported social and cultural values (Source: https://www.unclearn.org/sites/default/files/inventory/non-carbon_benefits_of_redd_en.pdf)*

aims to enhance benefits for society, the environment and the economy, while preventing or minimizing conflicts [3].

The strengths and limitations of spatial analyses for REDD+ strategizing and planning are summarised in Box 1.

Although the focus of REDD+ is to allow developing countries to contribute to the fight against climate change and to reduce carbon emissions, supporting the reduced deforestation and degradation, the conservation, and the enhancement of forests provides many more added values and benefits. Forests in fact provide more than only carbon sequestration ecosystem services; they deliver such benefits as water regulation, forest foods and wildlife habitat. By understanding and acknowledging the range of these non-carbon benefits/ecosystem services, an integrated land-use planning approach can contribute to achieving a wide range of the Sustainable Development Goals, from poverty reduction to biodiversity conservation. This approach also represents an opportunity to increase knowledge on a country's natural capital, as well as to identify and highlight land tenure issues and establish effective participatory processes for natural resources management and governance.

Countries are also invited by the United Nations Framework Convention on Climate Change (UNFCCC) to submit information on the nature, scale and importance of non-carbon benefits related to REDD+ implementation

[5]. While demonstration of non-carbon benefits is not a requirement for REDD+, such benefits are recognized as being important for the long-term sustainability of REDD+, can contribute to climate change adaptation, and under the Green Climate Fund could command a 2.5% premium on results-based payments for REDD+ [6].

Identifying best practice to applying integrated land-use planning in REDD+ strategy and planning processes

An NS/AP is one of four essential elements² that countries must have in place to be eligible for results-based payments under the UNFCCC Warsaw framework. The NS/AP should describe how emissions will be reduced and/or how forest carbon stocks will be enhanced, conserved and/or sustainably managed.

Spatial analyses can support the preparation of the REDD+ NS/AP and any subsequent investment or implementation plans, by providing the opportunity to identify and visualise the spatial distribution of REDD+

² Design elements for REDD+ implementation are: National Strategy or Action Plan, National Forest Monitoring System, Safeguard Information System, Forest Reference Emission Level/Forest Reference Level (Decision 1/CP.16, paragraph 71(a)), in accordance with Decisions 12/CP.17 and 11/CP.19). The UNFCCC has gathered the full text of all the decisions relevant to REDD+ in the 'Decision booklet REDD+'.

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relevant parameters, such as natural capital³, socio-economic information and drivers of deforestation and forest degradation. The resulting maps can be used as part of the screening process in the identification of the most appropriate REDD+ Policy and Measure and the most suitable locations for their implementation.

The UN-REDD Programme, after ten years of work, has accumulated experiences across many partner countries in overcoming challenges and making good use of spatial analysis for REDD+ planning. To learn the various lessons and gather this experience, we interviewed representatives of nine selected UN-REDD partner countries and undertook a review of available NS/APs and investment/implementation plans.

Spatial analysis in REDD+ planning documents

As of October 2018, 22 UN-REDD partner countries and two non-UN-REDD partner countries (Brazil and Mozambique) have a published NS/AP (Figure 1). For

this briefing document, 39 REDD+ strategy and planning documents have been reviewed, including six NS/APs yet to be published, and six sub-national planning documents (Cross River State in Nigeria and five provinces in Viet Nam).

Almost all of the published and draft strategies include some sort of non-carbon benefits (even if not always labelled in this way) among their objectives or strategic goals.

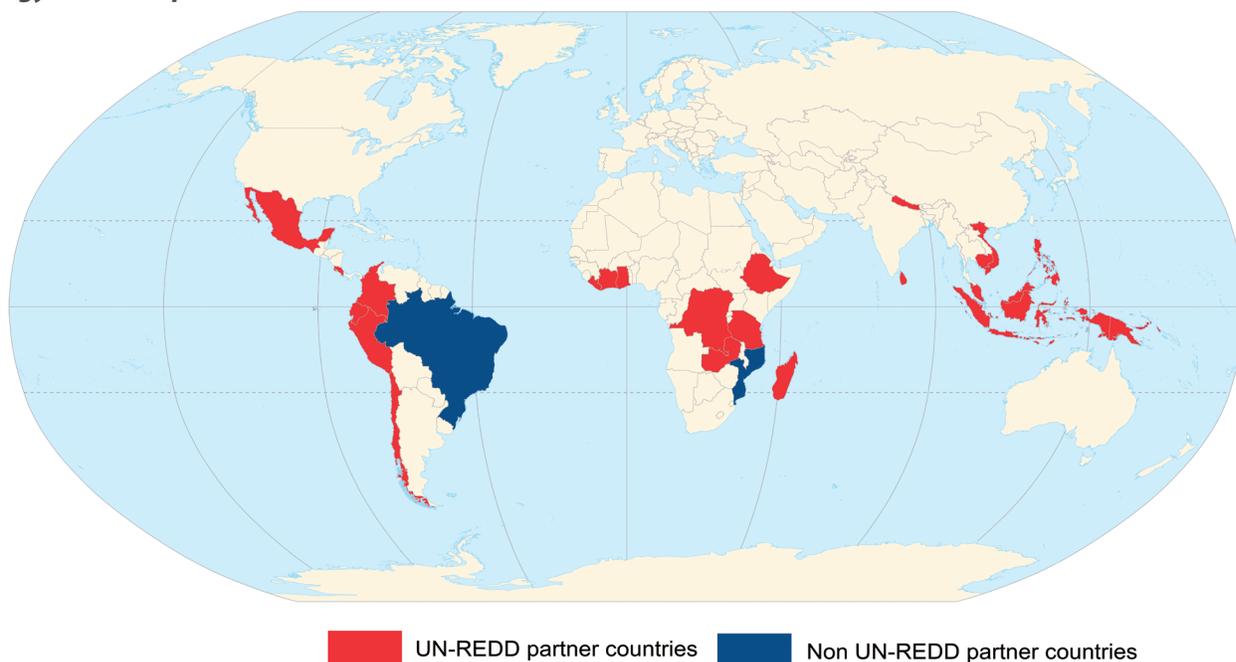
Maps included in REDD+ policy and planning documents can support REDD+ policies, actions and activities⁴ and in particular, showing the distribution of spatially explicit non-carbon benefits can strongly support the identification and location of policies and measures.

Maps are included in two thirds of these documents. Land cover maps are most frequently included, followed by maps showing deforestation and priority zones/landscapes for REDD+ implementation. Three countries have directly included the results from spatial analyses on multiple benefits in their REDD+ plans and strategies. Costa Rica (case study 1), Nigeria in its as yet unpublished REDD+ strategy for Cross River State (case study 2) and Ecuador.

³ Natural capital is the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people (Source: "What is Natural Capital". www.naturalcapitalcoalition.org. Natural Capital Coalition. Retrieved 24 January 2018)

⁴ Policies: set of principles agreed by the Government on REDD+ goals and objectives; Actions: efforts taken or mandated by governments to implement REDD+ activities; Activities: Reducing emissions from deforestation and degradation, conservation, sustainable management and enhancement of forest carbon stocks.

Figure 1. UN-REDD Programme partner countries (red) and others (blue) with a published REDD+ national strategy or action plan as of October 2018.



The boundaries and names shown and the designations used on maps do not imply official endorsement or acceptance by UN Environment or contributory organisations.

Projection Robinson, Central Meridian 0 degrees

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Case study 1: Policy impact in Costa Rica

In Costa Rica, spatial analyses on potential benefits of REDD+ actions were carried out after the National Strategy was finalised in 2015. The Secretaría REDD+ – Costa Rica, together with FONAFIFO (the country's National Forestry Financing Fund) and the UN-REDD Programme, worked on identifying and combining policies, actions and activities included in the NS to develop the implementation plan (published in 2017). Five main policies and measures are included in the final implementation plan. For four of these (Promotion of low carbon systems, Forest fire control and mitigation, Strengthen conservation and sustainable forest management and Restoration of landscapes and forest ecosystems) national level spatial analyses were developed, considering seven environmental and social benefits (support to communities vulnerable to hydrological stress, potential for socio-economic improvement, water erosion control, potential for governance improvement, climate change mitigation, natural scenic beauty for tourism, and biodiversity conservation).

The parallel development of spatial analyses and the implementation plan has facilitated collaboration and synergies between the technical team and the policy makers, the alignment of the analyses and policy objectives. This allowed the resulting maps to be included in the planning document.

The maps resulting from the spatial analyses were designed as an illustration of potential, since not all the factors necessary to identify areas for implementation were considered (e.g. public policy, feasibility, potential conflicts). In some cases, the too coarse spatial resolution of the data and the use of proxies, has only allowed the visualization of the distribution of suitable areas for implementation at the national level and not the identification of specific local areas. Nevertheless, the results identify areas where most of the benefits converge and a focus for more detailed analyses.

Whilst feeding into REDD+ policy-making, this work emphasised potential synergies between the National REDD+ Strategy and other objectives and commitments of Costa Rica, such as those focused on national development, restoration and biodiversity conservation. More recently, this work has featured in meetings for the Gender Action Plan, which is being developed within the NS. During the meetings spatial layers showing the concentration of women by district were overlaid with the multiple benefits layer, this helped to highlight districts where women could be acting as conservation agents, support efforts to reduce forest fires, undertake reforestation or could take action to promote multiple benefits even further.

Map showing the areas where the benefits considered in the analyses converge.



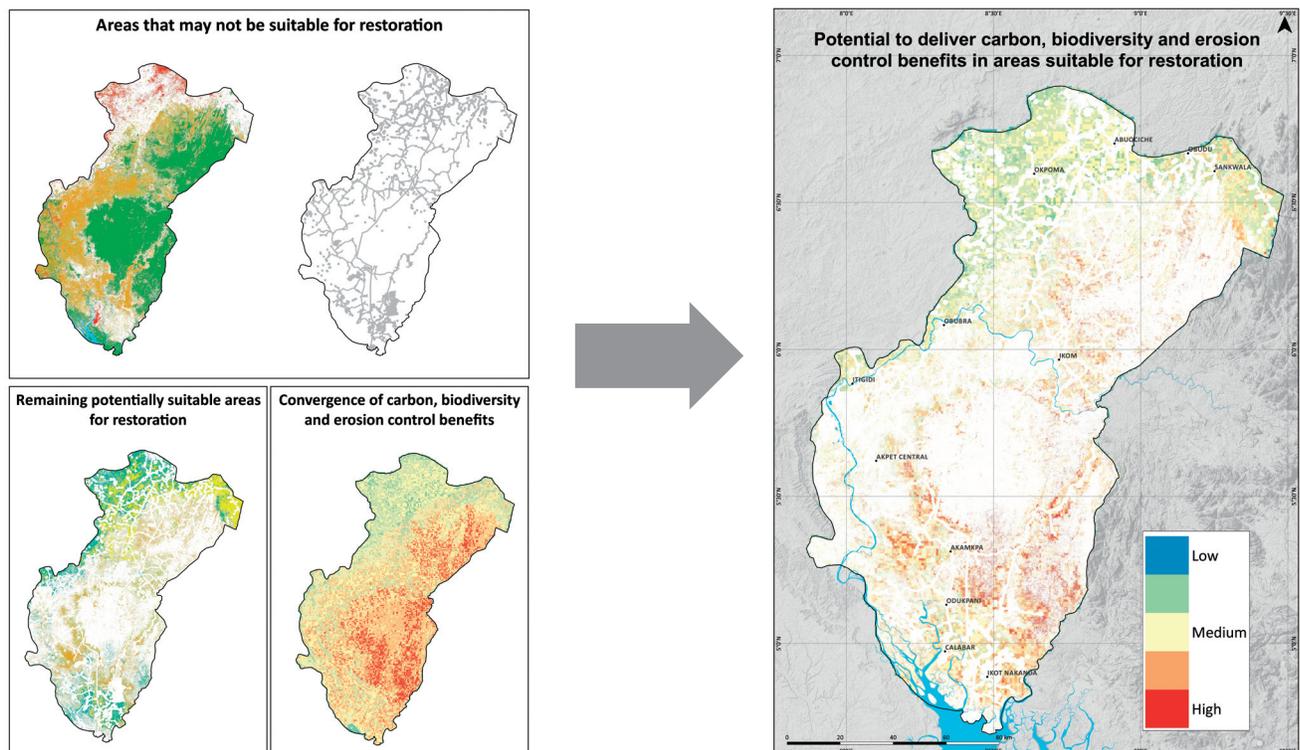
Sources: [7,8]

Case study 2: Spatial analyses on resource use and non-carbon benefits informing the Cross River State REDD+ Strategy in Nigeria

In Nigeria, the Cross River State (CRS) REDD+ strategy has been endorsed by the Government but not formally published at the time of writing. The forests of CRS are home to biodiversity of national and international importance, and provide essential goods and services, from forest foods to ecotourism, to people within the state and beyond. Between 2013 and 2015 the UN-REDD National Programme focused on Cross River State, and several studies were developed through consultations, including spatial analyses to explore multiple benefits from REDD+ in Cross River State.

The maps developed for CRS are included in the State Strategy. They help visualise the distribution of goods and services across the State's landscape, identify areas where there is higher potential to secure multiple benefits from REDD+ Policies and Measures, and, combined with other data, show where forests and their services have been affected or may be threatened in the future by deforestation and degradation.

“The restoration of degraded forest areas through Assisted Natural Regeneration (ANR) and reforestation/afforestation programmes” is one of the strategic interventions included in the CRS REDD+ Strategy. Spatial analyses aimed to identify potential suitable areas for its implementation, through the exclusion of areas unavailable for reforestation (settlements, long-established farmlands, forest plantations, areas within 1km from infrastructure development) and by combining the remaining land with a map of the following potential benefits: carbon, richness of threatened species and soil erosion mitigation.



Maps showing areas unsuitable for forest restoration (top-left), the remaining areas and potential benefits (bottom-left) and the potential areas for forest restoration also delivering multiple benefits (right).

Sources: [9, 10]

Case study 3: Participatory approaches to planning for REDD+ in Viet Nam

Much of Viet Nam's national REDD+ programme is implemented at multiple scales: national, provincial and local. Viet Nam's NS, known as the National REDD+ Programme (NRAP), was approved in 2012, reviewed in 2016 and approved again in 2017. It is now in its second implementation phase (2016–2020). The 2017 NRAP includes integrated land-use planning activities to help meet a national target of 16.24 million hectares of land designated for forest by 2020, meaning an increase of forested cover to 47%.

In 2017, official sub-national REDD+ planning guidance was developed by the UN-REDD Viet Nam Phase II Programme, together with the governments of five pilot provinces (Bac Kan, Binh Thuan, Ca Mau, Ha Tinh and Lao Cai), and national institutes¹ that worked with these provinces to develop their plans.

The guidance was prepared drawing on the experience of the five pilot provinces in developing their Provincial REDD+ Action Plans (PRAPs) with UN-REDD Programme support. A participatory integrated land-use planning approach, which involved desk-based analysis, multi-stakeholder processes and participatory mapping, was used to develop the PRAPs. This approach has been taken up by other initiatives supporting REDD+ readiness in Viet Nam, and by March 2018, 19 provinces had approved PRAPs.

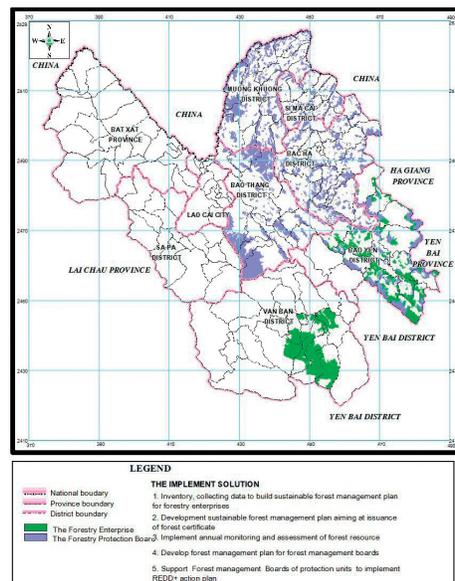
Viet Nam's experience illustrates how participatory processes for subnational scale planning can increase the transparency, local ownership, and social and environmental sustainability of REDD+. This approach has informed the government guidelines for the development of PRAPs, which are followed by provincial governments when developing their action plans.



Capacity building workshop on spatial analyses and participatory mapping.

Sources: [4, 11, 12]

For more information on REDD+ in Viet Nam visit: <http://vietnam-redd.org>



Example of final PRAP map for Lao Cai Province showing potential areas for implementing sustainable forest management interventions.

1 The Institute of Forest Ecology and Environment (IFEE), the Forest Inventory and Planning sub-Institute for the Southern Region (South Sub-FIPI); the Forest Inventory and Planning sub-Institute for the Northwest Region (Sub-FIPI Northwest) and the Forest Resources and Environment Center (FREC).

Benefits and risks specific to individual REDD+ Policies and Measures were mentioned in half of the documents reviewed and, in most cases, there was evidence that they had influenced the choice of policies and measures comprising REDD+ strategies and plans.

Other countries (e.g. Sri Lanka, Zambia, Madagascar, Peru, Ethiopia and Ghana) have included spatial analyses to inform their REDD+ planning documents, focusing on deforestation hotspots, ecosystems boundaries or watershed-based landscape approaches. In Viet Nam, spatial analyses have been included in the Provincial REDD+ Action Plans (case study 3) to identify priority areas for the implementation of REDD+ Policies and Measures. The analyses were carried out using participatory approaches, and mostly focused on forest cover change and drivers of deforestation and forest degradation.

Factors enabling or hindering the uptake of the spatial analyses in REDD+ National Strategies/Action Plans

The top five factors identified as important for the integration of spatial analysis results into policy documents (Figure 2) are briefly described below:

Reliability and availability of data – There is a widespread feeling that the use of global data does not provide reliable results at the country level, if not adapted using local knowledge and country data. This also reflects experience from collaborative working sessions run by UNEP-WCMC. Data need to be legitimate and credible to have the chance to influence decision-making. This lack of credibility is often an issue that prevents the integration of spatial analyses. Data at a resolution that allows use

at a sub-national scale often do not exist or are difficult to access. The availability of data is also connected to the level of inter-agency communication and coordination. Unfortunately, data at the national level collected by different institutions, universities and non-government organizations, are often never analysed, lost, forgotten or simply not shared within the country.

Timing of spatial analyses – Countries reported that the time required for data collection and production of final maps often did not fit well with the timeline for development of the policy documents. In at least one case (Côte d’Ivoire), delays in the process prevented the integration of the results into the policy documents. In some countries, the analyses were developed after the completion of the NS/AP, so that integration into NS/AP was not an objective.

On the other hand, NS/APs are often considered living documents so there is an opportunity for later integration of new information during subsequent policy reviews/revisions. One country representative stated, “... the timing of the spatial analyses is not a limitation, the strategy can be reviewed once new data and maps are available...”

Finally, analyses undertaken prior to drafting the NS/AP may not be well aligned with the final set of REDD+ policies and measures included.

Clarity of goals and relevance to wider development policies – The objective of the analyses needs to be clear and identified through discussions with all the stakeholders involved; such an approach will also help reduce the gap between technical teams and policy makers. As one country representative suggests, “...from a policy perspective it is very important to understand, since the beginning, how the results will be used...”

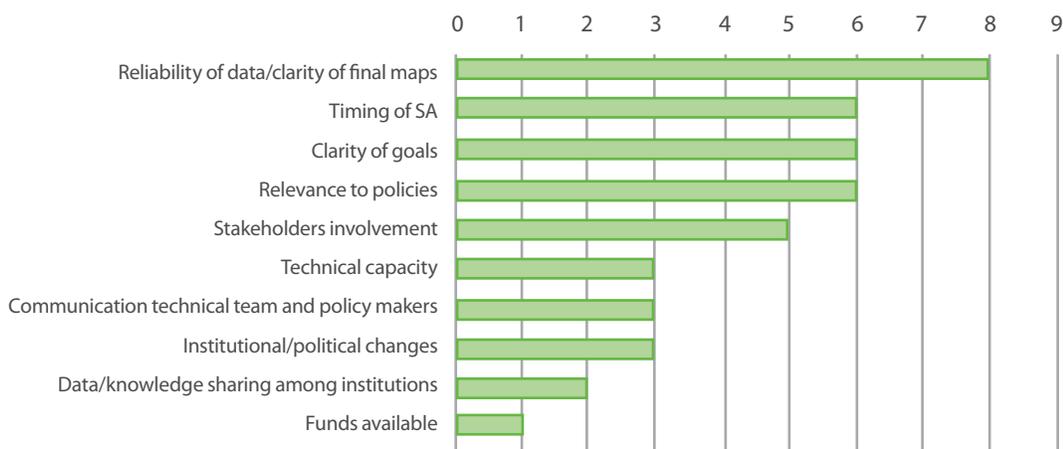


Figure 2. Chart showing the factors enabling the uptake of spatial analyses in the REDD+ policy documents and the number of countries that have identified them.

Stakeholder involvement – stakeholders should be involved from the first phases of the spatial analysis development. Communication, coordination and data sharing can be facilitated by the involvement of stakeholders often belonging to different government and non-government institutions, as well as women and minority groups, starting early in the planning process. In Ecuador, the establishment of a REDD+ Committee ensuring the participation of multiple stakeholders, was particularly helpful in the REDD+ readiness process. The Committee reviewed and validated the Action Plan.

Technical capacity – both for data collection and development of the spatial analyses. Country representatives have stressed the need for technical capacity not just in analysing the data, but also in collecting them systematically.

Communication between technical teams and policy makers – The value of involving the technical team that undertakes the spatial analysis in the development of the NS/AP and similar policy documents has been highlighted by most of the interviewees. A lack of communication between the technical team developing the analyses, and the policy makers drafting the strategy, has been identified as one of the factors hindering the uptake of the spatial analyses results into the policy documents.

Summary of best practices

The aim of this brief was to compile the experiences of different countries in Africa, Asia-Pacific and Latin America to identify common factors and processes that have enabled the uptake of spatial analyses results into REDD+ policy documents. Most of these lessons are widely applicable to any process where spatial analyses can support decision-making. Reliability of spatial data, clarity of final maps and goals, timing of spatial analyses, relevance to policies, and stakeholders' involvement, are the factors identified by most countries consulted as critical to enabling the integration of spatial analysis results into policy documents. The scope of the goals and stakeholder engagement determine whether the approach can truly be described as integrated land-use planning, and this varies from country to country.

Any integrated land-use planning process can be challenging and general best practices need to be adapted to the specific context. Best practices emerging from the REDD+ work are as follows:

Agreeing objectives of the analyses through participatory approaches: Major stakeholders have to be involved in objective-setting, alongside technical teams to ensure the feasibility of the analyses and assess technical capacity and data required. Identifying the objectives of the analyses in a collaborative way allows for a better understanding of sectoral goals and the data required to ensure that all voices are considered. The use of multi-criteria approaches helping to prioritise competing objectives is an option during this initial phase.

Aligning the development of spatial analyses and policy: When the development of new policies is required, it is necessary to understand whether spatial analyses are relevant (i.e. whether spatially explicit decision making is required). If this is the case, plans for analysis needs to be aligned with the policy development process.

Involving all key stakeholders: Coordination and involvement of all key stakeholders is a pre-requisite for the development of any new policy. Communication should be a priority, ensuring that technical teams, policy-makers, private sector and local communities are involved in all the relevant phases and are kept informed. Initial workshops bringing together policy makers and technical teams are critical to ensure that spatial analyses will be integrated into policies.

The experience in Viet Nam shows that it is possible to involve local communities during the development of spatial analyses. Here, a combination of mapping and participatory approaches was successful in the development of sub-national REDD+ planning.

Making spatial data available and accessible by:

- Engaging all the major stakeholders, from the initial phases of the planning process and exploring which data are available and best ways to use them.
- Validating global data at the country level. Validation activities require less effort and budget than the collection of new national data and can represent the initial step for planning the collection of in-country data for monitoring and for the enhancement of previous analyses. Such validation can also be achieved combining the use of cutting edge technology, such as the UN-REDD Programme / Norway supported user-friendly cloud-based platform known as SEPAL [13].
- Planning for further data collection and assessing what capacity building is needed.

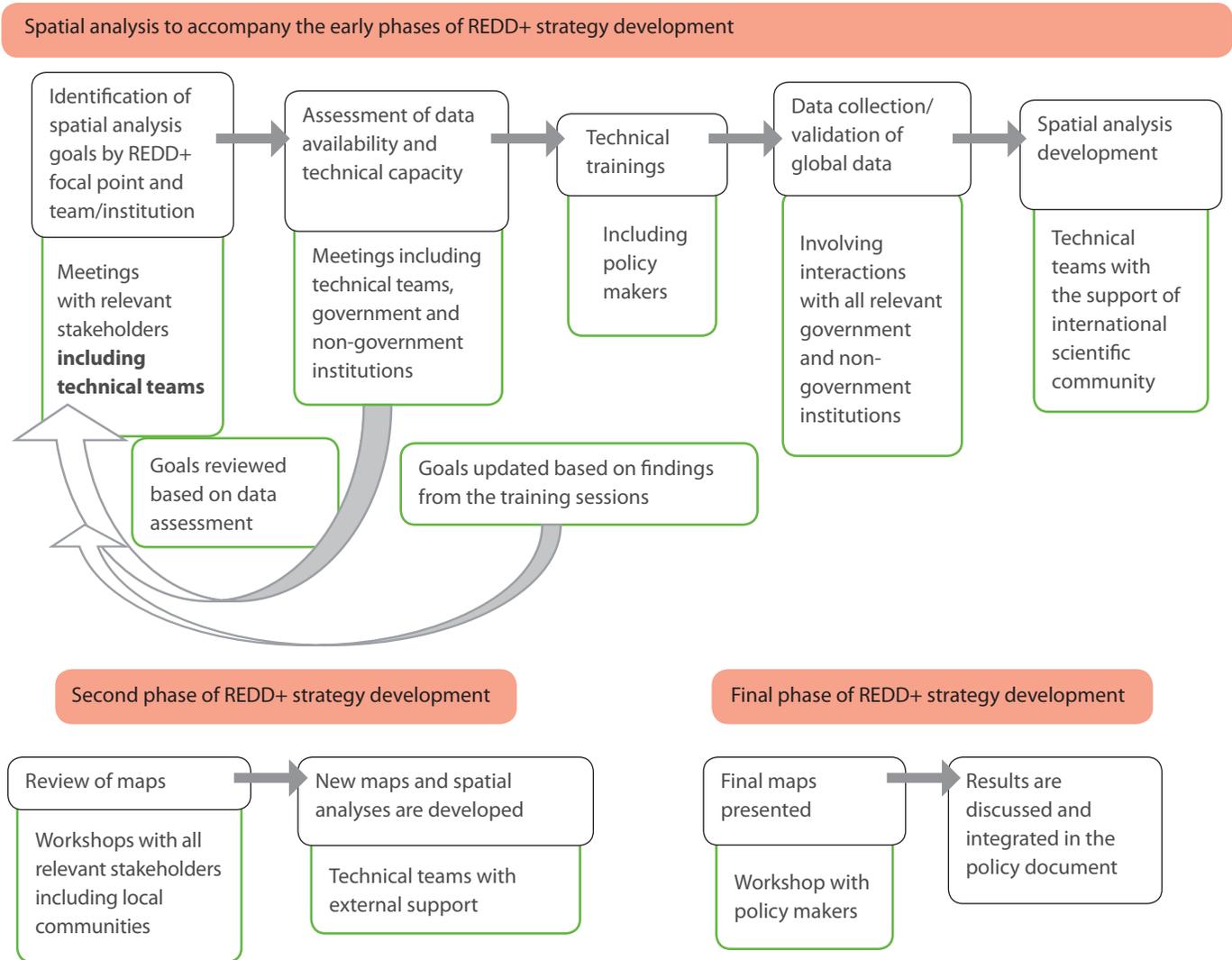


Figure 3. Workflow on integrating spatial analyses into REDD+ strategizing and planning.

Building technical capacity: The need for more technical capacity building for map analysis was expressed by almost all the country representatives interviewed. It is recommended that countries develop a strategic plan for technical training, aiming to capacitate national trainers of trainers as in Viet Nam’s REDD+ work. This approach will ensure the independence of the country from further basic technical assistance and improved ownership of the results. A strong technical capacity in-country will ensure that the use of spatial analyses continues in the future.

Bringing these best practices together, the workflow in Figure 2 summarises the ideal steps in integrating spatial analyses efficiently and effectively into REDD+ strategizing and planning.

Conclusion

REDD+ represents an important opportunity not only to mitigate climate change, but also to gain a better understanding of the distribution of the country’s natural capital and to increase the technical capacity of national institutions for collecting, analysing and managing spatial data. Spatial analyses represent a critical supportive tool to plan, communicate and implement REDD+ Policies and Measures, as well as any other policy dealing with spatially explicit information. At it’s best, understanding and visualising the spatial distribution of non-carbon benefits and identifying areas where carbon and these other benefits overlap, allows the generation of integrated land use plans, capable of achieving a higher number of development goals, beyond climate change

mitigation. Spatial analyses are one of the approaches needed to develop land-use plans that consider different sector goals, from biodiversity conservation to infrastructure development.

REDD+ countries are currently at different stages of development of their REDD+ strategy and planning documents, but the use of spatial analyses should be considered at any of these stages. National ownership of both analyses and data behind them is essential to uptake of the results into policy and planning, and requires clear goal, good timing and collaborative working to ensure relevant, high quality results. The development of spatial analyses can often be challenging, but by taking

into account the factors identified in this brief, some of those challenges can be overcome and will hopefully help countries in their effort to achieve their national development targets, beyond REDD+.

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Endnotes

- [1] Dickson, B., Bertzky, M., Christophersen, T., Epple, C., Kapos, V., Miles, L., Narloch, U., Trumper, K. (2012) REDD+ Beyond Carbon: Supporting Decisions on Safeguards and Multiple Benefits. UN-REDD Policy Brief, Issue 2. <http://bit.ly/reddPB2>
- [2] UNFCCC Decision 1/CoP16. <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf>
- [3] Metternicht, G. (2017) Land use planning. Global Land Outlook Working Paper, 67, UNCCD.
- [4] Garcia-Rangel, S., Hicks, C., Ravilious, C., Williamson, A., and Nguyen, T.P. (2017) Integrated land-use planning for REDD+: lessons from combining spatial analysis and participatory approaches to the sub-national level in Viet Nam. UN-REDD Viet Nam Phase II Programme, Hanoi.
- [5] UNFCCC Decision 1/CoP16. <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf>
- [6] GCF Decision B.18/23, Annex XI, Paragraph 13, Step 4. Available at: https://www.greenclimate.fund/documents/20182/820027/GCF_B.18_23_-_Decisions_of_the_Board__eighteenth_meeting_of_the_Board__30_September__2_October_2017.pdf/b55d8183-005c-4518-91dc-152113506766
- [7] Secretaría Ejecutiva REDD+, FONAFIFO (2017). Plan de implementación de la Estrategia Nacional REDD+ Costa Rica. http://reddcr.go.cr/sites/default/files/centro-de-documentacion/plan_de_implementacion_enreddcr_v3.pdf
- [8] García Rangel, S., J. Walcott, X. de Lamo, C. Epple, L. Miles, V. Kapos, D. Carrión, M.E. Herrera Ugalde, T. López Lee, M. Ballesteros, E. Vega-Araya, G. Quirós Ramírez y A. Gómez Román (2017). Beneficios múltiples de REDD+ en Costa Rica: análisis espaciales para apoyar la toma de decisiones. Cambridge, UK: UNEP-WCMC. <http://www.bit.ly/costaricabeneficiosmultiples>
- [9] Federal Republic of Nigeria and Cross River State (2017). Cross River State REDD+ Strategy. Unpublished.
- [10] Maukonen, P., Nkor, B., Ama, M., Guth, M., Williamson, A., Okeke, F., Hicks, C., Effiom, E., Adekola, R., and Ekwu, A. (2017) Using spatial analysis to explore multiple benefits from REDD+ actions in Cross River State, Nigeria. Prepared by the Nigeria REDD+ Programme, Cross River State Forestry Commission (CRSFC) and UNEP-WCMC. Nigeria National REDD+ Programme, Federal Ministry of Environment, Abuja. <http://bit.ly/2jMeKF0>
- [11] UN-REDD Viet Nam Phase II Programme (2016). Operationalising REDD+ in Vietnam through Provincial REDD+ Action Plans (PRAP). Hanoi, Viet Nam. <http://www.vietnam-redd.org/Upload/CMS/Content/REDD%20projects/UN-REDD%20VN%20Phase%202/PRAP.pdf>
- [12] Institute of Forest Ecology and Environment (IFEE) (2017). Handbook on Spatial Analysis to Support Subnational REDD+ Planning in Viet Nam. Final draft, May 2017. Prepared with the UN-REDD Viet Nam Phase II Programme.
- [13] SEPAL: System for earth observations, data access, processing & analysis for land monitoring. Innovative open-source software to help countries measure, monitor and report on forests and land use. Accessible through <http://www.openforis.org/tools/sepal.html>

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