Natural Capital Accounting for Better Policy Decisions:

Measuring and Valuing Natural Capital to Improve Landscape Management and Governance

Proceedings and Highlights of the 4th Forum on
Natural Capital Accounting for Better Policy Decisions
18-19 November 2019, Kampala, Uganda

GPS Global Program on Sustainability

WAVES Wealth Accounting and the Valuation of Ecosystem Services

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Wealth Accounting and Valuation of Ecosystem Services (WAVES) is a World Bank-led global partnership, initiated in 2012, that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. In 2018, a larger umbrella program, the Global Program for Sustainability (GPS) was started, which includes WAVES as one of its pillars.

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- Forum Participants – see Appendix 1.2
- Authors, which are listed in each chapter

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List of abbreviations

AF	Additional Financing
AfDB	African Development Bank
AFR	Africa (World Bank region)
ANU	Australian National University
CBS	Central Bureau of Statistics
CI	Conservation International
CRS	Creditor Reporting System
DFID	Department for International Development (United Kingdom)
EAP	East Asia and Pacific (World Bank region)
ECA	Europe and Central Asia (World Bank region)
ES	Ecosystem Services
GEF	Global Environment Facility
GIZ	*Gesellschaft für Internationale Zusammenarbeit* (Germany)
GLF	Global Landscapes Forum
GPS	Global Program on Sustainability
GPFLR	Global Partnership on Forest and Landscape Restoration
IARNA	Institute of Research on Natural Environment and Society, University Rafael Landivar, Guatemala
IDA	International Development Association
IIED	International Institute for Environment and Development
ILM	Integrated Landscape Management
IUCN	International Union for Conservation of Nature
LCR	Latin America and Caribbean (World Bank region)
LPFN	Landscapes for People Food and Nature
MNA	Middle East and North Africa
NCA	Natural Capital Accounting
NEMA	National Environmental Management Authority (Uganda)

OECD	Organisation for Economic Cooperation and Development
PES	Payments for Ecosystem Services
PAD	Project Appraisal Document (World Bank)
PADAP	*Projet Agriculture Durable par une Approche Paysage*
PBL	Netherlands Environment Agency
PDO	Project Development Objective (World Bank)
PP	Project Papers (World Bank)
SANBI	South African National Biodiversity Institute
SAR	South Asia (World Bank region)
SEEA	System of Environmental-Economic Accounting
ROAM	Restoration Opportunities Assessment Methodology
TTL	Task Team Leaders (World Bank)
UK	United Kingdom
UN	United Nations
UNCEEA	United Nations Committee of Experts on Environmental-Economic Accounting
UNEP	United Nations Environment Programme
UNHCR	Office of the United Nations High Commissioner for Refugees
UNSD	United Nations Statistics Division
USA	United States of America
USD	United States of America Dollar
USGS	Unites States Geological Survey
WAVES	Wealth Accounting and Valuation of Ecosystem Services
WCMC	World Conservation Monitoring Centre
WRI	World Resources Institute

Preface

It is with great pleasure that we present this publication, resulting from the discussions and written contributions to the *4th Forum on Natural Capital Accounting for Better Policy Decisions*, held in Kampala, Uganda, from 18-19th November 2019. The publication follows on from the publications of the previous three fora in 2016, 2017 and 2018.

The 4th Policy Forum brought together users and producers of natural capital accounts for the fourth time, the first time outside of Europe. This Forum brought together the natural capital accounting (NCA) community with policy-makers and experts involved in integrated land management (ILM).

In total, over 100 high-level participants from many organizations came to Kampala to understand how natural capital accounting is used in government and business decision making, with a focus on the complex field of decentralized, landscape-level decisions. The 4th Policy Forum provided a platform for lesson sharing and for identifying ways to improve decision-making in ILM through natural capital accounting (NCA).

The Forum was followed by a special meeting addressing Africa's developers and users of natural capital accounting and ecosystem services, exploring in particular what could be achieved by forging an African community of practice on the policy use of NCA.

Executive summary

The fourth Forum on Natural Capital Accounting for Better Policy Decisions met against the backdrop of alarming evidence that natural resources are under considerable pressure. Earlier in 2019, the Global Assessment Report on Biodiversity and Ecosystem Services and the IPCC Report on Climate Change and Land had identified dramatic changes in land use as having the most negative impacts on nature. These reports had given rise to policy and media debates on a 'nature emergency' and calls for more integrated ways to manage landscapes under growing pressure. The theme for this year's Forum was therefore very timely – *measuring and valuing natural capital for improved landscape management*.

The Forum was co-organized by the World Bank, United Nations Statistics Division (UNSD), the Government of Netherlands, and the Government of Uganda, and was held in Kampala on 18 and 19 November 2019. It brought together over 100 high-level participants including government representatives from developing and developed countries, as well as organizations working on Natural Capital Accounting (NCA), environmental and economic policy, and sustainable landscape management. The Forum explored the benefits of bringing Integrated Landscape Management (ILM) and NCA, and options for combining their significant potentials. To enable a rich discussion, a background paper on NCA and ILM by P BL (the Netherlands Environmental Assessment Agency) was circulated before the Forum (Chapter 2 in this report), along with a paper by the World Bank reflecting on the use and potential of NCA in its many landscape projects (Chapter 3).

Mr. Ephraim Kamuntu, Minister of Tourism, Wildlife and Antiquities of Uganda opened the Forum emphasizing how the need in every country has never been more urgent for clear direction and solid metrics to understand the drivers of change across land uses, and to make better informed decisions on policy and investments. He noted how the many and diverse participants in the Forum *"demonstrate the growing interest in Natural Capital Accounting and how it can inform policy and sustainable management of our natural resources, leading to sustainable development.''*

Participants were excited by the possibilities of combining NCA and ILM to improve national and landscape-level decision-making. Although both NCA and ILM are relatively new concepts, each embraces the multiple factors that drive change, and so can inform critical trade-off decisions. This accords them high potential to combine in having real operational impact – something that had not been explored before this Forum. Participants discussed how NCA and ILM together would result in better achievement and reporting of international goals such as the Bonn Challenge, Paris Agreement on Climate Change, and post-2020 Global Biodiversity Framework.

Two keynote presentations opened the discussions. In her keynote on national wealth and the role of natural capital, Glenn-Marie Lange of the World Bank explored NCA. She urged participants to look beyond the numbers produced by NCA: *"NCA doesn't just come up with values. It allows us to know who will be affected – who are the losers, and who are the winners. It also can help to identify the interventions needed for reform."* Tim Christophersen of UN Environment in his keynote on landscape policy issues and approaches said "*We are not managing our landscapes well. NCA can enable us to measure both short- and long-term costs of value creation, value extraction, and value destruction in the landscape. This helps us to propose better solutions to mitigate landscape degradation*."

To figure out how NCA and ILM could work together in a country context, it is important to understand the comparative advantages of each, and what it takes to implement them. The Forum heard from experts on innovative modelling, planning and accounting methodologies involved in land use, and how of these many approaches can reinforce each other and influence the machinery of government, improving 'vertical' links between national and local levels as well as 'horizontal' links between the factors that shape landscapes, and between the stakeholders involved.

It was recognized that ILM and NCA had many similarities – both being science-based, with a great emphasis on data quality, and supporting holistic cross-departmental integration, and focused on balancing environmental and economic factors. Both ILM and NCA had developed 10 principles which are different but highly compatible. But there are distinctions, too. Participants found that NCA provides a highly structured approach that delivers consistent, comparable information on a regular basis, helping to track trends in natural capital and its use, using an agreed international statistical standard: the System of Environmental-Economic Accounting (SEEA) adopted by the UN Statistical Commission. ILM was found to be a flexible, decentralized, participatory tool, which can be adapted to inform a highly specific decision or intervention. Likening the emerging relationship of the standardized NCA system with the relatively adaptive ILM approach to a new 'courtship', presenters asserted that NCA and ILM are complementary, and that a well-prepared 'marriage' of the two mechanisms could be mutually beneficial.

The second day saw presentations from countries around the world, which offered glimpses of how the relationship can work. Several countries are using NCA in decision-making for landscape government and management. For example, in Guatemala, forest and ecosystem services accounts are important for identifying those forest areas that justify investment in restoration. In South Africa, the new national land and ecosystem accounts are beginning to inform a much more integrated approach to land management. In Madagascar, data from accounts produced under the WAVES program were used in a model to design ILM interventions in a major sustainable landscape program PADAP (*Projet Agriculture Durable par une Approche Paysage*).

The meeting concluded that there is growing demand in many countries for the integrated landscape management that ILM can provide – to ensure good governance in practice. There is also increasing demand for solid, regular integrated data on natural assets with standardized metrics that NCA can provide, to enable evidence-based decisions. It also recognized the potential to draw these demands together: both ILM and NCA have evolved, if separately to date, to meet the pressing need for people and nature to thrive together. Participants identified many ways for ILM and NCA communities to combine forces, from local to international levels. These included:

- Expanding the network established by this conference, so as to continue sharing experiences and learning on NCA and ILM
- Explaining NCA to the ILM community and vice versa, to clarify their separate and joint potentials
- Creating a shared vocabulary and data protocols to enable joint work
- Preparing and sharing success stories of accounting for landscape governance and management that will inspire countries
- Educating decision-makers on how ILM and NCA can work together, encouraging joint projects
- Running joint pilot projects to establish proof of concept, using existing data and modelling tools
- Developing capacity especially at the local level to realize the potentials in practice

A potential joint work plan was drafted drawing on the above. It was noted that the work should inform several events and campaigns coming up in 2020-21, such as COP 15 of the Convention on Biological Diversity (CBD) in 2020, the UN Decade on ecosystem restoration, the Decade of SDGs, IUCN World Conservation Congress, and UN Ocean Conference. Although now postponed due to the COVID19 pandemic, all of them provide opportunities to explore and promote the use of NCA and ILM approaches separately and together. The day following the Forum, excellent progress was soon made on one way to tackle several of the identified needs for action: an African Community of Practice on NCA was set up (see Chapter 4).

The Fourth Forum on Natural Capital Accounting for Better Policy was filled with ample opportunities to explore, learn, and leave inspired. Participants looked forward to the follow-up work and to a potential Fifth Forum, which is tentatively timed for early 2021.

1. Report of the 4th Forum on Natural Capital Accounting for Better Policy Decisions

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1.1 Introduction

On the 18th and 19th of November 2019 in Kampala, Uganda, The World Bank, United Nations Statistical Division (UNSD), Government of The Netherlands, and the Government of Uganda co-hosted the *4th Policy Forum on Natural Capital Accounting for Better Policy*[1]. This report briefly explains the background to the forum, presents the main findings of the presentations and discussions in each session, and summarizes the main messages and recommendations of the Forum.

1.1.1 Background

The 4th NCA Policy Forum built on the success of the previous three Policy Forums, held in November 2016, 2017 and 2018.

The 4th Forum brought together organizations and governments from around the world with the land management community to assess how integrated land management (ILM) could best be addressed and indeed improved through the development and use of natural capital accounts (NCA). The Forum recognized a range of international and national initiatives all seeking to improve decision making by mainstreaming consideration of natural capital in government, business and communities.

During the two-day meeting, participants shared knowledge and experiences, exploring how NCA and complementary natural capital approaches can contribute to land management and its local benefits, while also assisting with global issues such as biodiversity conservation, and climate change prevention and mitigation. As per the previous three Policy Fora, the topics for discussion were identified by account producers and users in advance of the meeting – very much a demand-driven approach. Each of the first three Policy Fora had raised the challenge of how NCA could expand its utility beyond informing national decisions to better inform critical spatial and other distributional decisions. Discussions had pointed to the landscape as an appropriate decentralized level where data and decisions could be brought together. For

[1] See the webpage of the 4th Forum on Natural Capital Accounting for Better Policy

the 4th Policy Forum, participants wished to make this a real focus: exploring how NCA production, analysis and communication of results can better recognize and inform landscape management issues, spanning local to national levels. It also sought to explore how governments and other actors working on NCA and ILM could benefit from collaborating more.

Before moving to the deliberations and conclusions of the 4th Forum, it is worthwhile revisiting the main findings of the 1st, 2nd and 3rd Policy Fora.

The 1st Policy Forum was hosted by the Government of the Netherlands and The World Bank WAVES program in 2016. It focused on how NCA can improve public policy. A highly collaborative spirit was evident among the 41 participants who worked towards the 'ten living principles of policy-fit NCA' that cover both 'supply-side' and 'demand-side' measures. The papers, presentations and discussions on what NCA has achieved in 12 countries and globally, were edited and published[2]. The key conclusions of the 1st Policy Forum were:

- NCA helps the whole policy cycle – analysis, dialogue, decision-making and implementation, and not just the monitoring that has been the dominant public policy use of NCA to date.
- There are good cases of NCA influencing policy decisions in countries rich and poor alike.
- More needs to be done to link NCA producers with a wide range of policy users.

The 2nd Policy Forum was held in 2017, again in the Netherlands, and focused on how businesses and organizations, as well as governments, could use NCA for achieving the UN Sustainable Development Goals (SDGs). More co-hosts joined the WAVES program and Government of the Netherlands – the United Nations Statistical Division (UNSD), Gesellschaft für Internationale Zusammenarbeit (GIZ, the German development agency) and the Natural Capital Coalition. Sixty participants came from 20 countries and included NCA users and producers from various sectors. The papers and discussion were published in two volumes[3,4], with key takeaways being:

- NCA is well suited for both monitoring and implementing of many of the SDGs
- Businesses and governments alike need credible and trusted information to support their increasing needs for holistic decision making
- Several countries and business are using NCA to help manage or monitor holistic challenges like green growth, development strategies, environmental risks (e.g. flooding) and land use planning

[2] See Policy Forum on Natural Capital Accounting for Better Policy Decisions: Taking Stock and Moving Forward

[3] See 2nd Policy Forum on Natural Capital Accounting for Better Policy Decisions: Applications for Sustainable Development (Part 1 - Takeaways).

[4] See 2nd Policy Forum on Natural Capital Accounting for Better Policy Decisions: Applications for Sustainable Development (Part 2 – Case Studies).

The 3rd Policy Forum was a core part of the 'Natural Capital Week' held in Paris, France in November 2018. The Forum again successfully brought together people from a diversity of countries and backgrounds to share experiences with NCA. This Forum's focus was how NCA can better employed to improve government and business decisions in two urgent, multi-faceted endeavors: biodiversity conservation and climate change mitigation and adaptation. Key issues arising were the needs to:

- Better align the approaches to NCA among public and private sectors, while understanding the different roles NCA plays in, for example, internally-focused business decision-making *versus* public reporting
- Develop a shared narrative about natural capital and NCA in particular, and cataloguing the case studies available for demonstrating how NCA is best used in management, planning and target setting
- Ensure access to the data needed to build accounts as well as processes for assuring data quality

Progress in these areas is particularly important for continuing to improve trust and understanding between account producers and account users and to inform their respective procedures – all of which should result in greater use of NCA. Encouraging links between NCA and international agreements of climate change, biodiversity conservation and sustainable development will be increasingly important, especially given the 2020 reform of global biodiversity targets. The papers and presentations prepared on climate change and biodiversity conservation were very well received and were included in the proceedings of the 3rd Policy Forum[5].

1.1.2 Objectives and organization of the 4th Policy Forum

Each of the three previous Policy Fora had raised the tough challenge of national level NCA informing critical local decisions about natural capital use and trade-offs between localities and user/producer groups. In 2019, the Global Assessment Report on Biodiversity and Ecosystem Services and the IPCC Report on Climate Change and Land subsequently pointed to land use change having the largest negative impacts on nature. It was also clear, through activities of the Global Landscapes Forum and others, that a community of practice in sustainable and ILM was both gaining policy attention and in need of the kind of information that NCA can provide. In consultation with Forum participants, the organizing committee therefore decided to make landscape level decisions the focus of the 4th Policy Forum, with the objective to explore how NCA and ILM can work together to improve landscape management and governance, in ways which also accelerate progress in national and international policy agendas

[5] See the publication Natural capital accounting for better policy decisions: climate change and biodiversity

Similar to previous fora, the approach taken at the 4th Policy Forum involved:

- NCA users and producers sharing case studies, challenges and ideas for 'policy-fit' NCA that works at the landscape level.
- Identifying how NCA can support ILM planning, implementation and monitoring
- Combining the learnings of governments, international bodies, non-government organizations, academia and others to advance a common agenda between ILM and NCA
- Discussing future collaboration, including a 5th Forum

The 4th Policy Forum was organized into eight sessions, which explored a combination of conceptual, policy and practical issues, from a range of perspectives, local through to national and international. Each session had time for questions and facilitated discussions. The sessions were:

- Session 1. Welcome, objectives of 2019 Forum, recap of 2018 Forum, agenda orientation and introductions
- Session 2. Linking growing national wealth and Integrated Landscape Management
- Session 3. Landscape policy challenges and potentials – protecting, restoring and sustainably managing landscapes
- Session 4. NCA informing landscape policy and governance – sharing news and learning from 'stories of change'
- Session 5. Methodologies – how combining NCA and ILM approaches and methods can meet the landscape policy challenges
- Session 6. Country reflections on the Forum discussion so far
- Session 7. Expanding and accelerating the application of NCA and continued interaction with ILM
- Session 8. Forum messages and next steps

The complete agenda of the 4th Policy Forum can be found in Appendix 1.1 and is also available online with links to presentations[6]. Two background papers were prepared in advance of the 4th Policy Forum and made available on the Forum webpage:

- *Integrated Landscape Management and Natural Capital Accounting: Working Together for Sustainable Development,* by the Netherlands Environment Agency, PBL[7]
- *World Bank Landscape Projects: What Role for Natural Capital Accounting?* by Stefano Pagiola of the World Bank[8]

[6] See 3rd Policy Forum website linked here
[7] See PBL paper is linked here
[8] See World Bank is paper linked here

These papers were updated substantially following the discussions at the Forum and these updated versions are included as Chapters 2 and 3 of this publication.

Participants to the 4th Policy Forum included government representatives from developing and developed countries, as well as a range of professionals from organizations working on NCA, environmental-economic policy, and sustainable or integrated landscape management. The participants are listed in Appendix 1.2.

Summaries of the sessions follow in sections 1.2-1.9.

1.2 Welcome, objectives of 2019 Forum, recap of 2018 Forum, agenda orientation and introductions

Welcoming remarks by the co-organizing agencies emphasized how the 4th Forum on Natural Capital Accounting for Better Policy was taking place against the backdrop of alarming evidence that natural resources are under considerable strain. Earlier in 2019, the IPBES Global Assessment Report on Biodiversity and Ecosystem Services[9] and the IPCC Report on Climate Change and Land[10] had pointed to land use change as having the largest negative impacts on nature. How to manage land use change is a complex problem, spanning social, economic and environmental issues and demanding ways to find and integrate information from these realms. The facilitator, Steve Bass, recalled how previous NCA Policy Fora had identified how some of the biggest challenges facing environments and people are intensely local in nature and are best viewed and tackled at the landscape level. It was therefore timely to bring together the NCA community with the ILM community for its first 'encounter' on how landscape level governance and management could be improved through NCA.

In formally opening the Forum and welcoming participants, Mr. Ephraim Kamuntu, Minister of Tourism, Wildlife and Antiquities of Uganda, emphasized the shared sense of urgency and commitment:

> "There are over 100 delegates representing various governments and institutions from countries around the world present here today. This demonstrates the growing interest in the concept of Natural Capital Accounting and how it can in turn inform policy and sustainable management of our natural resources leading to sustainable development. (…) I therefore want to reaffirm the Government of Uganda's determination to take the lead in measuring our country's Natural Capital extent, condition and function; and in turn using these results to inform policy at every level.

[9] Report linked here
[10] Report linked here

> We will also continue to work in partnership with agencies and countries, share experiences and learn from each other. This conference presents an important platform to do that.''[11]

Raffaello Cervigni from the World Bank's WAVES and GPS programs and Alessandra Alfieri from UNSD set the scene for discussions at the 4th Forum, highlightingthe need for countries and international agencies to work together to promote NCA to achieve sustainable development. Raffaello Cervigni showed how NCA had gone from being a specialist program, WAVES, to now being embedded in the broader work of the World Bank under the Global Program for Sustainability (GPS). Alessandra Alfieri stressed how NCA had gone from being trialed in a few countries at the margins of national environmental monitoring to now an agreed international standard which was routinely being used to make key decisions in around 70 countries.

1.3 Linking growing national wealth and integrated landscape management

The objective of Session 2 was to ensure that participants were aware of, and inspired by, two key concepts for achieving sustainable development:

- National wealth and natural capital
- Landscape policy and management.

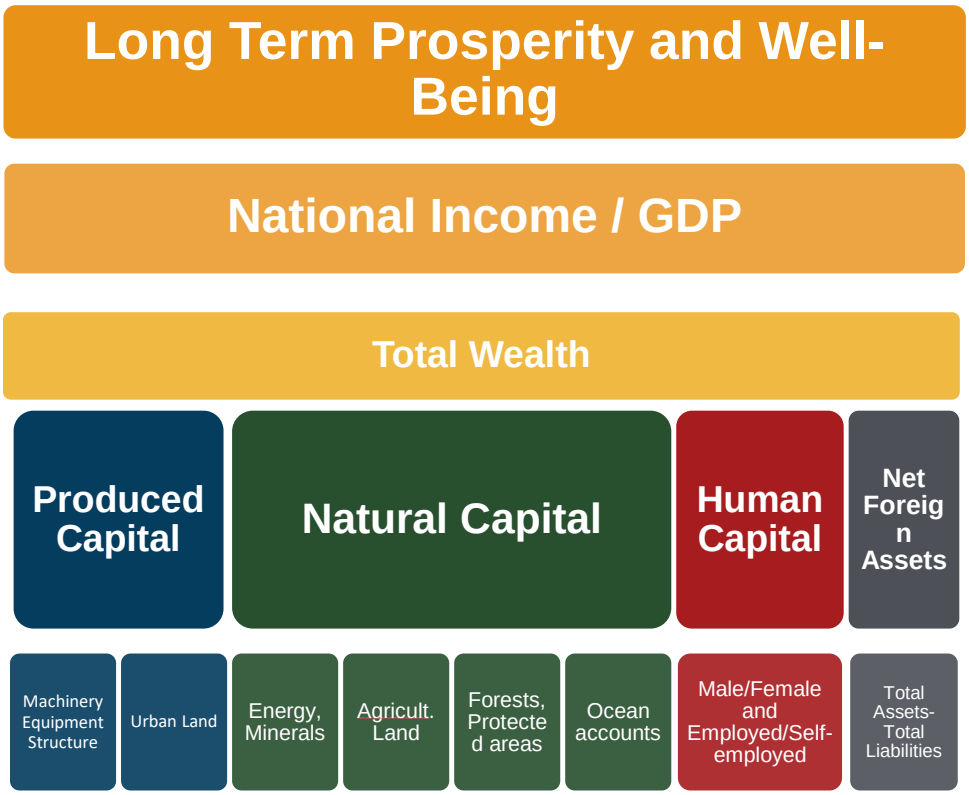
To achieve these objectives two presentations were made and discussed. The first was by Glenn-Marie Lange from The World Bank and lead author of Accounting for the Wealth of the Nations[12], and the second by Tim Christophersen, the Head of the Freshwater, Land and Climate Branch of the UN Environment Program.

National wealth: Glenn-Marie Lange's presentation showed how much natural capital contributes to the total wealth of nations and, in turn, how wealth relates to national income (or GDP) and to long-term prosperity and wellbeing (Figure 1.1). She went on to identify areas where better information from accounts could help to manage the macroeconomy, including adapting to the risks of climate change and the loss of biodiversity and associated ecosystem services. The target audience for the national level wealth accounting and NCA were usually the Ministries of Finance, Planning or Public Works and the accounts enable these ministries to assess priorities, model expected benefits of changes, and identify the costs of management reform. All of this helps to identify the possible trade-offs associated with different decisions. It particular, NCA would answer questions about natural resources such as:

[11] See Opening remarks at the opening of the 4th Forum on Natural Capital Accounting for Better Policy
[12] See The Changing Wealth of Nations 2018

- How much government revenue is lost through poor natural capital management?
- How much government revenue could be increased through better management?
- How would jobs and private profits increase with better management?
- Can the fiscal cost of natural disasters be reduced through better management or restoration of natural capital in combination with built infrastructure?

Figure 1.1: Relationship of natural capital to total wealth, national income and long-term prosperity



Source: Glenn-Marie Lange's presentation[13]

Importantly, subnational and spatially referenced accounts would allow trade-offs between different areas to be assessed, allowing for locally-specific management and investment decisions. Thus, NCA can help governments to move from the simple 'general case for environment' – which rarely elicits policy action – to knowing with greater certainty where and how to change things for the better.

[13] See Landscapes and the Changing Wealth of Nations Nov 2019 v2.pdf

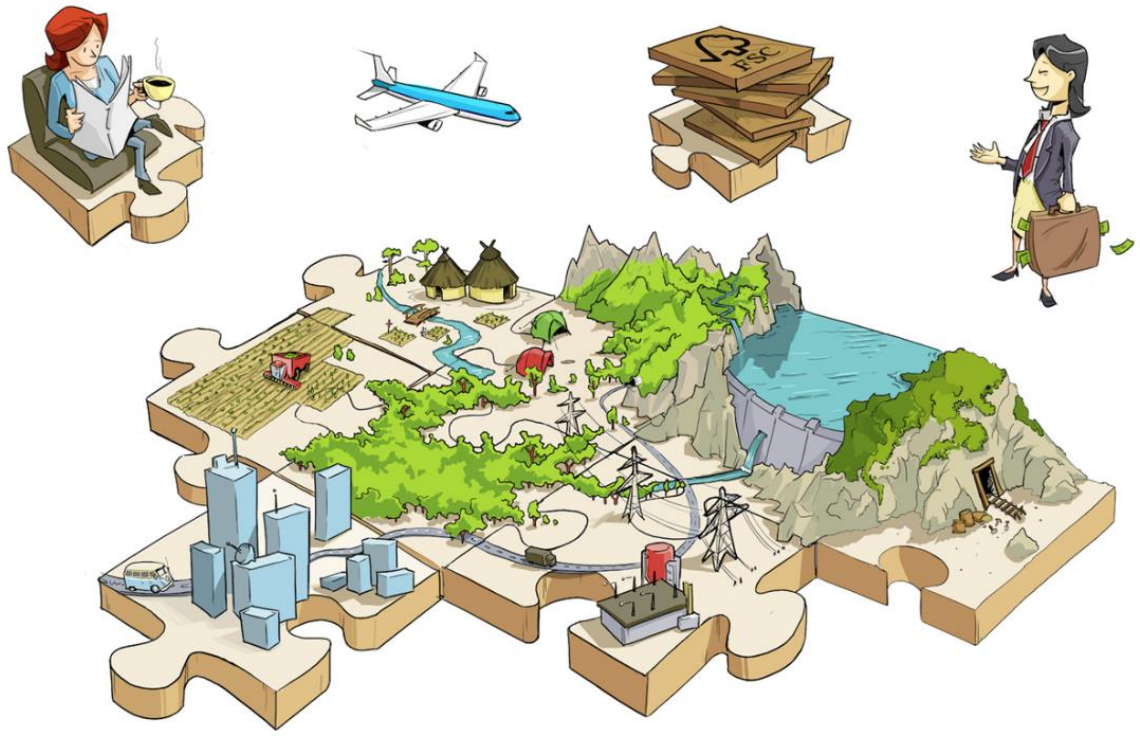
On a practical level, Dr Lange noted that the information used for building national level NCA usually came from lower levels, often from remotely-sensed data for small grid cells. As such, some of the existing information used for national NCA for land and ecosystems could also support subnational NCA and hence better support local level management decisions and investment. This approach would apply to both terrestrial and marine areas. Dr Lange used mangrovesand forests as examples to show the benefits from these ecosystems in terms of ecosystems services, from which asset values could be calculated[14,15].

Landscape policy and management: Tim Christophersen presented perspectives on the multiple values of the landscape. He began by addressing the question: what is a landscape? He showed a series of slides that pieced together different types of areas, using the analogy of a jigsaw puzzle, where different areas were subject to different degrees of influence by people both within and outside those areas, all of whom interact with different parts of the landscape in a variety of ways (Figure 1.2). Decisions about the use and management of the landscape are therefore something that needs to involve all stakeholders. He then went on to reflect on the 10 principles of a landscape approach identified by Sayre et al. (2013)[16], described in Chapter 2 of this publication (see Table 2.4), and how these principles and information from the SEEA could support decision making. The 2019 IPPC Special Report on Climate Change and Land [17] was recommended as an excellent starting point for understanding landscapes and their management.

Dr Christophersen provided examples of value creation, extraction and destruction in the landscape. He noted (with examples) that activities such as agriculture create a lot of economic activity and use a variety of ecosystem services in their production. They contribute to GDP but many also generate externalities that destroy value in the landscape. They are usually not accounted for and consequently long-term economic consequences are generally ignored. In contrast, the benefit-cost ratio of investing in landscape restoration can be high. In a similar vein, the ecosystem accounts for Uganda[18] were also presented by Dr Christophersen with examples of how and they could be applied to inform wildlife tourism.

[14] See Beck et al. 2018. The Global Value of Mangroves for Risk Reduction, The Nature Conservancy, Berlin
[15] Based on data from https://datacatalog.worldbank.org/dataset/wealth-accounting
[16] Sayer et al. (2013). "Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses." Proceedings of the National Academy of Sciences 110(21): 8349.
[17] See IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. https://www.ipcc.ch/srccl/
[18] UNEP-WCMC and IDEEA (2017). Experimental Ecosystem Accounts for Uganda. www.wcmc.io/0524

Figure 1.2: **Landscapes as a 'jigsaw puzzle' with diverse people interacting with different parts of the landscape in a variety of ways**



Source: Tim Christophersen's presentation to 4th Policy Forum[19]

A key message from Dr Christophersen was that 'business as usual' will not work and would not achieve the Sustainable Development Goals, Paris 2015 Targets on Climate Change, Bonn Challenge on rehabilitation of degraded land, the New Declaration on Forests which aims at halting tropical forest deforestation, or the Aichi Targets on biodiversity conservation.

Financing was identified as key barrier to change. Four initiatives aiming to overcome this barrier were highlighted in the presentation:

- Tropical Landscapes Finance Facility (TLFF). UNEP, BNP Paribas and ADM Capital are lending money and providing technical assistance to support sustainable agriculture production and reduce deforestation in Indonesia.[20]
- AGRI13 Fund. Coordinated by UN Environment and Rabobank, this fund is providing loans, technical assistance and other de-risking instruments to support sustainable agriculture investments

[19] See Tim Christophersen's presentation "Values in the landscape"
[20] See the video linked here

- Green Impact Facility of the FAO and UN Environment, which is providing equity investment and technical assistance to smallholder organizations to stimulate deforestation-free commodity production
- UNEP Land Use Finance Initiative, is a partnership between UNEP and the global financial sector to mobilize private sector finance for sustainable development[21] (e.g. the Financing Sustainable Land Use for People and Planet, a project which aims to unlock private finance for sustainable commodity production and to improve rural livelihoods, protect forests and restore degraded land[22])

In addition to these, a range of other resources and tools for supporting integrated land management were identified by Dr Christophersen[23]. Dr Christophersen noted that each of these initiatives requires a comprehensive range of information provided in regular and standardized ways, to make the case for investment and to account for results – such as NCA can provide. He concluded by examining how a transformation to sustainable landscape management could be achieved:

- Focus on long-term societal gain and not only the short-term private profits that tend to dominate landscape level decisions
- Reflect the gains (or losses) better in national accounting and fiscal policies
- Ensure monitoring of key indicators for success in the landscape: (1) soil organic carbon; (2) farmer income and health; (3) biodiversity; (4) water quantity and quality
- Channel public and private funds into regenerative agriculture and ecosystem restoration
- Create an enabling environment to induce demand for sustainably produced commodities – notably reform of agricultural fiscal and trade policies
- Effectively communicate successful finance model "blueprints" to mainstream finance and agribusiness sectors
- Develop and offer an environmental and social impact framework consistent with the above, with monitoring and evaluation KPIs & procedures that can be adopted by government and industry alike

The two keynote addresses were commented on by the discussant, Mike Nsereku from the National Environmental Management Authority (NEMA) of Uganda. He noted that more than 70% of people in Uganda work intimately at landscape level and depend on agricultural production. In large part as a consequence, both forest cover has halved from 24% to 12% wetlands have halved from 18% to 9% between 1990 and 2015. The lack of awareness of the full values of forests and wetlands at farmer level means that the natural capital is not well

[21] See report linked here
[22] See report linke here
[23] See TEEB Agri-Food; IBAT – Integrated Biodiversity Assessment Tool; Global Partnership on Forest and Landscape Restoration; UN Decade on Ecosystem Restoration 2021-2030, and; The Economics of Land Degradation

used. Neither are the values or losses well-factored into agricultural policy decisions. However, to combat the loss of forest and wetland a new National Environment Act 2019 was put in place, which addresses wider values such as effects of climate change, and which allows for NCA. The provisions of the new Act have real potential to be reflected in new biodiversity conservation laws and the new National Development Plan III.

In conclusion, participants agreed that there are also practical opportunities for ILM and NCA to inform decision making at international levels. In 2020, there are several meetings of international parties for various agreements where the integration of ILM and NCA approaches could be promoted by many of the participants: Sustainable Development Goals, Paris 2015 Targets on Climate Change, Bonn Challenge on rehabilitation of degraded land, the New Declaration on Forests and the Aichi Targets.

1.4 Landscape policy challenges and potentials – protecting, restoring and sustainably managing landscapes

The aim of the 3rd session was to increase:

- Shared understanding of landscape policy challenges and opportunities
- Mutual understanding of ILM and NCA communities – why NCA and why ILM (and to raise the idea that combining ILM and NCA can help)

Dr Glenn-Marie Lange from the World Bank facilitated the session, which comprised two presentations and a panel discussion. The presentations were:

- *"Landscapes as a focus for integrating many objectives, actors and systems"*[24] presented by Johan Meijer and Ezra Berkhout (PBL via video link), supported by Michael Vardon (ANU) who was in the room.
- *"NCA and Landscapes"*[25] presented by Stefano Pagiola (World Bank)

The subsequent discussion was kicked off by an expert panel consisting of Luther Anakur (IUCN), Mao Amis (African Centre for a Green Economy) and Rosimeiry Portela (Conservation International).

Johan Meijer and Ezra Berkout (PBL) began by suggesting that NCA and ILM could join in a useful marriage of experiences and ideas but they first needed to understand each other. Landscape management is about identifying and making trade-offs and recognizing that, while we need to deliver development, this cannot be at the expense of the environment. NCA is about systematizing and regularly presenting information. To achieve landscape management

[24] See Chapter 2 of this publication for the full paper prepared for the 4th Policy Forum
[25] See Chapter 3 of this publication for the full paper prepared for the 4th Policy Forum

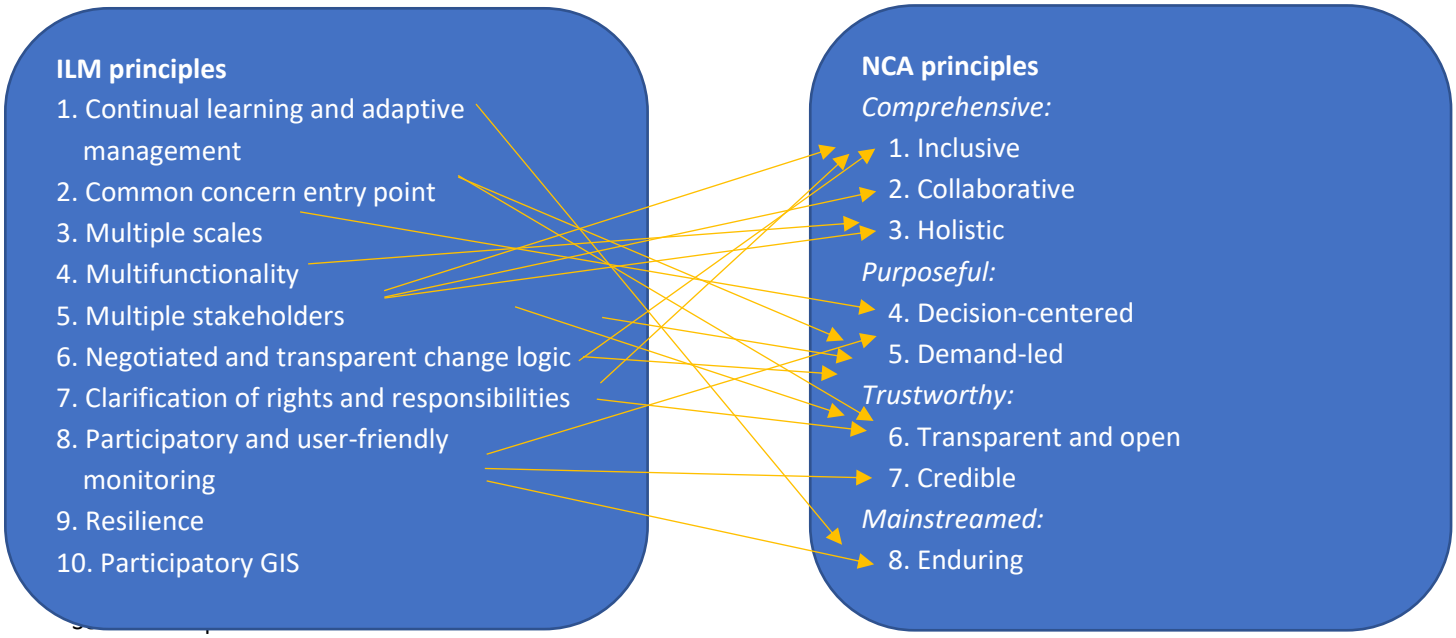
we need to mainstream the environment and biodiversity into economic production and consumption processes and planning and NCA can help with this.

To better understand how ILM and NCA can be used together to help decision makers, PBL reviewed range of material, and a series of interviews of experts was conducted. This is reported more fully in Chapter 2 of this document. In brief, the main findings reported to the 4th Policy Forum were:

1. **Limited understanding and awareness of each concept in both communities**: NCA in general is not well-known, if at all, by many people in the ILM community. A typical view was that NCA was mainly about economics, putting a price on nature and was missing the spatial context or the data was too aggregated to be useful. Similarly, ILM was not known by many in the NCA community but when learning of its use of data in decision-making processes was of great interest
2. **Activities and research that is undertaken in ILM can be related to accounting**: This includes the estimation of ecosystem services as well as their measurement and monitoring
3. **There are benefits of bringing ILM and NCA closer together:** Bringing natural capital more rigorously into monitoring frameworks would help assess progress with landscape management and development, and provide an opportunity to make landscape-related plans more coherent (e.g. between sectors and levels of government), better linking economic and environmental data as well as providing trusted information to all including financiers potentially interested in landscape restoration.

That NCA can reveal trade-offs at various landscape levels was seen as a key benefit. The accounts can help identify to the impact of different decisions: who wins, what they win, where they win, and when they win. Such information would greatly assist ILM. It was also noted that, while both ILM and NCA are relatively new, each had grown out of other established fields. Both had also evolved to consolidate information, and both had recently developed “10 Principles” for their application. These principles have been mapped and there are many direct correspondences between the two sets of principles that point to clear roles for NCA in landscape-level decisions (Figure 1.3; also see Chapter 2 and Table 2.4).

Figure 1.3: Relationships between the 10 principles of ILM and NCA



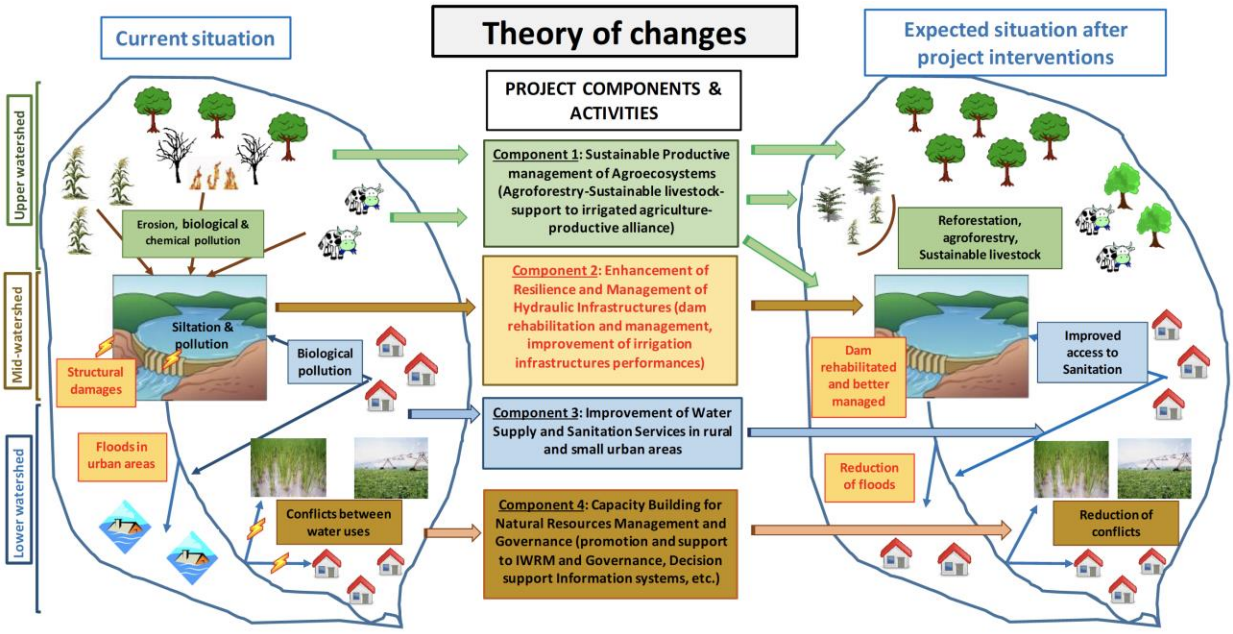
Stefano Pagiola's presentation turned attention from the policy level to the project level. He presented a stocktake of the World Bank's diverse portfolio of landscape projects and introduced how NCA could contribute to them and this is outlined more fully in Chapter 3. In the presentation, he noted that there was no formal World Bank definition of landscape projects, but that such projects are generally based on ideas of multiple land uses, having effects on spatial areas outside of the project area as well as within, and interactions with non-land use activities (e.g. transport, land tenure reform, poverty alleviation).

The number of World Bank projects with "landscape" in their title had increased greatly since 2010. In addition, donor funds for such work had increased by 3- or 4-fold over last decade. The majority of the projects were in Africa, at least in terms of financial commitments.

A typical Theory of Change for landscape projects was presented, using an example from the Dominican Republic (Figure 1.4). The theory addressed multiple objectives, including the objective of recognizing ecosystem services. Ecosystem services related to water supply, flood prevention, climate regulation, biodiversity conservation and improving agricultural sustainability were highlighted.

Stefano Pagiola emphasized the role of NCA in identifying beneficiaries – in landscape projects, identifying who benefits and who loses is key and can help to make the case for investment. Thus, NCA can help with landscape project design and reveal trade-offs between different groups of people and different areas.

Figure 1.4: Theory of change used in landscape projects



Source: Stefano Pagiola's presentation (after Dominican Republic Resilient Agriculture and Integrated Water Resources Management, P163260).

NCA can also assist with the organization of data in transparent and consistent ways and thus play an important role in improving both coverage and rigor of project monitoring and evaluation. At present, landscape projects often rely on *ad hoc* data, using secondary data sources and/or indirect techniques such as benefits transfer. While NCA could potentially deliver a richer set of data for landscape management in more consistent ways, at present there is little direct input of NCA into landscape projects.

It was stressed that spatially disaggregated data was needed for NCA to make a real difference to landscape-level decisions. For these decisions, various spatial models and procedures are employed. Test plots and detailed sampling at landscape level can help to better calibrate the models and estimation procedures used for compiling NCA. This could be done at a low cost as an integral part of landscape projects if designed into the projects at the beginning.

The stocktake also highlighted issues of taking data at face value. An example of a national estimate of watershed protection values in Laos was given. Here, a national average value was provided but it was based on a simple average of two very different locations, between which the value varied substantially. How representative these two sites were of the national situation is not known and hence scaling up the estimate is problematic.

A lively panel discussion then proceeded involving Luther Anakur, IUCN; Mao Amis, African Centre for a Green Economy; and Rosimeiry Portela, Conservation International. The facilitator, Glenn-Marie Lange, kicked off with the question: *What is it that the NCA approach can bring to the ILM and vice versa?*

Five key findings from the panel's responses and subsequent discussion were:

1. **ILM and NCA have common interests in data quality**: Both require systematic approaches to data collection and presentation. Both have been held back by poor data quality and *ad hoc* approaches to data collection and presentation. A joint data protocol for NCA that works at landscape level could be a helpful way forward: with clearer nomenclature, use of standard classifications and data quality assessment procedures, more usable data would be available for both ILM and NCA. Data from local ILM projects could be used to calibrate models for estimating values in NCA at higher levels.
2. **Consistent and credible monetary valuation is important:** At present a variety of approaches is used in ILM and NCA to value ecosystem assets and services. This makes comparisons between different initiatives problematic. A process of standardization is underway via the SEEA. Standard valuation approaches would make comparisons easier – as well as enabling economic instruments to more effectively operate across national borders.
3. **ILM can use NCA data to support planning, management and financing:** ILM can use NCA to standardize information, and then use this to prioritize investment decisions. For example, by identifying and defining the benefits of ILM to different groups of people and assessing the management changes needed to optimize the benefits. This includes objectives like meeting the Bonn Challenge target for ecosystem restoration as well as identifying downstream impacts (e.g. what happens to water quality when upstream catchments are converted from forests to agriculture?) and possible solutions. In the short term we need to identify policy priorities, and then the design of appropriate NCA to inform the policies.
4. **The process of developing and applying NCA to ILM would create links across different levels of government as well as between the public, private and NGO sectors**: By working together, both on the preparation of ILM plans and the production and analysis of NCA, people who do not usually meet would be brought together. This would help understanding between local land managers, those managing the national economy, and those responsible for international environment commitments. Over time, such interactions will help to institutionalize both ILM and NCA in the decision-making process of the different sectors and levels of government.
5. **Developing understanding and capacity for both ILM and NCA is needed across the broader community:** Both ILM and NCA are still in their infancy and need to be supported via appropriate initiatives. The UN and World Bank have both worked in these two complementary areas and this needs to continue in more concerted ways.

However, knowledge of ILM and NCA and their complementarities is limited in most governments as well as in the broader community. Countries and international organizations need to continue to promote ILM and NCA via appropriate media (including social media)

1.5 NCA informing landscape policy and governance – sharing practical experience

The goal of Session 4 was to inform participants of practical examples of development of NCA and its use in informing landscape policy and governance. The examples presented were chosen to reflect diverse examples of NCA improving landscape management.

Marko Javorsek, UNSD facilitated the session and the presenters were:

- Samuel Maango, Acting Director, National Remote Sensing Centre, Zambia[26]
- Mandy Driver, Senior Biodiversity Policy Advisor, SANBI, South Africa[27]
- Zhiyun Ouyang, Director, Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences, China[28]
- Ottoniel Monterroso, Director, IARNA, Guatemala[29]
- Peter Katanisa, former WAVES Adviser, government of Rwanda[30]
- Hannah Brooke, Relationships Director, Natural Capital Coalition[31]

In introducing the session, Marko Javorsek noted that ILM was a specific use of the accounts and hence represented a demand-side view of accounts, while NCA was a supply-side view, and it was important that these two views were brought together. How to achieve this was something he asked presenters and the audience to reflect on.

Each presenter provided an overview of the work in which they had been involved, which spanned the public, private and academic sectors.

South Africa's 'accounting for ecological infrastructure' identified the locations where investment in watersheds and other 'ecological infrastructure' would be a good complement to physical infrastructure – which in many places was compromised or could not deliver the necessary water security; this helped in setting up demonstration catchments. In a similar vein, *Guatemala* was able to highlight those landscapes that were most likely to be threatened by reduced water and food supply as a result of climate change. *China's* work resulted in defining 63 critical landscapes to protect so that the available ecosystem services would be optimized

[26] See the presentation linked here
[27] See the presentation linked here
[28] See the presentation linked here
[29] See the presentation linked here
[30] See the presentation linked here
[31] See the presentation linked here

(weighting ecological services availability by the size of the dependent population). *Rwanda's* land accounts also looked at population pressure and identified the best areas to resettle people. Finally, an increasing number of *businesses* have found the landscape level the most tangible level at which to identify a business' dependence on natural capital, and some are putting values on the business' relationship with it.

The main findings that emerged from subsequent plenary and table discussions in Session 4 were:

1. **Accounts can be produced with existing data and skills**: there is a range of data and expertise within countries that can be mobilized to generate accounts for particular resources. Land, forests and water accounts were the most common form of account produced that can inform ILM.
2. **Accounts should be linked to a country's needs for analysis and policy**: Forest and water management, climate change, agricultural and "green" investment are all priority areas where accounts could be used. However, the accounts are a starting point, not an end point, playing an important role in the assessment of opportunities and risks.
3. **NCA and ILM uses similar concepts**: each embraces a range of terms, which may differ in name, but may have a similar intent. For example, 'environmental assets' in NCA and 'ecological infrastructure' in ILM. Ecosystems services are common to both NCA and ILM.
4. **NCA and ILM can be linked**: at present there are some examples where this can be seen in practice (e.g. in China, Guatemala, Rwanda, South Africa and Zambia as well as in the private sector).
5. **There are some important technical issues to be resolved**: use of common classifications, access to data, appropriate valuation techniques and spatial boundaries for aggregated of information were recurring topics in need of attention.
6. **A range of institutional arrangements has been used in the development and production of accounts:** in all cases, cooperation between different agencies was essential. Government agencies for land, forests, water and statistics have worked together, with leadership or coordination provided by central agencies, such as ministries of planning.
7. **Developing capacity for ILM and NCA is needed, as well as advancing understanding of them in the broader community:** Both ILM and NCA are still in their infancy and need to be supported with appropriate initiatives. The UN and World Bank have both worked in these areas and their increasingly close cooperation is welcome and needs to continue. However, knowledge of ILM and NCA is limited in most governments as well as in the broader community. Countries and international organizations need to continue to promote ILM and NCA via appropriate media (including social media). As

part of this, some consideration needs to be given to finding common language and indicators, to encourage joint working.

1.6 Methodologies – how combining NCA and ILM approaches and methods can meet landscape policy challenges

Day 2 began with Session 5 which focused on methodologies, drawing on case studies. The goals of the session were:

- To increase mutual understanding of ILM and NCA communities about how NCA is done and how ILM is done. The two key questions were: (1) How is NCA established – with what process of production, data sources and methods, the types of analysis that accounts can be used for; the skills and expertise needed for account production and interpretation; and the enabling or disabling institutional environment? (2) How is it decided to use ILM – in what typical institutional environment and management context, and what are the skills, expertise, stakeholder engagement, and information sources are needed for implementation?
- To better understand the potential for the ILM and NCA communities to collaborate. For example, in particular areas (e.g. provinces within countries), land cover types (e.g. forests or farmland), industries and sectors

The facilitator Michael Vardon (ANU) introduced the five presenters. Their presentations followed, with time for questions and table discussions. The presentations were by:

- Ken Bagstad, US Geological Service[32]
- Sophie Kutegeka, IUCN Uganda[33]
- Fabi Randrianarisoa, National Commission for Science and Technology[34]
- Barakalla Robyn, Oceans & Climate Senior Program Lead, WRI Indonesia[35]
- Marko Javorsek, Statistician, UNSD[36]

The lead presentation by Ken Bagstad (USGS) offered an overview of methodologies and data used to inform landscape governance and management decisions. He noted that we are "living in golden age of data". However, while there is much data from a range of new sources, and in particular remotely sensed data, it takes a lot of work to turn these data into useable accounts.

[32] See the presentation linked here
[33] See the presentation linked here
[34] See the presentation linked here
[35] See the presentation linked here
[36] See the presentation linked here

The presentation focused on the biophysical data and modelling that is used to populate the kind of NCA that is likely to be useful for ILM.

Three key messages from the presentation were that: (1) models are always a simplification of reality; (2) there are many different types of models and; (3) you must choose models carefully to suit their purpose[37]. Understanding for what use models are to be employed is essential. The accounts can be useful for showing where you are, providing a baseline of information and the basis for projecting into the future.

A fourth key message was that models, and the accounts they are used to populate, can be:

- Good and cheap (but will not be fast to produce), or
- Fast and good (but will be expensive), or
- Cheap and fast (but unlikely to be good)

An appropriate model will incorporate local data and knowledge, represent physical and social processes and have good spatial resolution. The twin needs for spatial resolution and accuracy were recurrent themes in discussion. There is little point having a high level of spatial resolution if it lacks accuracy - and there are too many examples of remotely-sensed land cover data, which can provide information for 1,000s of km^2, but do not reflect the on-ground reality[38]. For example, remotely-sensed land cover data for country may tell you there is a forest in a particular $1km^2$ cell, but local on-ground field data tells you this cell is a banana plantation. Comparing multiple data sources and the results of different models should therefore be standard practice in pulling together NCA. Ideally the results of models should be calibrated with other data, including on-ground assessments. It was also noted that process-guided machine learning could increase the accuracy of modelling.

One use of spatial models is to help disaggregate national data. This can help us to understand trends within and across different areas and hence can help identify possible actions that can avert negative trends. Scenario modelling is a key part of this, helping to predict, for example, changes in availability of ecosystem services under different management regimes. A number of global ecosystem models are available, for example InVEST[39] and ARIES[40], which were both briefly discussed.

[37] E.g. Schroter et al. (2015). Lessons learned for spatial modeling of ecosystem services in sup- port of ecosystem accounting. Ecosystem Services, 13, 64–69. https: //doi.org/10.1016/j.ecoser.2014.07.003

[38] E.g.Eigenbrod et al 2010. The impact of proxy-based methods on mapping the distribution of ecosystem services. Journal of Applied EcologyVolume 47, Issue 2. https://doi.org/10.1111/j.1365-2664.2010.01777.x

[39] Chaplin-Kramer et al. 2019. Global modeling of nature's contributions to people. Science, 11 Oct 2019: Vol. 366, Issue 6462, pp. 255-258DOI: 10.1126/science.aaw3372

[40] See the ARIES website linked here

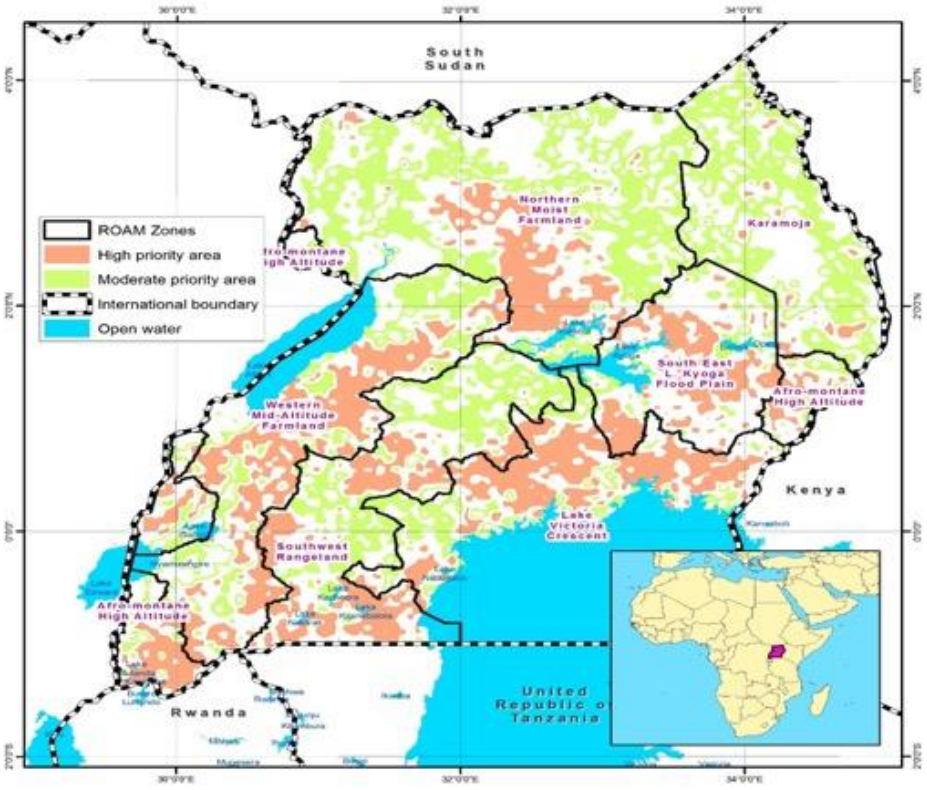
Expertise, times and resources for using the right models for ILM and NCA are in short supply. An online platform to allow collaborative modelling was suggested as one way to overcome this barrier. For not-for-profit organization the ARIES platform has open-source data and models and enable those producing NCA or undertaking ILM to connect with experts from across the world[41].

Four case studies were then presented, covering country experience of tools that could help linking NCA and ILM. The first of these was from Sophie Kutegeka (IUCN) who outlined the Restoration Opportunities Assessment Methodology (ROAM)[42] which is a framework for assessing national and subnational forest restoration potential, that was developed jointly by IUCN and WRI to meet the Bonn Challenge of restoring 150 million hectares of forest. An example was given of Uganda's commitment to restoring 2.5 million hectares of forest. The ROAM framework brings together people to identify, negotiate and implement activities for restoration and helps to answer questions about the ecological and economic feasibility of forest restoration within and outside of protected areas. A principal output of the ROAM process is a map of priority areas for 'Forest Restoration Landscapes' and such a map has been prepared for Uganda (Fig 1.5).

Fabi Randrianarisoa provided an overview of methodologies and data analysis for the Sustainable Landscape Management Plan in Madagascar which, among other things, aims to improve the management of natural resources, including forests, water and agriculture. For this, information and information systems, along with participation of people across sectors, are critical for an effective plan. For example, an assessment of land degradation mitigation options to improve downstream water availability used the national water accounts for Madagascar[43], prepared as part of the WAVES program, in the planning process. The water accounts were also used to calibrate other data sets. The information from the assessment done for the planning also identified erosion hotspots as well as the downstream beneficiaries from particular upstream land manage interventions (e.g. terracing of hills for irrigation and reforestation of harvested areas).

[41] See the website linked here
[42] See the website linked here
[43] See the presentation linked here

Figure 1.5: Map of priority areas for forest restoration in Uganda from the ROAM process

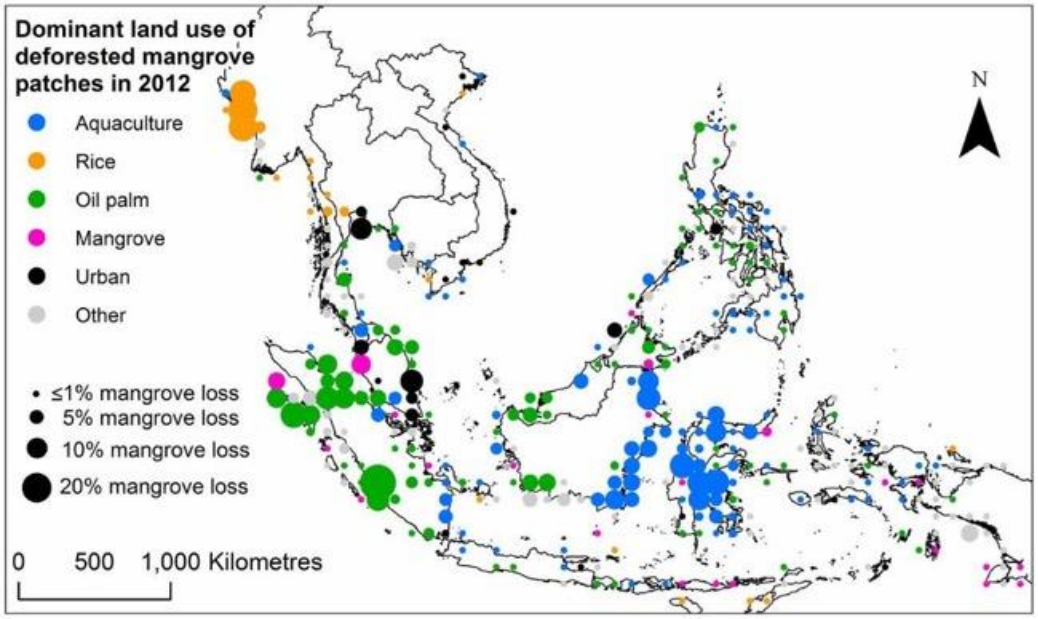


Source: Sophie Kutegeka (IUCN) presentation

Barakalla Robyn's (WRI) presentation on "Blue Carbon: Bridge between ocean and climate" drew attention to mangroves as having the highest carbon sequestration rates of all ecosystems and to Indonesia as having 22.6% of global mangrove extent. Until the "Blue Carbon" initiative, Indonesia had not been exploring the potential of mangroves to deliver this particular ecosystem service – although other ecosystem services from mangroves, such as storm protection and nurseries for fish were acknowledged.

The Blue Carbon project in Indonesia mapped the extent of mangroves using remoting sensing, backed by ground truthing, and identified the main land uses driving of mangrove loss (Fig. 1.6).

Figure 1.6: Land uses driving mangrove loss in Indonesia.



Source: Barakalla Robyn's presentation

The final presentation of Session 5 was by Marko Javorsek (UNSD), who outlined a guidance document on biophysical modelling that UNSD is developing, with a first draft due to be available by the end of 2020. The guidance on biophysical modelling is to be part of a series of guidance documents to support ecosystem accounting consistent with the SEEA (two other guidance documents on valuation and scenario analysis are also planned).

The following key findings emerged from the presentations, plenary questions, and subsequent group discussions on how NCA and ILM communities could work better together:

1. **Modelling is needed to produce ecosystem accounts**: While there is a great deal of data available for accounts, for many types of ecosystem services modelling is needed to transform the various data, which is typically not available for all years and places, into a consistent time series of spatially referenced accounts to support ILM (or any other decision-making area).
2. **Account producers need to understand the data available and models as well as the questions being asked of the accounts**: Involvement of account users in the design and development of the accounts helps to build trust in the results. A range of trade-offs between the quality of information needed and decisions being made need to be assessed in order to make informed choices about the best models and data to use. Good accounts are unlikely to be fast and cheap – but it is also apparent that information from accounts (or elsewhere) do not have to perfect to be useful. The well-worn example is a flood warning now from a trusted weather bureau, saying water

height will peak at 8-12 meters in around 4-6 hours, is better than a flood warning in 2 hours, saying water height will peak at 9.2 meters in 2 hours 35 minutes. Here the timeliness of the warning is of more importance than the accuracy and precision of the estimate. The trustworthiness of the issuer of the warning is also a key factor and this trust needs to be built over time.

3. **Producers of NCA will need support to really help ILM:** a number of general initiatives are in place to support account producers and users. Web-based platforms for modelling and collaboration are available, while guidance documents are in development. Ultimately more specific support will be needed for NCA producers to be able to assist ILM processes.
4. **Communication of success stories can help to accelerate progress**: a number of success stories were presented, but they need to be communicated clearly to key audiences involved in NCA and ILM (e.g. different levels of government, development partners and NGOs operating in the field). Communication between the NCA and ILM professional communities needs to first recognize and then harmonize terminology. At present there is some confusion, but the discussions at the 4th Policy Forum were a good first step in overcoming this barrier.

1.7 Country reflections - on experience so far and future demands

The overarching goal of Session 6 was to ensure that the Forum's main findings, messages and recommendations are rooted in the diversity of country experiences to date, as well as likely demands, opportunities and constraints – a reality check before moving forward.

This was addressed by a panel of mostly country representatives offering informal reflections inspired by the presentations and discussions in the first day and a half. The panelists were asked for their thoughts on the main challenges and opportunities and, if relevant, what their country or organization might be interested in doing. The panel consisted of:

- Helen O'Connor, Senior Climate and Environment Adviser, Africa Regional Dept, DFID, UK
- Henry Alterio Gonzalez, Ecosimple, Colombia
- Mandy Driver, Senior Biodiversity Policy Advisor, SANBI, South Africa
- Sam Mugume, Principal Statistician, Macro-Economic Policy Department, Ministry of Finance, Planning and Economic Development, Uganda
- Richard Lungu, Development Planning Department, Regional Planning Section, Ministry of National Development Planning, Zambia
- Ruud Jansen, Executive Secretary, Gaborone Declaration for Sustainability in Africa

Henry Alterio Gonzalez (Ecosimple, Colombia) talked about new demands for NCA. He observed that historically NCA had been driven by the supply side, with technical organizations producing the accounts with relatively little from the demand side. Now things were changing

and the potential of NCA is recognized and policy makers are asking more questions of account producers – so that accounts could be 'decision-centered'. In particular they want specific answers, not to be given a response about the general usefulness of NCA and general arguments about natural capital. He noted cases in Colombia where NCA had been used to set water prices and to estimate the benefits from the peace process. Furthermore, the private sector and NGOs are also recognizing NCA as useful and want to understand more about them. In this, understanding the new values of ecosystem services which can be captured by NCA (but not by traditional national accounting) is key. He highlighted the example of forests– traditional accounts just counted the timber but the NCA can show the value of ecosystem services from the forests as well as their value to biodiversity. Henry Alterio Gonzalez concluded by saying that building trust in NCA would take time but that policy makers are increasingly looking to NCA to support monitoring and analysis of policy.

Helen O'Connor (DFID, UK) emphasized how the scale of the problems being faced is huge, but that the application of neither NCA nor ILM is at such a scale. She noted that there were both challenges and opportunities with data: there is lots of data, but decisions and actions are not always based on the data. The model of 'decision-centered' account production being a joint process between the suppliers and users of accounts was a good one and would help build trust in the accounts as well as help ensure that the right data were available at the right time. Helen O'Connor raised a further issue on which DFID and other donors are likely to demand further attention. This is equality, and specifically the question: how can the accounts support poverty reduction? The distributional approach of ILM is a valuable emphasis and NCA should support it.

Davis Vuningoma (Ministry of Finance, Uganda) spoke about it being time to raise the ambition and he noted opportunities in Uganda to do so. In this, he noted that NCA and ILM were ideas gaining momentum but, to be implemented, they would require support from many departments or agencies at different levels within Uganda. For implementation to be successful, understanding of NCA and ILM would need to be increased and a program of capacity building would be needed. Given the scale of what is needed, a train-the-trainers model would be appropriate, and here collaboration with universities could be helpful. For Uganda there are high-profile opportunities to include NCA and ILM in the next National Development Plan, as well as to provide information to support mitigating and adapting to climate change. For the latter, Davis noted that finance ministers know that drought brings down GDP because of reduced agricultural production. If NCA and ILM together can help to maintain agricultural production levels and GDP, this would be an extremely significant contribution.

Richard Lungu (Ministry of National Development Planning, Zambia) spoke about the need to bridge institutional silos and the opportunity that both NCA and ILM offer to do this in a

structured and purposive way. He announced that NCA for water and forests accounts had been completed in Zambia and that land accounts should be finished soon. The process of producing the accounts had helped to break silos down within government, with a variety of agencies being involved in the production and interpretation of the accounts. The challenge now was to ensure on-going production and improvement of the accounts and to develop new accounts. Having more regional information in the accounts was a new demand and this work would help with ILM, particularly in the 80% of land which is under traditional ownership and management. Richard suggested that one or more provinces could be chosen to test the benefits of integrating ILM and NCA in Zambia. Water and food security are top policy priorities and management of water is a high-profile issue where some rivers are already drying out.

Ruud Jansen (Gaborone Declaration for Sustainability in Africa, GDSA) introduced the work of GDSA, noting GDSA's mandate to support a range of NCA work including testing the SEEA in Africa. NCA is important right now as the Africa countries have a wealth of natural resources but are losing that wealth with little information or appreciation of the value of these resources. He noted that the demand for NCA was recognized at an African Ministers of Environment meeting in the previous week. To meet the growing demand for NCA, there is a foundational need to build capacity to produce and use NCA and ILM. For ILM he noted that many critical landscapes and ecosystems cross nations and hence transboundary issues could be better addressed and understood via standardized NCA. The first African NCA Regional Forum, to be held later in the week would begin to address this and in particular how to support an African NCA community of practice (See Chapter 4).

Mandy Driver (SANBI, South Africa) emphasized the timeliness of action now, as there are a number of opportunities for NCA and ILM in South Africa. Some had recently been identified at a July 2019 national workshop on NCA hosted by Statistics South Africa. The first example is that NCA could be used to track the target in the new National Spatial Development Framework to protect 50% of watersheds. The second is that NCA has been included as a chapter in the new strategy for development of statistics. A principal challenge to realizing these opportunities is the lack of staff dedicated to producing accounts – and hence there has been no regular production of accounts. Thus, producing value-added NCA products is a priority – which in turn should encourage financing of account production and developing staff capacity. ILM, moreover, could be a good test case for linking NCA to policy and management in South Africa (also see Chapter 4 "Africa Forum on Natural Capital Accounting and recommendations for future actions").

Steve Bass as facilitator summarized Session 6's main findings as: **there is growing demand for the integrated data that NCA can provide, and the integrated management that ILM can provide; but we need to encourage collaboration between these communities to be clear on**

the practical joint potentials; and we need to develop capacity especially at the local level to realize the potentials in practice. This summary set the scene for Session 7.

1.8 Expanding and accelerating the application of NCA and ILM – working together

Session 7 scoped how to bring about a combined ILM and NCA approach to improving landscape governance and management. It did this by brainstorming possible key elements of a shared work plan (to be firmed up at a later date). To make the work plan realistic, the session began by sharing information on the opportunities presented by international programs for the ILM and NCA communities to work together. Three international organizations – The World Bank, UNSD and UNEP – briefly outlined their plans. Broader contributions on NCA and ILM working together were then elicited through group discussion, with ideas shared and collected via "post-it notes" as input to the final Session 8.

Raffaello Cervigni began by outlining how WAVES is now an integral part of all three pillars of the Global Program on Sustainability (GPS):

- Pillar 1 Global Information – developing the information and tools to inform policy and investment decisions (including those of the World Bank)
- Pillar 2 Country Implementation – building countries' capacity to produce and use NCA
- Pillar 3 Incentives – integrating sustainability into the functioning of financial markets

WAVES is mostly in Pillar 2 focused at country level, although there are overlaps with Pillar 1 and, to a lesser extent, Pillar 3. Through the GPS, NCA is becoming mainstreamed across a wider range of World Bank work. WAVES is looking to continue NCA work in existing countries as well as to add new countries, depending on resources available. All three pillars have the potential to include ILM as the work will involve tough trade-off decisions between resource uses and will seek synergies. He therefore anticipated NCA and ILM working closer together.

Alessandra Alfieri provided an update of UNSD's work program and how it is managed by the statistical community, with different countries or international agencies taking the lead of different areas under the umbrella of the UN Committee of Experts on Environmental-Economic Accounting. The work of the UN Committee has five main elements:

- Coordination and promotion of NCA
- Methodological development for NCA
- Development of databases covering statistics related to population, social-economic issues and the environment
- Implementation and statistical capacity development
- Formulation of statistical responses to emerging issues, for example climate change and biodiversity conservation

The key methodological work is the revision of the SEEA Experimental Ecosystem Accounting system. This is due for completion at the end of 2020 for endorsement by the UN Statistical Commission in March 2021. As part of this, there are technical groups to address methodological issues (notably biophysical modelling, valuation, and scenario analysis) and particular types of accounts (e.g. accounts for biodiversity and oceans). Capacity building will continue with on-line "E-Learning" as well as regional workshops and country projects.

Tim Christophersen (UNEP) informed participants that the diverse activities of the UN and the international community were aligning and that 2020 promises to be a "super year" for nature with many opportunities for ILM and NCA to contribute. This is important since, according to the IPBES report[44], loss of ecosystem services amounts to 10% of global GDP.

The opportunities for the 2020 "super year" include:

- IUCN's World Conservation Congress – which includes a motion on NCA
- The Convention on Biodiversity CoP – which aims for post-2020 biodiversity targets
- The UN Decade of Action and Delivery for the SDGs – in which evidence-based landscape and land management are identified as central to SDG achievement
- The UN Decade for Ecosystem Restoration – which aims to prevent, halt and reverse the degradation of ecosystems and has a heavy emphasis landscape level investment and on monitoring ecosystem quality
- The Coalition of Finance Ministers for Climate Action – with over 50 ministers agreeing to mobilize finance to implement national climate action plans and to establish best practices for investment avoiding fossil fuels – with a need for new metrics.

Group discussions identified six recommendations:

Recommendation 1 – Including ILM and NCA together in the agendas of international processes and other fora: The IUCN motion on accounting for biodiversity[45] provides an example of this. Other more immediate suggestions include:

- Hosting a session on NCA at the Global Landscapes Forum[46]
- Getting NCA and ILM jointly considered on the African Union Agenda
- Attaching NCA and ILM to the SDG work[47]
- Exploring how ILM and NCA can support the policy and operational aims of REDD+[48]

[44] See the report linked here
[45] See the motion linked here
[46] See the website linked here
[47] It was noted that for NCA this had been done from the supply side at least – see here
[48] See the website linked here

Recommendation 2 – In-country policy work on policy coherence: Closer working of ILM and NCA could identify which land use policies are coherent, and which are working against each other. There were suggestions to think beyond the obvious cases of improving land and water management: for example, how ILM and NCA together could prevent and reduce waste? Such closer working on policy analysis might also be able to reduce costs (both need to tackle the political economy that constrains information availability, institutional cooperation and market mechanisms to make ES profitable).

Recommendation 3 – Communication to get ILM and NCA 'on the same page': Communications was a recurring theme, notably the need for aligning of terminology and consistency of messages. It was suggested that short briefings be prepared to introduce: NCA to the ILM community; ILM to the NCA community; and the general public and senior policy-makers to the benefits of integrating ILM and NCA. A further issue is how to keep open the channels of communication with the ILM community that had successfully opened up at this 4th NCA Policy Forum.

Ideas for organizing this work clustered around a possible technical working group, regional hubs, and coordinated international support.

Recommendation 4 – A technical working group for integrating ILM and NCA: A formally established group could help to maintain momentum, develop a roadmap of joint activity which could be costed and proposed to funders, as well as provide a platform for future work. Improving data standardization and exchange, and data quality assurance processes are important areas for possible joint work.

Recommendation 5 – Regional hubs: This was an idea raised to handle the specificities of different ecosystem, landscape and land use types. There are many possibilities including sharing and documenting experiences, staff exchanges, and potentially transboundary landscape work. An Africa-wide community of practice could be the start of this (and it was discussed at a special workshop later in the week: see Chapter 4).

Recommendation 6 – Formalized partnerships between international organizations involved in NCA and/or ILM, and with partner countries, could play facilitating and resource-raising roles. Resourcing is currently a constraint to ILM and NCA and their integration. International agencies, governments and NGOs should step up support to raise resources and realize synergies in:

- Catalyzing capacity development – within countries already involved (e.g. those attending the 4th Policy Forum) in their programs, as well as engaging new countries[49]

[49] One post-it note offered the simple but powerful suggestion "no-one should be left behind".

- Supporting inclusion – South-South knowledge exchanges, and engagement of local communities and the private sector
- Documenting – real examples of NCA helping to improve landscape-level governance and management, to understand what has worked, what has not, and why
- Platforms – developing and managing shared information and modelling platforms
- Joint pilot projects – involving NCA and ILM
- Joint NCA and ILM targeting of reform of particular policies and management regimes
- Communication collaboration to promote the joint ILM-NCA approach

1.9 Forum messages and next steps

The final session shaped the 4th Policy Forum's key messages on improving landscape-level governance and management through better measurement and valuation of natural capital. Sonu Jain of the World Bank led the session. Drawing on the discussion, we summarize the main messages as:

1. *Meeting complex challenges:* Science says loud and clear that improved governance and management is urgently needed at landscape level if people and nature are to thrive together. Countries need clear directions for how to improve landscape governance and management – which ILM can provide. And they need solid data to agreed metrics to inform these improvements – which NCA can provide.
2. *Mutual fit of ILM and NCA:* ILM and NCA have similar strengths, which enables them to be mutually beneficial: both are science-based, holistic and focused on interacting environmental and economic factors; and both identify trade-offs over time, space, and sector. Each works to 10 principles, which are different but highly compatible: NCA is a rigorous, fixed and standardized system which fits with mainstream macro-economic measures; but ILM is much more flexible and can adapt to suit diverse local economic, governance and biophysical contexts.
3. *Priority opportunities for ILM and NCA to combine forces:* There are many entry points at the international level – the work programs of the World Bank, UNSD and UNEP are just three examples – which are potentially open to ILM and NCA joint approaches. There is much data available at global level which can be used, and the ARIES global cooperation platform and model can help deliver good, cheap and relatively fast information. There are many progressive and holistic policy initiatives which can be influenced to encourage joint approaches such as pilot projects, especially in the 2020 'super year for nature' with the landmark Biodiversity and Climate CoPs and the UN decades for Ecosystem Restoration and SDG Delivery.
4. *Improving communications between the NCA and ILM communities:* Common vocabulary, definitions and concepts are not too far off and, if worked on, could link the NCA and ILM endeavors. To improve others' confidence in them, the message is to "just do it": getting started and continuous improvement can make more progress than

delaying perfection. Joint cases can be made, especially for how ILM and NCA together can help to achieve mainstream policy goals such as tackling poverty and inequality.

There was unanimous support for these messages and strong encouragement to promote them by preparing the current Forum proceedings as well as via the websites and newsletters of participating agencies (this has begun[50]). A shared workplan was suggested as a follow-up priority and its outline contents were scoped; the workplan was drafted following the forum (Appendix 1.3).

The 4th Policy Forum closed with remarks from Alessandra Alfieri (UNSD), Benoit Blarel (World Bank), and Prof Pamela Mbabazi Kasabiiti (Chairperson of the National Planning Authority, Uganda). All expressed thanks to participants for making the Forum a valuable experience. Alessandra Alfieri noted how far things had advanced with the production of accounts in many countries, and how ILM offers an excellent means to realize the accounts' usefulness. Benoit Blarel (World Bank) agreed that the Forum showed how accounts could be useful in important spatial areas, and asserted the need to show how they can help policy for biodiversity and climate change. He announced that there would be a 5th Policy Forum, most likely in early 2021 so that it could consider responses to the many events in 2020's "super year for nature", including integrating ILM and NCA in key programs such as ProGreen and ProBlue. Prof Mbabazi backed these sentiments with much enthusiasm, urging continued the conversations between the ILM and NCA communities, learning how to work together, sharing successes and feeding lessons into national planning and development processes, as they are currently doing in Uganda, as well as into international processes.

In concluding, Steve Bass noted that in addition to the key messages there had been many other important findings emerging from each session of the workshop and which are summarized in Annex 1.4). These findings can be used to strengthen our key messages for given circumstances. In particular, we identified growing demands both for the integrated data that NCA can provide, and for the integrated management that ILM can provide. We therefore need to encourage collaboration between the ILM and NCA communities to be sure that the joint demands can be met in practice. We will then also need to encourage networking between ILM and NCA communities and develop capacity especially at the local level, to deliver those potentials. The 4th Forum had been a useful beginning, bringing together a joint community of practice for the first time – but hopefully not the last.

[50] For example see the World Bank report on the 4th Policy Forum

1.10 Acknowledgments

This report on the 4th Policy Forum is based on the notes of the authors of this chapter (Steve Bass and Michael Vardon) as well as those of the rapporteurs and the notes and recollections of several other people. Particular thanks go to Steven King, JP Castaneda, Sonu Jain, Raffaello Cervigni, Stefano Pagiola, Shun Chonabayshi, Glenn-Marie Lange and Marko Javorsek. We also wish to thank Sofia Ahlroth, Johan Meijer and Ezra Berkhout who contributed greatly before, during and after the meeting but sadly were unable to be at the Forum in person although they were 'on-line' for much of it. Finally we want to thank our colleagues in Uganda for the successful organization and running of the Forum: Ronald Kaggwa, Sam Mugume, Franklin Mutahakana, Lesya Verheijen, Damalie Nyanja, Catherine Joy Ajiku Obitre Gama and Judith Mirembe.

Appendix 1.1 Agenda for the 4th NCA Policy Forum (from website)

AGENDA

4th FORUM ON NATURAL CAPITAL ACCOUNTING FOR BETTER POLICY

Measuring and Valuing Natural Capital to Improve Landscape Management and Governance

November 18-19, 2019
Lake Victoria Serena Hotel
Kampala, Uganda

Meeting objective:

To explore how natural capital accounting (NCA) and integrated landscape management (ILM) can work together to improve landscape management and governance, thereby also accelerating progress in national and international policy agendas

Day 1: November 18, 2019		
MORNING: POLICY SCENE-SETTING: THE 'DEMAND-SIDE'		
8.30 am	**Registration**	Tea and coffee
9.00 am - 9.45 am	**Session 1. Welcome, 2019 Forum objectives, recap of 2018 Forum, agenda orientation, introductions**	
	Welcome & introductory words	The World Bank, United Nations, Gov of Netherlands
	Opening remarks	Government of Uganda
	Setting the scene: topical introduction to the Forum's themes	Raffaello Cervigni, World Bank Alessandra Alfieri, UNSD
	Forum objectives, agenda, intro's	Steve Bass, IIED
9:45 – 10:45 am	**Session 2. Linking growing national wealth and Integrated Landscape Management** Facilitator: tbc	
	Keynote: National wealth and the role of natural capital	Glenn-Marie Lange, World Bank
	Keynote: landscape policy issues and approaches	Tim Christophersen, UNEP
	Discussant followed by Q&A	Tom Okurut, Govt of Uganda
10.45 – 11.15 am	**Coffee and Tea**	
	GROUP PICTURE	
11.15 am - 12.30 pm	**Session 3. Landscape policy challenges: protecting, restoring and sustainably managing landscapes** Facilitator: Glenn-Marie Lange, World Bank	
	Presentation: Landscapes as a focus for integrating objectives, actors and systems	Johan Meijer, PBL Michael Vardon, ANU
	Presentation: NCA and Landscapes	Stefano Pagiola, World Bank
	Expert panel discussion	Luther Anakur, IUCN Mao Amis, African Centre for a Green Economy Rosimeiry Portela, CI

	Q&A	
12.40 – 2.00 pm	**Introduction of poster session**: Countries' progress on producing and using NCA	
12.40 – 2.00 pm	**Lunch with voluntary poster session**	
AFTERNOON: NCA 'SUPPLY-SIDE' PROGRESS		
1.30 - 5.00 pm	**Session 4 – NCA informing policy and governance: sharing news and learning from 'stories of change'** Facilitator: tbc	
	Panel: Country examples of landscape-related NCA experience – land, forest, water, ecosystem and other accounts	Zambia, China, South Africa, private sector, plus other representatives tbc
	Afternoon Coffee and Tea	
	Group discussions: Landscape-level NCA: what works best to improve landscape management and governance	Facilitation: Marko Javorsek, UNSD
17:00pm	EVENING RECEPTION	

Day 2: Tuesday, November 19, 2019		
MORNING – NCA AND ILM JOINING FORCES FOR SUSTAINABLE LANDSCAPES		
8.30 am	**Arrival**	Tea and coffee
9.00 am - 10.30 am	**Session 5. Methodologies: how combining NCA and ILM approaches and methods can meet the landscape policy challenges** Facilitator: Michael Vardon, ANU	
	Presentation: Overview of methodologies and data used for landscape-related NCA	Ken Bagstad, USGS
	Presentation: Overview of methodologies and data for sustainable landscape projects	Presenter tbc
	Short presentation on the biophysical guidelines	Presenter tbc
10.30 - 11.00 am	**Morning Coffee and Tea**	

11:00 - 12.30 pm	**Discussion groups: Congruence between NCA and ILM approaches; and how NCA can best help SLM**	Facilitator: Michael Vardon, ANU
12.30 – 1.30 pm	**Lunch**	
AFTERNOON – LOOKING FORWARD		
2.00 - 3.00 pm	**Session 6 – Country reflections on the Forum discussions so far** Facilitator: Steve Bass	
	Panel: Country needs, constraints and opportunities for NCA helping landscape policy and governance	Panel: Zambia, Uganda, GDSA, others tbc.
3.00 - 4.30 pm	**Session 7 – (inc. coffee) – Expanding and accelerating NCA application: NCA & ILM working together** Facilitator: Steve Bass	
	Brief presentations: international updates and opportunities to engage	Raffaello Cervigni, World Bank Alessandra Alfieri, UNSD Rosimeiry Portela, CI
	Q&A	
3.30- 4.00 pm	**Afternoon Coffee and Tea**	
3.30- 4.00 pm	Session 7 continued – **Brief small group and plenary discussions: potential NCA/ILM collaborations**	
4.00- 5.30 pm	**Session 8. Messages and next steps from the 2019 Forum** Facilitators: Steve Bass and Sonu Jain	
	Discussion: Main messages and targets for messages from this forum – discussion	Presenter: Sonu Jain, World Bank
	Next steps after the Forum: Priorities and actions towards 2020 Forum	Facilitator: Steve Bass, IIED
	Closing remarks	Alessandra Alfieri, UNSD Raffaello Cervigni, World Bank Ronald Kaggwa, Govt of Uganda

Appendix 1.2 4th Policy Forum participant list

Name	Agency	Country
Paola Andrea Acevedo Ramirez	Departamento Administrativo Nacional de Estadística	Colombia
Alessandra Alfieri	United Nations Statistics Division	UN
Henry Alterio Gonzalez	Ecosimple Columbia	Colombia
Charlotte Ampaire	Environment GP	World Bank
Fabien Clair Andriamalala	PADAP	Madagascar
Arison Fabien Clair Andriamalala	National Commission for Science and Technology	Madagascar
Luther Anukur	IUCN	Kenya
Evelyn Atuhaire	Ministry of Water and Environment	Uganda
Ba Kaung	Ministry of Natural Resources and Environmental Conservation	Myanmar
Ken Bagstad	United States Geological Survey	USA
Steve Bass	International Institute for Environment and Development	UK
Garo Batmanian	World Bank	World Bank
Benoit Blarel	Global Platform, Environment and Natural Resources	World Bank
Samaychanh Boupha	Lao Statistics Bureau	Lao PDR
Hannah Brooke	Natural Capital Coalition	UK
Evelyne Busingye	IUCN Uganda	Uganda
Elizabeth Carabine	Ministry of Foreign Affairs	Netherlands
María Beatríz Cardona Alfaro	INAB	Guatemala
JP Castaneda	Environment GP	World Bank
Raffaello Cervigni	Environment GP	World Bank
Lloyd Chingambo	World Bank	World Bank
Shun Chonabayashi	Environment GP	World Bank
Tim Christophersen	UN Environment	Kenya
Monica Lopez Conlon	UN Environment	UNEP
Nicholas Conner	IUCN	Australia
Carlos Cordero	Secretary of Planning of the Environment, Energy and Oceans Sector	Costa Rica
Stanley Damane	Ministry of Tourism, Environment, and Culture	Lesotho
Mrs. Aminata Sall Diop	Ministry of Environment and Sustainable Development	Senegal
Amanda Louise Driver	KNBS	Kenya
David Duli	WWF	Uganda
Sam Echoku	Uganda Bureau of Statistics	Uganda
Mersie Ejigu	IUCN Eastern and Southern Africa	IUNC
Sonigutu Asibong Epke	Ministry of International Development Cooperation	Nigeria
Hadeer Mohamed Fathallaha	Ministry of Environment	Egypt
Dimpho Galegane	Department of Water and Sanitation	Botswana
Disikalala Gaseitsiwe	Gaborone Declaration For Sustainability in Africa	Botswana

Name	Agency	Country
Hans Hessel-Andersen	UN Environment	Kenya
Elizabeth P. Hoggard	Environmental Protection Agency	Liberia
Ross Hughes	Environment GP	World Bank
Eugene Itua	NCC	Uganda
Lucy Iyango	Ministry of Water and Environment	Uganda
Sonu Jain	Environment GP	World Bank
Ruud Jansen	Gaborone Declaration for Sustainability in Africa	GDSA
Marko Javorsek	United Nations Statistics Division	UN
Ronald Kaggwa	Trade and Tourism Planning, National Planning Authority	Uganda
Moses Kaggwa	Ministry of Finance	Uganda
Godwin Kamugisha	National Environment Management Authority	Uganda
Ephraim Kamuntu	Ministry of Tourism, Wildlife and Antiquities	Uganda
Peter Katanisa	World Bank	Rwanda
Kim Thi Thuy Ngoc	Ministry of Natural Resources and Environment (MONRE)	Vietnam
Steve King	UNEP-WCMC	UN
Sophie Kutegeka	IUCN	Uganda
Glenn-Marie Lange	Environment GP	World Bank
Imane Loudiyi	HCP	Morocco
Richard Lungu	Ministry of Development Planning	Zambia
Samuel C. Maango	National Remote Sensing Centre	Zambia
Zacharia Magombo	National Herbarium and Botanic Gardens	Malawi
Christine Mukami Magu	Kenya National Bureau of Statistics	Kenya
Abisha Mapendembe	UNEP-WCMC	UK
John J. Maughan	Green Growth Knowledge Partnership	Switzerland
Jackline Kasabiti Mbabazi	National Planning Authority	Uganda
Ottoniel Monterroso	IARNA	Guatemala
Onesimus Muhwezi	UNDP Country Office	Uganda
Franklin Mutahakana	World Bank	World Bank
Justine Namaalwa	Makerere University	Uganda
Sandra Namukaya	Ministry of Finance	Uganda
Everline Ndenga	VitalSigns	Uganda
Shiva Raj Neupane	Ministry of Forests and Environment	Nepal
Nguyen Tuan Anh	Ministry of Planning and Investment	Vietnam
Mike Nsereko	NEMA	Uganda
Vincent Nuwabiine	National Planning Authority	Uganda
Helen O'Connor	DFID	UK
Tom Okurut	National Environment Management Authority	Uganda
Iretomiwa Olatunji	Environment GP	World Bank
Kennedy Olwasi	Ministry of Environment and Forestry	Kenya
Zhiyun Ouyang	Chinese Academy of Sciences	China

Name	Agency	Country
Stefano Pagiola	Environment GP	World Bank
Pham Xuan Luong	General Statistics Office of Vietnam	Vietnam
Teresa Magalhaes Pinto	Ministry of Land, Environment and Rural Development	Mozambique
Rosimeiry Portela	Conservation International	CI
Marie Fabienne Randrianarisoa	National Commission for Science and Technology	Madagascar
Ignela Sahondra Randriantsizafy		Madagascar
Maminiaina Rasamoelina	World Bank	Madagascar
Pramod Raj Regmi	CBS	Nepal
Kim Reuter	World Bank	World Bank
Barakalla Robyn	World Resources Institute	Indonesia
Rita Kyategeka Samanya	WWF	Uganda
Mizushi Satoh	World Bank	Vietnam
Cornelius Nkoanyane Sebutsoe	African Development Institute	AfDB
Bathusi Segobai	Ministry of Finance and Economic Development	Botswana
Tom Sengalama	DFID	Uganda
Ranya Sherif	UNHCR	Canada
Olufunso Somorin	Climate Change & Green Growth Officer, East Africa Regional Office	AfDB
Than Zaw	Central Statistical Organization	Myanmar
Tin Htun	Forest Department	Myanmar
Mandar Trivedi	DFID	UK
Vanessa Ushie	Policy Analysis Division, African Natural Resources Centre	AfDB
Michael Vardon	Australian National University	Australia
Lesya Verheijen	Environment GP	World Bank
Davis Vuningoma	MOTPED	Uganda
George Wamunga	Ministry of Water and Environment	Uganda
Abduvokhid Zakhadullaev	Department of International Relations	Uzbekistan
Adwell Zembele	Ministry of Finance	Malawi

Appendix 1.3. Tasks identified for strengthening ILM and NCA links to policy and decision making

Task	**Agency(ies) responsible**	**Time**
Establishment of Africa Region Forum	GDSA, CI, World Bank and UN	Nov-Dec 2019
Writing of articles on the forum for newsletters and website	World Bank and UNSD	Dec 2019 – Feb 2020
Preparation of Africa NCA workshop proceedings	World Bank and CI	Nov-Feb 2020
Preparation of 4th Policy Forum proceedings	World Bank	Jan - May 2020
Development of integrated ILM and NCA proposals for funding	Countries, international organizations, NGOs	Jan-Dec 2020
Analysis of how NCA and ILM can assist biodiversity conservation (as input to CBD discussions)	World Bank and CI	Jan-Sep 2020

Appendix 1.4. Summary of key findings from the 4th Policy Forum on ILM and NCA

Summary of key findings from the 4th Policy Forum on ILM and NCA	
Key finding	*Notes*
Accounts can be produced with existing data and skills	There is a range of data and expertise within countries that can be mobilized to generate accounts for particular resources. Land, forests and water accounts were the most common form of account produced that can inform ILM
Accounts should be linked to a country's needs for analysis and policy	Forest and water management, climate change, agricultural and "green" investment are all priority areas where accounts could be used. However, the accounts are a starting point, not an end point, playing an important role in the assessment of opportunities and risks
NCA and ILM have concepts in common	Each embraces a range of terms, which may differ in name, but may have a similar intent. For example, 'environmental assets' in NCA and 'ecological infrastructure' in ILM. Ecosystems services are common to both NCA and ILM
NCA and ILM can be linked	At present there are some examples where this can be seen in practice (e.g. in China, Guatemala, Rwanda, South Africa and Zambia as well as in the private sector).
There are some important technical issues to be resolved	Use of common classifications, access to data, appropriate valuation techniques and spatial boundaries for aggregated of information were recurring topics in need of attention.
A range of institutional arrangements has been used in the development and production of accounts	In all cases, cooperation between different agencies was essential. Government agencies for land, forests, water and statistics have worked together, with leadership or coordination provided by central agencies, such as ministries of planning

Summary of key findings from the 4th Policy Forum on ILM and NCA	
Key finding	*Notes*
Developing capacity for ILM and NCA is needed, as well as advancing understanding of them in the broader community	Both ILM and NCA are still in their infancy and need to be supported with appropriate initiatives. The UN and World Bank have both worked in these areas and their increasingly close cooperation is welcome and needs to continue.
Modelling is needed to produce accounts	While there is a great deal of data available for accounts, modelling is needed to transform the various data into a consistent set of accounts to support ILM (or any other decision-making area)
Account producers need to understand the data available and models as well as the questions being asked of the accounts	Involvement of account users in the design and development of the accounts helps to build trust in the results. A range of trade-offs between the information needed and decisions being made need to be assessed in order to make informed choices about the best models and data to use
Producers of NCA will need support to really help ILM	A number of initiatives are in place to support account producers and users. Web-based platforms for modelling and collaboration are available, while guidance documents are in development
Communication of success stories can help to accelerate progress	Several success stories were presented, but they need to be communicated clearly to key audiences involved in NCA and ILM (e.g. different levels of government, development partners and NGOs operating in the field). Communication between the NCA and ILM professional communities needs to first recognize and then harmonize terminology. At present there is some confusion, but the discussions at the 4th Policy Forum were a good first step in overcoming this barrier

Summary of key findings from the 4th Policy Forum on ILM and NCA	
Key finding	*Notes*
ILM and NCA have common interests in data quality	Both require systematic approaches to data collection and presentation, and both have been held back by poor data quality and *ad hoc* approaches
Consistent and credible monetary valuation is important	At present a variety of approaches is used in ILM and NCA to value ecosystem assets and services. This makes comparisons between different initiatives problematic. A process of standardization is underway via the SEEA.
ILM can use NCA data to support planning, management and financing:	In this ILM can use NCA to standardize information, and then use this to prioritize investment decisions. For example, by identifying and defining the benefits of ILM to different groups of people and assessing the management changes needed to optimize the benefits.
Developing understanding and capacity for both ILM and NCA is needed across the broader community	Both ILM and NCA are still in their infancy and need to be supported via appropriate initiatives. The UN and World Bank have both worked in these two complementary areas and this needs to continue. knowledge of ILM and NCA and their complementarities is limited in most governments as well as in the broader community. Countries and international organisations need to continue to promote ILM and NCA via appropriate media (including social media).
The process of developing and applying NCA to ILM would create links across different levels of government as well as between the public, private and NGO sectors	By working together, both on the preparation of ILM plans and the production and analysis of NCA, people who do not usually meet would be brought together. This would help understanding between local land managers, those managing the national economy, and those responsible for international environment commitments.

2. Integrated Landscape Management and Natural Capital Accounting: Working Together for Sustainable Development

Johan Meijer[1], Ezra Berkhout[1], Chloe Hill[2] and Michael Vardon[3]

[1] Netherlands Environmental Assessment Agency (PBL)

[2] Altus Impact

[3] Australian National University

2.1 Main findings

Introduction

Integrated Landscape Management (ILM) and Natural Capital Accounting (NCA) are frameworks that have been separately developed by distinct stakeholder groups. Both frameworks synthesize a broad range of theories and practices that can contribute towards the ongoing global effort of achieving sustainable development. This paper explores experience of these two approaches in more detail, particularly focusing on the links that can be made between them. A draft of this paper was provided as background material for discussion at the 4th Policy Forum on Natural Capital Accounting for Better Policy, held in Kampala Uganda, 18-19 November 2019. The draft paper was updated after the discussions at the Forum as well as inputs following the Forum.

Managing global challenges at the landscape level

The recent Global Assessment Report on Biodiversity and Ecosystem Services produced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) identified that, for terrestrial and freshwater ecosystems, land use change has had the largest negative impacts on nature since the 1970s. Given that conversion of natural land and water to agriculture and aquaculture is a leading cause of biodiversity loss, mainstreaming information on biodiversity and natural resource use into development planning and production sectors has never been so important as it is today.

Conventional policy approaches, that assume particular lands have one priority objective, such as farming or forestry, and that this objective is a 'trade-off' against other objectives, are no longer viable in much of the world. The ILM framework is developing as an alternative to these conventional sectoral approaches of natural resource management. The landscape level is often the best scale for managing interactions, synergies, and trade-offs for the various aspects of natural resource management. In particular, ILM can improve the inclusiveness and participatory nature of the planning process at national and subnational levels. For effective ILM, credible, accepted, accurate and up-to-date information is a prerequisite to: (1) identify key issues as well as current and future trade-offs; and (2) develop and implement effective ways to maximize benefits and minimize damage to the economy and the environment though improving landscape planning and decision making.

NCA provides standardized information on natural resource use

NCA is an information platform that systematically organizes economic and environmental information that has been standardized via the System of Environmental-Economic Accounting (SEEA). The platform expands the coverage of the System of National Accounts (SNA), which produces the GDP (gross domestic product) metric. In particular, NCA adds an assessment of the depletion and degradation of natural resources, as well as the contributions of ecosystem services, to the economy and human wellbeing more generally.

Can we bring the ILM and NCA concepts and communities closer together?

This report explores the options and potential benefits of bringing ILM and NCA closer together. It is acknowledged that both ILM and NCA are relatively new, and as such there has been very little interaction until now. However, even on the basis of the limited integration to date of ILM in NCA, and vice versa, the potentials would appear to be good and closer integration would seem very desirable.

Benefits of connecting ILM and NCA

Drawing on experiences from a range of countries, spanning low- to high-income, as well as expert opinions, we conclude that NCA can contribute to different aspects of ILM throughout the general decision-making cycle (see Figure 2.1):

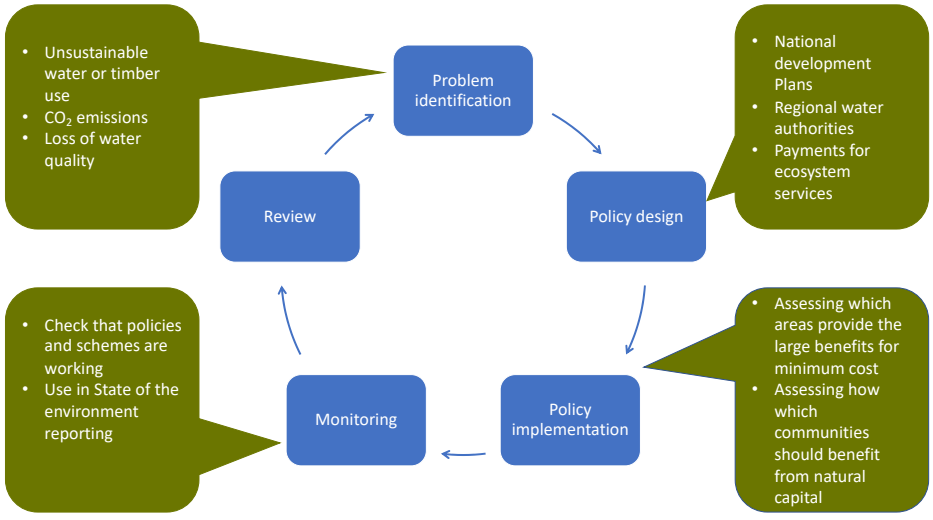
> **Problem identification** – Spatially explicit presentation of NCA information is particularly useful for communicating to decision makers where there are problems. The accounts, when coupled with appropriate modelling and analysis, can also be useful for predicting where problems might occur in the future.

Policy design – NCA can be used in modelling and scenario analysis to show existing trade-offs at the landscape level. Such information can then feed into the design of new policy instruments, such as payments for ecosystem services and restoration, or for encouraging the finance sector to internalize the broader benefits and risks to investments in major infrastructure projects.

Policy implementation – NCA can be used to identify spatially distinct landscapes and communities that could benefit from a more efficient targeting of existing policies. These could be the poorest communities, or areas either at most risk of degradation or that would witness the greatest benefits from the least investment (i.e. the low hanging fruit).

Monitoring and review – This is consistently identified as the most commonly-realized benefit of NCA that has been most commonly realized to date. Presenting integrated environmental and economic data regularly and consistently would be a significant advance of value to national governments, regional authorities, local landowners and financiers alike. Regular production of the accounts leads to improvements in data availability and quality as well as increasing the trust in the accounts at all levels (local to national).

Figure 2.1: How NCA can inform integrated landscape management in the policy cycle



A range of valuable insights and lessons for integrating ILM and NCA in decision-making is summarized in Table 2.1.

Going forward

To realize the benefits of more effective integration of ILM and NCA will require:

- Greater understanding and engagement between the two professional communities as well as with decision-makers involved in land management;
- Developing and sharing of examples of successful applications of NCA to ILM;
- Better raw data for NCA;
- Building trust in both information and the decision-making processes of ILM and NCA.

To make progress in this way, some practical issues and questions should be considered by the ILM and NCA communities. These should include:

Mismatch of data access, coverage and quality – Data access, coverage and quality are recurring issues for both ILM and NCA. What are the key data set requirements for ILM and NCA?

Boundary selection – The management areas of ILM seldom match the data output areas available directly. How best to select the boundaries and then to match these to the data available?

Landscape-level decision-making criteria – what approaches, like 'carrying capacity', 'catchment planning' and 'social value', are paramount for ILM and how can NCA best serve them?

Institutional reform – how can ILM and NCA together shift institutional arrangements to be more effective at landscape-level integrated decisions, i.e. shifting from silos to synergies, from overly-centralized to usefully decentralized?

Inclusion – can NCA and ILM work together to reduce the risk of entrenching top-down approaches? How can better landscape level data empower local stakeholders' hands in ensuring ILM is equitable?

Pilots – what scope for piloting joint ILM/NCA projects that address the above?

A key outcome of the 4th Policy Forum on Natural Capital Accounting for Better Policy was to develop a common understanding of these issues and questions. This in itself is a significant achievement. If progress towards resolving them can also be made as the ILM and NCA communities work further together and some pilot joint projects are implemented, then we will be a significant step closer to achieving sustainable development.

Table 2.1: Summary of insights and lessons for integrating ILM and NCA in decision making

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Process and governance	(1) Complexity (and inclusivity) increases with the number of stakeholders (2) Geographical areas relevant to ILM do not always align with jurisdictional boundaries (3) Managing multi-stakeholder relations is challenging	(1) Needs a process that brings the different data holders together (2) Needs formal arrangements for sharing and using data e.g. high-level agreements between agencies (3) Account users need to be involved in account design and construction so accounts are relevant and 'decision-centered'	(1) Senior representatives of key stakeholders in the ILM and NCA communities need to be brought together as early as possible (2) Need to form a high-level strategic body as well as technical groups that cover both construction and use of accounts (3) Production of the first accounts is not the end point, but the start of an interactive process to both improve the accounts continuously and further embed their use in ILM processes.
Data and methods (information needed)	(1) ILM is inherently a process that needs to be fed by data and analysis (2) A more standardized approach to ILM data needs would likely assist with implementation (3) ILM requires data and methods that focus on multifunctional uses (like mosaics, agroforestry)	(1) Data is scattered between different agencies (2) Some key data could be missing (3) Models and assumptions are needed to the absence of complete data (4) Regional and local data are essential to ILM (5) Need GIS technology and expertise to produce ILM-usable accounts	(1) Need to accurately represent the quality of data in information products (2) Need to have data quality assessment processes in place (3) Need to continuously improve data sources for the accounts

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Challenges in project implementation	(1) Challenge of integrating data originating from various administrative classifications (e.g. districts, watersheds, economic growth zones) (2) Socioeconomic data often lacking, compared with remote sensing derived data (3) Dealing with spill-over effect beyond landscape boundaries	(1) Breaking down national level information to match landscape (regional or local) area (2) Scaling up local data to match regional or national data (3) Spatially representing information can create issues with confidentiality (security, ownership, etc.) (4) Gaining an understanding of ILM and landscape-level decision-making terminology	(1) Defining boundaries for NCA that align with ILM regions (2) Gaining common understanding of terminology between ILM and NCA communities (3) Need to highlight existing NCA potentially useful to topical landscape decisions and produce NCA quickly to demonstrate usefulness to ILM community
Funding and finance	(1) Lack of financing of ILM has been mentioned by a small number of governments and international organizations and NGOs (2) Challenge of connecting large investors and funds to small landscape interventions (3) Strong link to sustainable finance and corporate social responsible activities	(1) So far finance has been mentioned by a limited number of governments and international organizations and NGOs	(1) A compelling case can and should be made for pilot studies of applying NCA to ILM (2) Funding by national governments and international agencies is important initially (3) Funding can come from a range of international, national and local stakeholders. Joint funding may increase commitment to on-going production and use of accounts

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Communication	(1) ILM is not a well-known term but the general concepts of it are recognized and understood by land managers (2) The concept is strong in illustrating interactions, either between activities in landscapes, or trade-offs in SDGs	(1) NCA is not well understood; need to address this early in account production (2) Need a plan for communicating NCA results to users and the general public (3) Diagrams, maps and charts work better than pages of tables	(1) Very important to identify the different audiences for NCA and ILM (2) Very important to be able to demonstrate the value of account production to the ILM community (3) Good examples are important (4) Need to recognize the limits of data quality
Potential in decision making (use in policy cycle)	(1) So far mainly useful in the identification of issues, bringing stakeholders to the table, development and implementation of interventions at local level (2) Could be scaled up to be useful at higher levels (national and multi-country) (3) Strengthen role as participatory mechanism in achieving global goals for sustainable development	(1) So far mainly used in monitoring, review and problem identification at national level (2) Could be used at subnational levels and in other parts of the decision-making cycle with additional analysis and modelling (3) Could be used in policy design and implementation, mainly useful in the identification of issues, development and implementation of responses	(1) Monitor and review the sustainability of current land use and land management (2) Assess trade-offs between land use, management and investment decisions (3) Identify hotspots in need of land use and land management change (4) Can be applied to international agreements such as the SDGs and CBD

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Challenges in policy cycle use	(1) ILM developed as a bottom-up approach; national level (sectoral) policies could be more aware and supportive (2) Decision making at local level influenced by many factors including poverty, immigration and large government and non-government businesses involved in resource use	(1) Account producers are often statistical officers, who deliberately do not extend into policy interpretation and analysis (2) Accounts are usually at the national level. We need landscape-level accounting to be useful for ILM decisions	(1) Need to align international, national and sub-national decision-making processes and priorities (2) Information needs to be seen as important (3) Information needs to be available when decisions are being made. Hence ILM and NCA need to be "ahead of the game"

2.2 Introduction

This paper was prepared as a background document for the 4th Policy Forum on Natural Capital Accounting for Better Policy, which was held in Kampala Uganda, 18-19 November 2019.[51] The focus of the 4th Policy Forum was the application of natural capital accounting (NCA) to integrated land management (ILM).

The key objective of the Forum was to explore how linking NCA and ILM can accelerate national agendas, such as effective land use planning and protection of ecosystem services, and international goals and targets, such as the Bonn Challenge, the Paris Agreement on Climate Change, and the post-2020 Global Biodiversity Framework. The overall context – achieving the Sustainable Development Goals (SDGs)- was also touched upon, but were not central to the agenda of the 4th Forum as they were the explicit focus of the 2nd Policy Forum[52] and subsequent publication (Ruijs and Vardon, 2018). The use of natural capital accounts to achieve the SDGs has also been examined in detail by Ruijs et al. (2018), which concluded:

- The accounts are particularly relevant to measuring progress towards SDG 15, Life on land, as well as several goals related to land (SDG 2 Zero hunger; SDG 6 Clean water and sanitation; SDG 12 Sustainable consumption and production, and; SDG 13 Climate action).
- However, the accounts have so far not been used to either assess progress towards SDGs or design policies to achieve the SDGs.

The participants of the 4th Policy Forum were government representatives from developing and developed countries, as well as from organizations working on accounting, environmental-economic policy, and landscape management at subnational levels or in sectors (e.g. agriculture, forestry, conservation, etc.). To support the better linkage of ILM and NCA, this document provides:

- An introduction to both ILM and NCA (Sections 2.2 and 2.3, respectively);
- Examples of how the concepts and practices of ILM and NCA have come together in countries (Section 3), with case studies from five countries (Section 2.4);
- Thoughts from a sample of experts on the benefits and challenges of integration of ILM and NCA and a summary of key insights (Section 2.5);
- An assessment of how ILM and NCA can be better integrated into one another, what the benefits from this are likely to be, and how this integration can be progressed (Section 2.6).

[51] https://www.wavespartnership.org/en/forum-natural-capital-accounting-better-policy
[52] https://www.wavespartnership.org/en/2nd-forum-natural-capital-accounting-better-policy

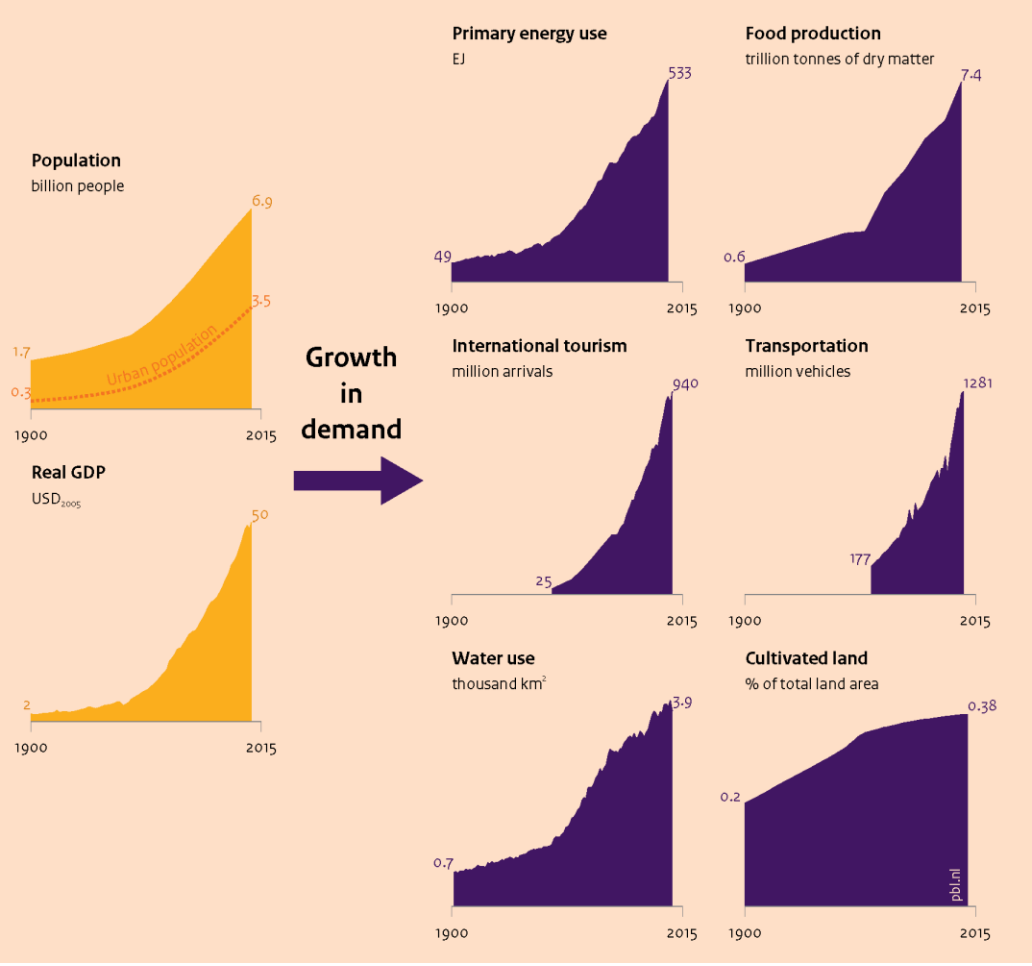
2.3 Integrating multiple objectives in landscapes

This section provides an overview of landscape approaches as a concept and means for balancing multiple objectives, integrating interests from local to global stakeholders. It then focuses on ILM as a process aimed at enabling stakeholders to manage, plan, implement and monitor actions in support of their goals.

2.3.1 Global trends: increasing and competing claims on natural resources

Growing populations and the resulting rising demand for land, food, fiber, water and energy are putting ever-growing pressure on natural resources (Figure 2.2).

Figure 2.2: Trends on population and GDP driving global demand for natural resources



Source: PBL People and the Earth report, 2017

In September 2015, the global community adopted the 2030 Agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs) and 169 constituent targets. The SDGs provide a framework for countries to plan and achieve a comprehensive, balanced and integrated development vision for 2030. Such a framework is needed to manage the competition for resources and optimize their allocation between the individual development goals.

The recent Global Assessment Report on Biodiversity and Ecosystem Services produced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) identified that, for terrestrial and freshwater ecosystems, land use change has had the largest negative impacts on nature since the 1970s. Given that conversion of natural land and water to agriculture and aquaculture is a leading cause of biodiversity loss, mainstreaming biodiversity and information on natural resources into development planning and production sectors has never been so important as it is today.

The latest IPCC Report on Climate Change and Land (IPCC, 2019) describes the relation between climate change, land degradation, food security and greenhouse gas in detail. The report states that priority should go to response options that do not necessarily lead to greater pressure on land, but which rather have the potential to provide multiple co-benefits in the sense of climate change mitigation and adaptation, alongside combating desertification and land degradation, alongside enhancing food security.

Spatial planning and spatially-explicit land governance is becoming more important as cumulative pressures from the demands for food, feed, biofuels, nature conservation, and urban expansion lead to increasing competition for natural resources and change the relative flows of different ecosystem services (Van der Esch et al., 2017). Conventional policy approaches, that assume particular lands have one priority objective such as farming, forestry or conservation, and that this objective is a ‘trade-off’ against other objectives, are no longer viable in much of the world (Gray et al., 2016; Shames et al., 2017).

2.3.2 Challenges converging at the landscape level

The specific actions that are required to achieve the 2030 development vision need to be planned and implemented at national and sub-national scales. This follows the desire to balance multiple goals related to both environmental and non-environmental processes holistically, for example, on livelihoods and sustainable resource management (Freeman et al., 2015). To transform national and regional spatial planning into a more interactive and adaptable spatial and land-use-planning process, there is a need for strong bottom-up components as the challenges are highly context-specific. Here the overlapping interests of a

range of stakeholders can best be integrated within a multifunctional landscape (CBD, 2014; UNCCD, 2017). At sub-national scales, stakeholders are able to more clearly understand the impact of specific actions than at national level, and are in a better position to implement them.

The interaction of people and nature in landscapes has evolved over time. With increasing globalization and the integration of local people in global production supply chains, landscapes are increasingly seen as the spatial scale where many stakeholders from global to local level need to cooperate in order to successfully balance competing interests and manage risks (Brasser, 2012; IPBES, 2019; Scherr et al., 2012). Thus, over several decades, the view of landscapes has developed from a perspective of geophysical boundaries in which landscapes were defined by natural processes, towards a perspective where natural processes, human actors and economic supply chains all play decisive roles.

The Landscapes for People, Food and Nature (LPFN) initiative has identified over 80 terms and definitions that refer to the governance and management of landscapes. Depending on their scientific roots (typically political science, development economics or ecology), these terms include descriptions that focus variously on: (1) the cultural identity of landscapes, e.g. where the "sense of place" is a key element; or (2) the integration of conservation and development plans; or (3) the (ecosystem) services a landscape provides. By using the definition of Denier *et al*. (2015), i.e. that a landscape is a socio-ecological system that is organized around a distinct ecological, historical, economic and socio-cultural identity, these various dimensions can be captured, while also recognizing that landscapes can also be seen as land use mosaics that are multi-functional (Arts *et al*., 2017).

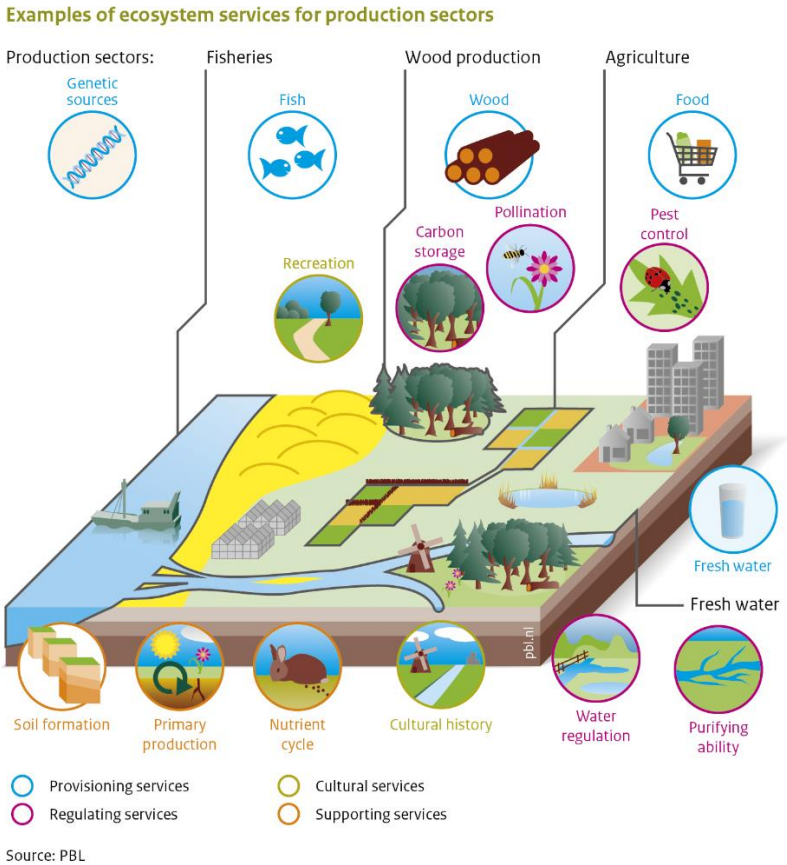
As such, *landscape* can serve as a uniting concept for various disciplines that deal with the human environment and its challenges, offering common ground to scientists, sociologists, economists and land management practitioners. Each group has different backgrounds, values, norms, ideas, and interests and can all meaningfully engage with landscape planning and management (Arts *et al*., 2017, Zurba *et al*., 2019).

A multi-functional landscape can meet a range of local needs simultaneously, (e.g. ensuring water availability; protecting biodiversity for crop pollination and wildlife tourism; producing nutritious and profitable crops). It can also contribute to national goals and commitments for global targets (e.g. for the SDGs, net reductions in land-based greenhouse gas emissions; targets for biodiversity conservation; generating power from renewable resources) (Thaxton, *et al*., 2015).

Describing the functions of landscapes using the concept of ecosystem services is common (Figure 2.3; De Groot *et al*., 2010; Hein *et al*., 2016). The Common International Classification of

Ecosystem Services (CICES), which is the recommended classification for accounting within the SEEA framework, recognizes three categories of ecosystem services: provisioning services (e.g. food and timber production), regulating services (e.g., carbon storage and sequestration), and cultural services (e.g., biodiversity values in local culture). Elsewhere, supporting services (e.g., nutrient cycling and soil formation) are recognized as another category of ecosystem services. They are considered necessary for the production of all other ecosystem services and differ from the other services in that their impacts on people are either indirect or occur over a very long time (MEA, 2005). All ecosystem services can be placed in the context of a landscape and therefore allow for analyzing synergies and trade-offs among different ecosystem services resulting from changes affecting the landscape.

Figure 2.3: Various ecosystem services positioned in a production landscape



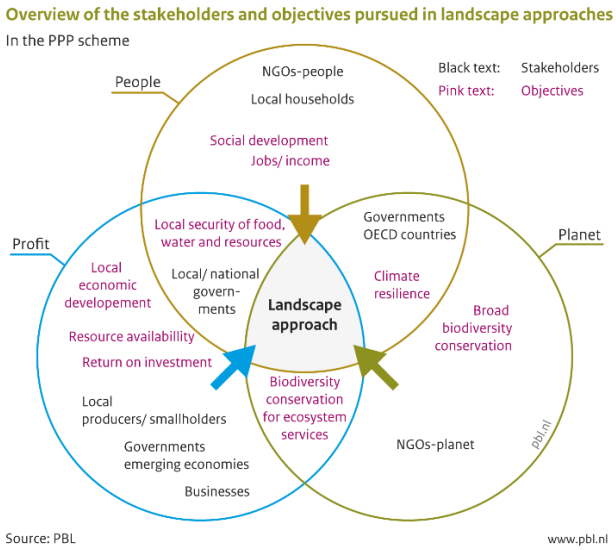
By focusing on interactions between ecosystem services and the ability to identify the various actors causing change or able to cause change to these ecosystem services, the landscape is a useful unit for assessing and achieving the SDGs (Thaxton, *et al*., 2015).

2.3.3 The landscape approach: promoting inclusion and sustainable development

Sectoral approaches to land use have dominated the resource management field to date. However, such approaches have not reflected the multi-sectoral nature of most landscapes, which can include the aims and activities of local communities, smallholder farms, protected areas, recreational activities, tourism enterprises, and/or commercial scale resource industries such as agriculture, forestry, or mining (Freeman et al., 2015; Reed et al., 2016; Scherr and McNeely, 2008). In response to this recognition, the landscape approach is increasingly promoted as an alternative instrument to conventional, sectoral land-use planning, governance, and management (Arts et al., 2017; Van der Horn and Meijer, 2015; Shames et al., 2017).

Historically, the landscape approach draws integrated spatial planning, a concept that was popular in the 1980s. This was inspired by discussions on nature conservation strategies in developed economies and fueled by debates on trade-offs between conservation goals and livelihood needs in developing economies. Since the 1990s, and in particular after the Rio Earth Summit in 1992, the landscape approach was linked to sustainable development. The concept urges cross-sectoral, multi-stakeholder, and policy integration at the "appropriate" scale, including landscapes (Figure 2.4; Arts et al., 2017, Sayer et al., 2013).

Figure 2.4: Overview of the different stakeholders in integrated landscape approaches, based on their primary interests, deploying the People, Planet, Profit (PPP) scheme



Reed et al. (2015) captured the main characteristics of a landscape approach:

> *"A landscape approach is a multifaceted integrated strategy that aims to bring together multiple stakeholders from multiple sectors to provide solutions at multiple scales. It can be broadly defined as a framework to address the increasingly widespread and complex*

> *environmental, economic, social and political challenges that typically transcend traditional management boundaries".*

Reed et al. (2015) explain that, as well as providing an alternative to conventional sectoral planning, the landscape approach is of interest because of its potential to deal with so-called wicked problems (complex issues laden with many uncertainties such as climate change, biodiversity loss, or sustainability in general). It is able to address the many trade-offs and inequalities in access to, and competing claims on, land and resources (e.g. by agriculture, mining, housing, leisure and nature conservation) (Arts et al., 2017; Gray et al., 2016; Sayer et al., 2013; Van der Horn and Meijer, 2015). It has also been advocated as a way to make policy, governance, and management more space- and scale-sensitive and to better take account of the linkages between people and their surroundings.

The recent IPBES and IPCC reports emphasize the need for further developing and operationalizing of landscape approaches. The main messages from the IPBES report is:

> "*cross-sectoral landscape approaches offer opportunities to reconcile multiple interests, values and forms of resource use, provided that these cross-sectoral approaches recognise trade-offs and uneven power relations between stakeholders. Integrated landscape governance entails a mix of policies and instruments that together ensure nature conservation, ecological restoration and sustainable use, and address the major drivers of biodiversity loss and nature deterioration*" (IPBES, 2019)

Similarly, within the UN CBD submissions for national biodiversity strategy and action plans, increasing attention is given to integrated approaches at the landscape level (Uetake et al., 2018). For the CBD's new post-2020 strategic framework, landscape approaches are gaining interest as a suitable framework for contributing to the realization of the CBD's vision of "Living in Harmony with Nature" by 2050.

2.3.4 The landscape approach in practice

The landscape approach aims to integrate the different objectives of various stakeholders by creating a sustainable system of management that benefits all stakeholders. To achieve this, three general dimensions need to be considered (FAO, 2012; Scherr et al., 2013; World Bank, 2014):

- *Horizontal*: spatially optimizing, across different decision makers, the management of various sectors that depend on natural capital: agriculture, livestock, forestry, fisheries and nature conservation, to ensure that across the landscape synergies are taken advantage of and trade-offs are minimized;

- *Vertical*: taking into account, next to local-level drivers, the drivers higher-up, such as higher-level institutions, land tenure, government policies (e.g. subsidies on energy or green technologies), markets (including financial institutions) and supply chains (e.g. prices of agricultural products and consumer demand), climate, and technology. These drivers influence the diverse sectoral activities within the landscape and might change the relationships between them, but could also provide opportunities;
- *Time*: ensuring that inclusive green growth is achieved through built-in, inclusive, well-informed decision-making processes that will respond quickly to internal and external changes to the landscape, and that decision making is based on long-term sustainability goals.

Given the diversity of landscapes worldwide, it is not surprising that there is no single blueprint for implementing a landscape approach.

Sayer et al. (2013) addressed this by developing a set of ten design principles to guide landscape-level processes and by acknowledging that such processes are hard to predict and should be characterized as "muddling through" and "learning by doing" rather than *ex ante* design and planning. The ten principles of Sayer et al. (2013) are:

1. The dynamic nature of landscapes forms the basis for continual learning and adaptive management.
2. Intervention strategies are built on common concerns and shared negotiation.
3. Landscape processes are shaped by influences from multiple scales.
4. Landscapes are multifunctional by nature, which requires choices and trade-offs.
5. Multiple stakeholders frame objectives differently, hence all stakeholders need to be engaged.
6. Trust among stakeholders is crucial to build up a negotiated and transparent change logic.
7. Clarification of rights and responsibilities, especially regarding land and resource use, is a necessity.
8. Monitoring of progress has to be done in a participatory and user-friendly manner.
9. System-wide resilience is to be achieved through recognizing threats and vulnerabilities, and the capacity to resist and respond.
10. The complexity of landscape processes requires strong capabilities of all stakeholders involved.

A prerequisite for all these principles is that all stakeholders are able to generate, gather, and integrate the information they require to interpret the activities, progress, and threats. Gathering and interpreting such information is a vital part of developing and updating the "theories of change" on which the landscape approach is based (Sayer et al., 2013).

The 10 principles were adopted by the CBD to "improve sustainable use of biodiversity in a landscape perspective" (UNEP, 2011). A review of selected landscape projects in Africa and Asia found that the principles have been applied selectively, and often adapted to specific local conditions and needs (Sayer et al., 2016). However, there is overall agreement that participation, interdisciplinary, multi-functionality and sustainability are the main concepts of an integrated landscape approach (Freeman et al., 2015; Reed et al., 2015) and this is the way term is used in this paper.

Currently, there a several global initiatives promoting the concept of the integrated landscape approach, its implementation in initiatives and organizing dialogues and learning events. These include:

- *Landscapes for People Food and Nature* (LPFN) initiative: a network of organizations promoting the creation and sustainability of integrated agricultural landscapes. Partners range from global organizations such as FAO, ICRAF and World Bank to local NGOs.
- *Global Partnership on Forest and Landscape Restoration* (GPFLR): a network focusing on restoration projects contributing to the Bonn Challenge, driven by IUCN.
- *Global Landscapes Forum* (GLF): a knowledge-led platform on sustainable land use, dedicated to achieving the Sustainable Development Goals and Paris Climate Agreement, organized by CIFOR, UNEP, World Bank and the German government.
- *Satoyama Initiative*: a global network inspired by the CBD, focusing on working together to realize societies in harmony with nature and emphasizing the cultural identity of landscapes.

Between 2013 and 2016, the LPFN initiative surveyed 428 examples of locally-driven, long-term integrated landscape initiatives (ILI) in Latin America, Africa, Asia and Europe. The overall conclusions of the study were: (1) they all involved stakeholders from different scales and sectors; (2) had been operational for several years; and (3) were working towards multiple objectives for agriculture, environment and human well-being. Their geographic areas ranged from ten square kilometres to tens of thousands of square kilometres, with populations from several thousand people to several million. More than 90% of the initiatives included farmer organizations as key partners. Private sector actors were involved, but their participation could

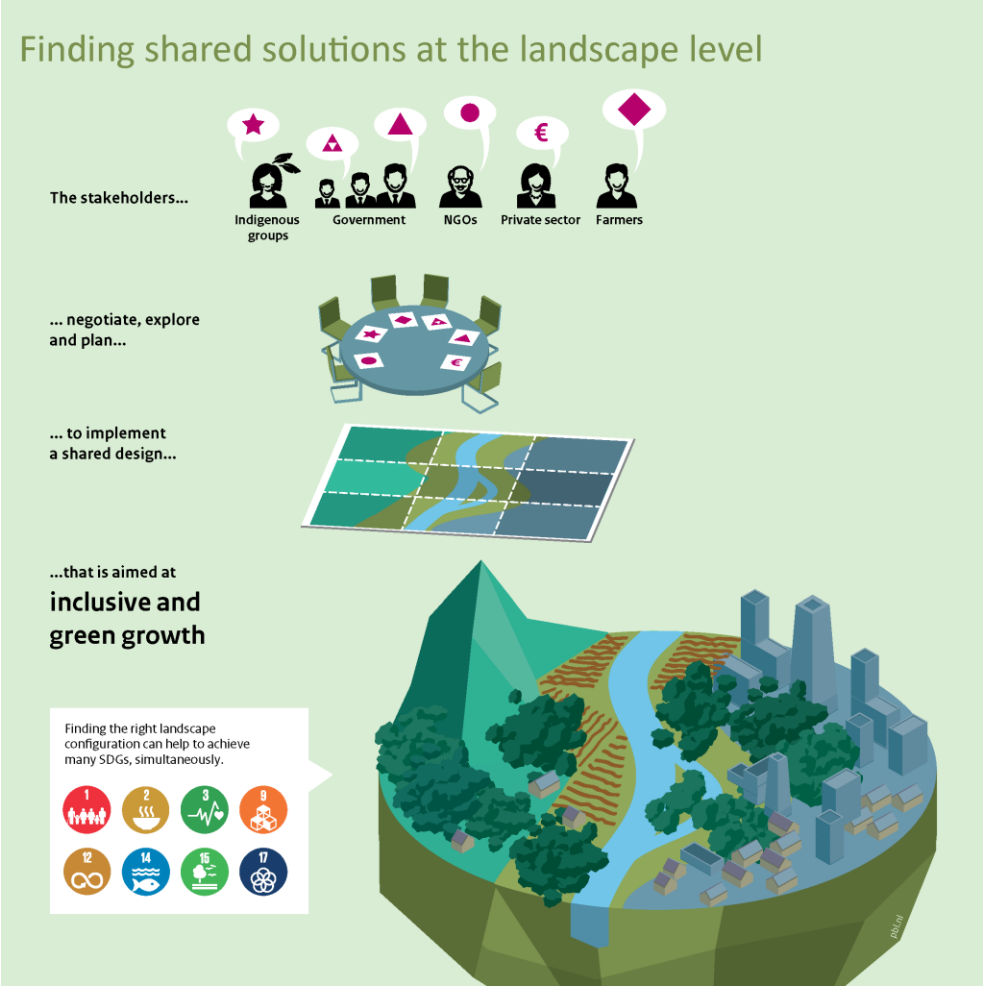
be improved. Though most of the claimed achievements of the ILIs were self-reported and not backed by quantitative evidence, 90% of Asian ILIs reported having baseline data, and aspects of monitoring and evaluation in place, enabling them to quantitatively assess ILI outcomes over time. However, greater investment in collecting and analyzing quantitative data on multiple landscape outcomes was urged for the African and Latin American ILIs, , so that independent verification would be possible. Disaggregated data was needed to reveal, for instance, the distribution of changes in food production, income, and use of natural resources across a landscape (Estrada-Carmona et al., 2014; Garcia-Martin et al., 2016; Milder et al., 2014; Zanzanaini et al., 2017).

Key critiques of the implementation of the landscape approaches were that focusing on creating win-win solutions seems naïve, and that achieving cross-sectoral integration in a world of governmental policy silos and scattered and non-standardized data is highly ambitious. However, ILM and NCA approaches could address these barriers – helping integrated institutional development via multi-stakeholder platforms, governance strategies and assessments, and supporting processes on joint learning, negotiation and reflection, backed by regular, independent, structured and authoritative data (Arts et al., 2017; Bass et al., 2017, Burgi et al., 2017, Kusters, 2015).

2.3.6 Managing the multi-stakeholder process in a landscape approach

Integrated Landscape Management (ILM) is the process by which various stakeholders can plan, implement and monitor actions to support their goals, including the SDGs and green growth (Figure 2.5). ILM is suited to landscapes where there are strong interactions and interdependencies around natural resource use and management. In most such places, government policies alone cannot resolve trade-offs or mobilize synergies between different stakeholders. Stakeholders need to be involved directly in negotiations and make commitments to incorporate agreed strategies and objectives into their own businesses and programmes (Ros-Tonen et al., 2018).

Figure 2.5: A multi-stakeholder approach towards achieving inclusive and green growth



Source: PBL People and the Earth report, 2017

An effective ILM process creates an improved understanding among stakeholders on the conditions and dynamics required for a sustainable landscape, and results in a plan of action that includes win-win interventions, realizes opportunities for blended investments, and mobilizes collaborative action to improve institutional and policy conditions. ILM, regardless of the 'entry point' for action in a particular landscape or among the stakeholders, has five key features (Scherr et al., 2013):

1. There are shared or agreed management objectives that encompass the economic, social and environmental outputs and outcomes desired by stakeholders in the landscape (commonly human well-being, poverty reduction, economic development,

food and fiber production, climate change mitigation, and conservation of biodiversity and ecosystem services).

2. Field, farm and forest practices are designed to contribute to those multiple objectives.
3. Ecological, social, and economic interactions among different parts of the landscape are managed to realize positive synergies among interests and actors or to mitigate trade-offs.
4. Collaborative, community-engaged processes are in place for dialogue, planning, negotiating and monitoring decisions.
5. Markets and public policies are shaped to achieve the diverse set of landscape objectives.

ILM implementation generally follows a learning and negotiating cycle with five key elements (Scherr et al., 2013):

1. Formation and organization of a multi-stakeholder platform;
2. Development of a shared understanding among stakeholders of landscape challenges and opportunities;
3. Agreement on broad ambitions for the landscape, strategies to achieve them, and an action plan;
4. Implementation, with refined intervention design, associated investment and policy action and;
5. Monitoring and impact assessment to inform the next cycle of stakeholder action.

Similar features were identified by Shames et al. (2017) as goals for government management.

Spatial information and analysis, and land-use planning can play a strategic role in each of these elements, helping to identify those land uses and management regimes that best meet the demand from stakeholders in different parts of the landscape, while safeguarding soil, water, and biodiversity for future generations.

With respect to the learning and negotiating cycle, Burgi et al. (2017) identify four pillars, similar to the ILM cycle elements, and illustrate the role and contributions of various knowledge providers (Table 2.2). This ranges from providing local ecological knowledge to improving understanding of landscape processes, to offering information required for spatial modelling and scenario building (Meijer et al., 2018).

Spatial planning is an important instrument that could support the ILM process, and *vice versa*. The negotiated outcomes from multi-stakeholder ILM discussion platforms could improve spatial and land use plans (Tisma and Meijer, 2018).

Table 2.2: Role and contributions of knowledge providers in the learning and negotiating circle (Adapted from Burgi et al., 2017)

Knowledge Provider	*Understanding of the functioning of the landscape*	*Exploring societal demands and environmental change*	*Designing future landscape options*	*Transforming based on negotiated interventions*
Scientific community	Methodology for synthesizing State of the art ecological knowledge	Climate change scenarios Global change scenarios Projections of Ecosystem Services demands	Modelling framework Optimization models	Process moderating Policy analysis Prototype effectiveness evaluation
Citizens, local land users and community based organizations	Local ecological knowledge	Local needs considering climate/global change	Scenario building Participation in design of landscape options	Participating in learning platforms (farmer to farmer)
Government authorities	Institutional knowledge	National/regional priorities	Scenario building Participation in design of landscape options	Policy framing and opening
Development agencies	Internationally demanded Ecosystem Services	Locally adapted SDGs	Official Development Assistance (ODA) agendas as input to scenario building and design of landscape options	Resources to test identified development options
Success indicators	Improved system understanding, joint learning on landscape potentials and threats	Set of scenario inputs developed that both reflect the local needs, as well as fitting the national and global context and ambitions	Set of alternative landscape options adapted to varying scenario contexts on which ownership is shared by the different participants in the co-design process	Prototype for landscape options implemented or policy options put forward and discussed; increased commitment for action and implementation for all stakeholders

In order for ILM to benefit from and influence spatial and land use planning, credible and up-to-date data describing the status and flow of natural resources and ecosystem services is

required (Albert et al., 2014; Boyd et al., 2018; De Groot et al., 2010; Vardon et al., 2018). This is the kind of information that is sought after and organized by natural capital accounting.

2.4 Natural capital accounting in landscapes

This section introduces natural capital accounting (NCA) – what it is, who produces it and who uses it. It then goes on to describe the links between NCA and the landscape approach, using ILM as an example of the landscape approach, summarizing the range of experience to date in diverse countries.

2.4.1 Background on natural capital accounting

NCA is undertaken or being developed by governments in more than 100 countries.[53] The level of work varies, from some countries that have been producing a suite of accounts for some time (10 years plus), to countries that are just beginning to produce accounts. Box 3.1 provides a brief introduction to natural capital accounting. Useful examples of accounts can be found in databases of the World Bank[54] and United Nations.[55] Most are at the national level, while other work has been at subnational levels. While most work has been executed by government agencies, there are a few examples of academic institutions and non-government organizations that have produced accounts. Much of this work, particularly at the subnational level, has been aiming to provide information for land and water management.

Examining the effectiveness of production and use of natural capital accounts at the Policy Forum on Natural Capital Accounting for Better Decision Making held in 2016, 2017 and 2018[56] has helped to develop and validate the Ten Principles for making accounting fit for policy purposes (Table 2.3). There is a good *prime facie* case for using NCA in integrated landscape management. Firstly, the 10 principles of landscape approaches (Sayer et al., 2013, see Section 2) can be successfully mapped to the 10 principles for 'policy-fit' NCA (Table 2.4) – there is a strong commonality of purpose and approach between ILM and NCA. Secondly, there are a number of examples of accounts produced with the purpose of aiding land management which we can learn from (Table 2.5).

[53] See Global Assessment of Environmental-Economic Accounting 2017.
[54] See WAVES Knowledge Centre
[55] See System of Environmental-Economic Accounting – Data
[56] See https://www.wavespartnership.org/en/policy-forum-natural-capital-accounting-better-decision-making

Box 3.1. What is natural capital accounting?

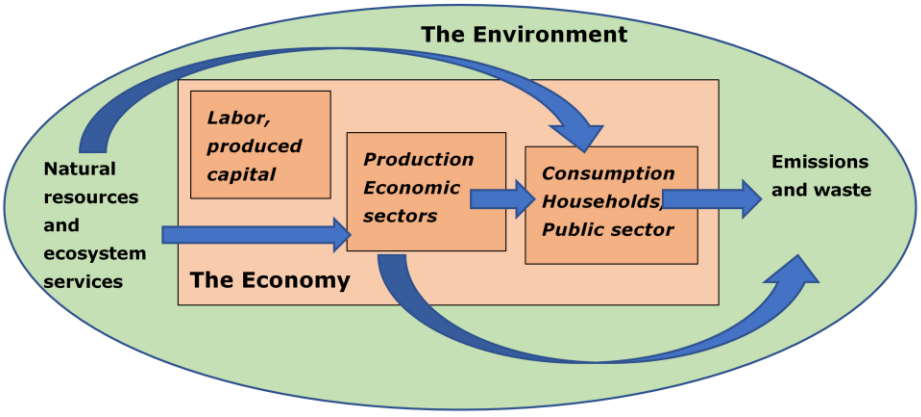
Natural capital accounting integrates natural resource and economic analysis, providing a broader picture of development progress than standard measures such as GDP (Gross Domestic Product).

Natural capital accounts are a set of objective data that show how natural resources contribute to the economy and how the economy affects natural resources. These accounts can provide detailed statistics for better management of the economy, such as accounts for the inputs of water, timber and energy as well as the outputs of pollution that are needed to model green-growth scenarios. The use of ecosystem services by the economy and people are also important to consider.

The concept of accounting for natural capital has existed for more than 30 years. In 2012, the United Nations Statistical Commission adopted the System for Environmental and Economic Accounts (SEEA). This system provides an internationally agreed-upon concept and method for account production. Accounting for ecosystem services is relatively new, with an experimental framework available in 2014.

Figure 2.6 illustrates the universe of natural capital accounts. The data that go into the rectangle representing the economy are from the System of National Accounts (SNA) and are economic in nature. The natural capital accounts provide data on natural resources, such as minerals, timber, and fisheries going into economic production and consumption, as well as the resulting emissions and waste. Integrating data on economic activities and the environment enables the analysis of different scenarios, for example, how the development of the economy affects the environment or how the degradation of the environment will affect the economy. This in turn enables the development and application of better policies that take into account the links between the environment and the economy.

Figure 2.6: The environmental and economic context for NCA



For more information on this topic, see the WAVES website, Natural Capital Accounting, http://www.wavespartnership.org/en/natural-capital-accounting, and System of Environmental Economic Accounting, https://unstats.un.org/unsd/envaccounting/seea.asp.

Table 2.3: Ten living principles for NCAs fit for policy purpose

Comprehensive:	
1. Inclusive	Acknowledging the diverse stakeholders concerned with decisions affecting natural capital, responding to their information demands, respecting different notions of value, and using appropriate means of engagement.
2. Collaborative	Linking the producers of NCAs, the users of NCAs for policy analysis and the policy makers using the NCAs results, and building their mutual understanding, trust, and ability to work together.
3. Holistic	Adopting a comprehensive, multi/interdisciplinary approach to the economic and environmental dimensions of natural capital and to their complex links with policy and practice.
Purposeful:	
4. Decision-centred	Providing relevant and timely information for indicator development and policy analysis to improve and implement decisions with implications for natural capital.
5. Demand-led	Providing information actually demanded or needed by decision makers at specific levels.
Trustworthy:	
6. Transparent and open	Enabling and encouraging public access and use of NCAs, with clear communication of the results and their interpretation including limitations of the data sources, methods, and/or coverage.
7. Credible	Compiling, assessing, and streamlining data from all available sources, and deploying objective and consistent science and methodologies.
Mainstreamed:	
8. Enduring	With adequate, predictable resourcing over time; continuous application and availability; and building increasingly rich time series of data.
9. Continuously improving	Learning focused, networked across practitioners and users, testing new approaches, and evolving systems to better manage uncertainty, embrace innovation, and take advantage of emerging opportunities.
10. Embedded	NCA production and use becoming part of the machinery of government and business, building capacity, improving institutional integration for sustainable development, and incorporating NCAs use in procedures and decision-support mechanisms.

Source: Bass et al. (2017)

Table 2.4: The 10 principles for an integrated landscape management (after Sayer et al., 2013) linked to natural capital accounting

ILM principle name and number	Notes on the ILM principle	What NCA offers to implement the ILM principle
1. Continual learning and adaptive management	Expensive, slow, difficult to show results, disconnect with funding cycles, risk aversion, requires analytical skills, burn out	NCA can provide a regular suite of data that can inform government, business and individual decision making – this relates to NCA Principle 9 Continuously improving (Table 2.3). A feature of macro-economic management is the regular data that is available from the SNA and other sources and institutions that know how to interpret and use the data. Regular production of NCA could lead to the development of similar institutions for environmental and "sustainability" management.
2. Common concern entry point	Lack of common entry point, entrenched position, conflict and distrust	Accounts can provide a common and trusted entry point for diverse agencies in the public and private sectors. This may be useful for increasing trust and credibility (NCA Principles 6 and 7), identifying areas of real difference and enabling different "players" to find common ground and work towards shared solutions.
3. Multiple scale	Lack of methods for scaling up, endless complexity, time lags, limited predictability, disconnect between levels, difficulty of linking local to macro scale drivers of change	NCA can be scaled. It has grown out of national level macro-economic management but increasingly there are sub-national accounts applied to local and regional issues. This is related to NCA Principle 5 Demand-led, providing information at the right scale.
4. Multi-functionality	Difficulty to manage diversity and complexity, trade-offs, incorporate multiple intangible values	NCA includes measurements in physical and monetary units and allows trade-offs to be assessed in multiple ways (e.g. non-monetary benefits can be assessed against changes in economic output and the condition of the environment).

ILM principle name and number	Notes on the ILM principle	What NCA offers to implement the ILM principle
5. Multiple stakeholder	Conflicting objectives, hidden agendas, identifying appropriate stakeholders, lack of capacity, power imbalance, lack of conceptual frameworks, distrust, high transaction costs, communication breakdowns	NCA presents a range of information. It links economic information to environmental information in a conceptual framework. With regular production on NCA, over time the framework and data presented will become better understood and used by different "players". This should also reduce transaction costs and improve understanding between different groups and is NCA Principle 1,2, and 3: inclusive, collaborate and holistic.
6. Negotiated and transparent change logic	Hidden agendas, conflict of interests, lack of accountability, corruption, different norms and mediation institutions	NCA provides a standard system for measuring the environment and the economy and NCA Principles 6 and 7, respectively transparent and open and credible. The logic of NCA is outlined in international documents that are adopted through formal UN processes.
7. Clarification of rights and responsibilities	Legitimacy, overlapping rights or claims, unequal access to justice, corruption, power imbalances, lack of awareness, knowledge and education	NCA provides information to all. It is useful for information provision to be separated from policy decisions as occurs for economic decisions, with the SNA produced by statistical agencies, whereas economic decisions are made by central agencies and departments of finance, economic planning, etc.
8. Participatory and user-friendly monitoring	High transaction costs, lack of capacity, no linkage to decision making and benefits, formal vs. informal monitoring, social and political structure, credibility	The development of NCA needs to be inclusive and collaborative (NCA Principles 1 and 2). In addition, NCA, and in particular the SEEA, has developed via international processes and builds on national statistical processes that deliver economic information, via the SNA, linked to environmental information. This makes the information credible (NCA Principle 7). These processes have data quality assurance processes and in most countries the SNA data is seen as credible by most. NCA can leverage this credibility.

ILM principle name and number	Notes on the ILM principle	What NCA offers to implement the ILM principle
9. Resilience	Complexity, difficult to operationalize, inherent uncertainty in system, insufficient information, basic concept used ambiguously	NCA can be mainstreamed (NCA Principles 8-10) providing a flow of information. In addition, NCA via ecosystem accounting can be used to operationalize and investigate "resilience". It may be able to define more precisely, in terms of ecological function and how this relates to economic production and human wellbeing, what is meant by resilience (e.g. is it the environment or human activity and the environment). This process is in line with NCA Principle 5, Demand-led.
10. Participatory GIS	Lack of basic education and skills, limited government and institutional investments, short term projects, ubiquitous situations of weak governance and institutional failures make operationalization difficult	Regular production of NCA at multiple spatial scales would provide a framework for operationalizing participatory GIS. This is very much in line with NCA Principles 8, 9 and 10 on mainstreaming NCA production. It would also provide a framework for government investment in data organization and data use.

2.4.2 What roles can NCA play in ILM?

A number of land allocation and management actions can be informed by NCA, for example:

- Assess trade-offs between social, economic, and environmental use of land;
- Maximize economic returns from investments in land and land management;
- Minimize environmental degradation from economic activities on land;
- Achieve sustainable development.[57]

Table 2.5 provides a summary of existing accounting work related to integrated landscape management at both national and subnational levels. In general, national statistical offices have focused on national level accounting, while other agencies and academic researchers have worked at subnational levels. As the table shows, water, land or ecosystem accounts have been the main accounts used to assess land management issues.

Table 2.5: Summary of NCA and ILM examples

Country	Account types produced	Land management issues	References
Australia	Water Land Ecosystem	Protected area management - Great Barrier Reef - Victoria Water supply Forest management Water shed management	ABS (2017) Eigenraam et al. (2013) ABS and BoM (2019) Varco et al (2013) Keith et al. (2017)
Botswana	Water	Water supply management	Pule and Galegane (2017)
Brazil		Water resource management	IBGE (2018)
Canada		Clean growth & climate policy analysis; trade agreement analysis; forest carbon budget (2018)	Ruijs and Graveland (2019)

[57] As noted in the Introduction (Section 1), the use of natural capital accounts to achieve the Sustainable Development Goals (SDGs) has been examined in detail by Ruijs et al. (2018), so will not be considered further here.

Country	Account types produced	Land management issues	References
Colombia	Forest Water Ecosystem	Forest Water pricing Water shed management - Lake Tota - Chinchina - Orinoquia	DANE (2017) Romero et al (2017a) Romero et al (2017b)
Costa Rica	Forest Water CO_2	Timber supply Water supply Ecotourism Climate change	Gutiérrez-Espeleta (2017) Rivera et al. (2017) The Contribution of Energy and CO2 Accounting to Policy in Costa Rica
Guatemala	Land Forest	Forest management Fuelwood supply	Castaneda et al. (2019)
Indonesia	Land Ecosystem	Management of forest and peatland	Garrido et al. (2019)
Madagascar	Water	Water supply	BRL (2016)
New Zealand	Forest	Forest management	Yao et al. (2019)
The Netherlands	Ecosystem	Food and water supply and nature conservation	PBL (2016), Atlas Natural Capital (2019), CBS (2018)
Peru	Ecosystem	Water management Biodiversity conservation	Portela et al. (2018)
The Philippines	Ecosystem	Water management and pricing including valuation and biophysical monitoring; Local landscape management; Assessing mangroves & coastal protection; fisheries	Reported at the 2016 Policy Forum Reported at the 2018 Policy Forum
Rwanda	Land Water	Land use planning; Review of Water Master Plan; biophysical monitoring & indicators (2016)	Reported at the 2016 Policy Forum[58]

[58] See: Rwanda NCA Process and potential

Country	Account types produced	Land management issues	References
South Africa		Spatial Planning Ecosystem restoration Water security Protected Area expansion Biodiversity mainstreaming	Reported at the 2017 Policy Forum[59] [60] Reported at the 2018 Policy Forum[61]
Uganda	Ecosystem	Protect area management Species management	King et al (2018) UNEP-WCMC and IDEEA (2017) Land accounts from government yet to be officially released
United Kingdom	Land Forest Ecosystem	Urban planning Forest management	Harris and Smith (2019)
Zambia	Water Forest Land	Climate risks to water supply and biodiversity; forest production modelling including honey	Yet to be officially released but reports at 2018 Policy Forum[62]

2.5 Case studies linking ILM and NCA

To illustrate the use of the NCA for ILM, we briefly present the experience from five case studies: Australia, Indonesia, Guatemala, Rwanda and The Netherlands. Other examples can be found in the publications referenced earlier in Table 2.5.

The case studies selected are: (1) ecosystem accounts (Australia); (2) land and peat swamp accounts (Indonesia); (3) agriculture and ecosystem accounts (Guatemala); (4) water and land accounts (Rwanda); and (5) planning and ecosystem accounts (Netherlands). These span local level and national applications as well as different themes e.g. management for water or timber supply, climate change and biodiversity conservation. In all cases, trade-offs were recognized in the accounts and the information could be used in decisions about integrated land management. In addition, a key benefit in the development of all the

[59] See: Policy applications: Spatial planning, ecosystem restoration, water security and protected areas

[60] See: Policy applications of ecosystem accounts: Emerging examples from South Africa

[61] See Natural Capital Accounts and mainstreaming biodiversity: Some reflections from South Africa . See also the SANBI website

[62] See Zambia - climate change policy and accounting. Presentation to the 2018 Policy Forum

accounts was that account producers and land and water managers were brought together enabling an increase in the understanding between the two groups. This ensured that relevant data was available and that the quality of the data was understood. In some cases, draft accounts were revised and updated information was included in the final versions of the accounts.

2.5.1 Australia: forest management for timber, water and biodiversity conservation

Ecosystem accounts that have been developed in Australia for the Central Highlands region, near Melbourne are informing a government decision-making process known as Regional Forest Agreements, which determine how forests across Australia can be used (Keith et al. 2017; Keith et al 2018). The native forest on public land in the region is managed under a Regional Forest Agreement that guarantees wood supply within a defined area on public land and conservation within national parks. This agreement is currently being re-negotiated. Synthesizing environmental and economic information in the form of ecosystem accounts has allowed quantitative comparisons in physical and/or monetary terms that enabled trade-offs to be defined explicitly and spatially.

The exploration of ecosystem accounts was done as native forest timber harvesting conflicts with other industries including water supply and tourism. To help assess the situation, accounts of the ecosystem services of water provisioning, carbon sequestration, biodiversity conservation and recreation were developed. As well as the values of ecosystem services, the economic value-added of industries that rely on the ecosystem services was also calculated.

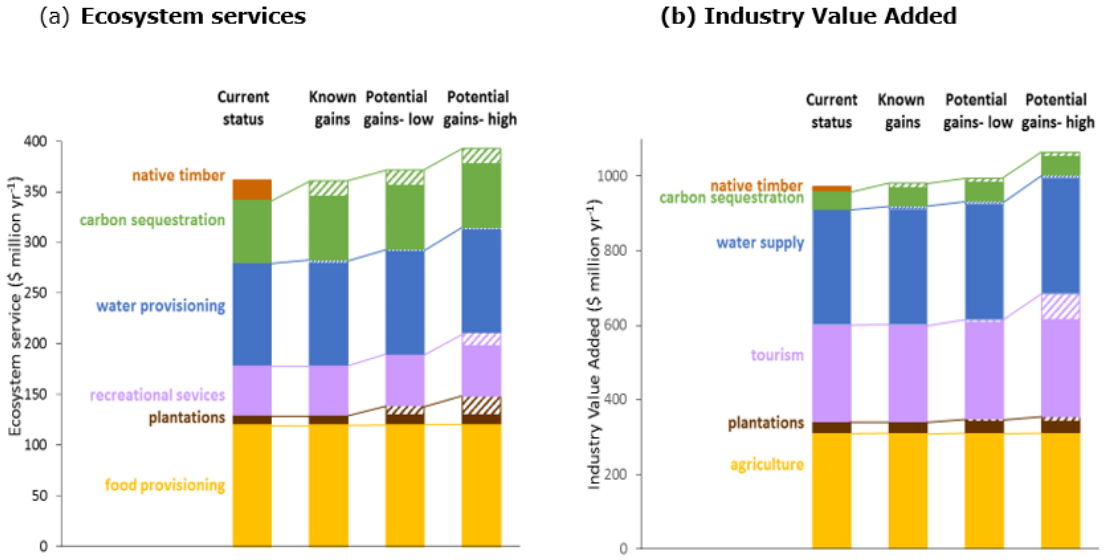
The results indicated that a transition away from native forest harvesting would improve the condition of ecosystem assets, the conservation of biodiversity, and the provision of ecosystem services for other land uses, and would reduce the threat of extinction of critically endangered species. They also showed that economic gains from increased water supply and carbon storage exceeded the losses from ceasing native timber production. Results from the study are contributing to the Regional Forest Agreement as well as government decision making more generally and public education (Keith et al., 2018).

As part of the development of the accounts, a draft of the accounts was discussed at a workshop with a range of government agencies, academics and other interested parties.[63] The discussion was important, as it enabled potential users of the accounts to see what they looked like, to ask questions and to consider how they might use the final accounts.

[63] Draft document for discussion see here

These discussions led to the addition of plantation forests to the final accounts when they were released.

Figure 2.7: Value of ecosystem services and Industry Value Added (2013-14), and the potential changes if native forest harvesting ceased



The accounts for the Central Highlands also produced estimates for how the value of ecosystem services and industry value added would change if the harvest of native forests for timber stopped (Figure 2.7). Estimates were made for known gains, mostly to carbon sequestration and water provisioning, as well as potential increases in tourism and timber provisioning from plantation forests were also accounted for.

The new Regional Forest Agreement is being discussed, with the accounts and the projections based on the accounts being part of information informing the process. The accounts for the Central Highlands highlighted several points:

- The need to identify the drivers of ecological change. It is important to understand the reasons for change in the past and to allow for prediction of future changes.
- The economic data available are generally for large spatial areas, and not related to biophysical characteristics. Methodological development is needed to improve spatial attribution of economic and social data to match environmental data.

- Choosing the boundary for a study area is complex, because the area of interest to stakeholders must align with the data sources available. The many sources of data in the accounts use different boundaries, such as natural resource management area, catchments, local government, statistical areas, ecosystem types and land use regions. No single boundary will accommodate all the different sources of data. In general, the biophysical data needs to be scaled up and the economic data scaled down.
- Multiple products are going to be needed if the communication of accounts information is to be effective for multiple audiences.

The last point is very important as the accounts, and the scenarios that were based on them, are new and not understood by all. Workshops, information papers, general brochures, popular articles, use of social media and briefings of senior government officials all helped to get the accounts noticed and used (or at least recognized) in the negotiations over the long-term use of the forest (i.e. in the Regional Forest Agreements).

2.5.2 Indonesia: low carbon development and forest management

A direct product of WAVES involvement in Indonesia was the *Low Carbon Development Initiative for Indonesia Report* (Garrido et al., 2019). Indonesia is a diverse archipelago nation of more than 300 ethnic groups, has the world's fourth largest population, and has the largest economy in Southeast Asia. In particular, it has a large forest area that is shrinking due to economic development – from 2000 to 2010, Indonesia averaged about 6% economic growth due largely to its rich base of natural capital. Continuous economic growth has allowed the country to become a middle-income country with the poverty rate reducing from 70% in 1984 to less than 10% in 2019. But these gains were accompanied by significant pressure on natural capital, which is now likely to threaten future growth.

Indonesia's high economic growth has relied largely on natural resources, with agriculture, forestry and fishing contributing 11.4% to GDP. Agriculture has mainly relied on expansion into new lands, with, for example, the clearing of forest for oil palm. Forest area decreased by 22 million ha between 1990 and 2014, resulting in reduced biodiversity and high carbon emissions (1,454 MtCO2-eq. in 2016). The air pollution from these emissions has also caused serious health effects for Indonesia's population: recent estimates indicate that the total annual cost of premature deaths from air pollution was about 3.5% of Indonesia's GDP in 2015.

The Government of Indonesia has become increasingly aware of the overall importance of forest and is proactively addressing management challenges. More recently,

comprehensive analysis of the prospects for a low-carbon economy allowed Indonesia's Government to better understand the ways to grow the economy sustainably and reduce pressure on natural capital. Bappenas (Indonesian's National Development and Planning Agency), in cooperation with several development partners, including the World Bank, introduced the Low Carbon Development Initiative for Indonesia (LCDI) to explicitly incorporate Green House Gases (GHG) emissions reduction targets into the country's Mid-Term Development Plan (RPJMN 2020-2025), along with other interventions for preserving and restoring natural resources at the regional level and for particular ecosystem types.

Within this, Indonesia's peats swamps are an important store of carbon: consequently, special accounts were prepared for them[64] in addition to the land accounts. These accounts and related modelling allowed the government to explore ways to maintain economic growth while minimizing forest and peatland loss, thus keeping the emissions low. One of the key findings of the LCDI report was that a low-carbon growth path can deliver an average GDP growth rate of 6% annually until 2045. By sustainably using natural resources, and by reducing carbon and energy intensity, Indonesia's total GHG emissions could fall by nearly 43% by 2030. This surpasses Indonesia's target in its national climate action plan (Nationally Determined Contribution – NDC), presently set at 41% below baseline. In these scenarios, forested land is also predicted to expand, while fish stocks should remain stable, while peat degradation should be largely avoided. Investments totaling between US$14.6 billion to US$22.0 billion per year for 2020-2024 are required to realize such improvements. This is equivalent to between 1.0 and 1.7% of GDP.

Further analysis of the accounts combined with a modelling exercise helped to understand how economic growth could be constrained by the limits of natural capital and the ecosystem services that it provides (i.e. provisioning, regulating and cultural services). In terms of policy uptake, this represents a key contribution of NCA in Indonesia as this work underpins decisions that could be made in the next five-year policy cycle.

2.5.3 Guatemala: climate change

The development of natural capital accounts in Guatemala was useful for understanding the impact of the economy on the environment and the contribution of the environment to the economy. The accounts were also used for identifying opportunities for innovation and promoting activities that could lead to sustainable development. From a macroeconomic perspective, the accounts were useful for sending signals to decision makers about the need to reduce negative externalities and to promote green growth.

[64] See Pilot Ecosystem Account for Indonesian Peatlands Sumatera and Kalimantan Islands

Importantly, the accounts helped to inform the national development plan and the competitiveness strategy (Castaneda et al., 2019).

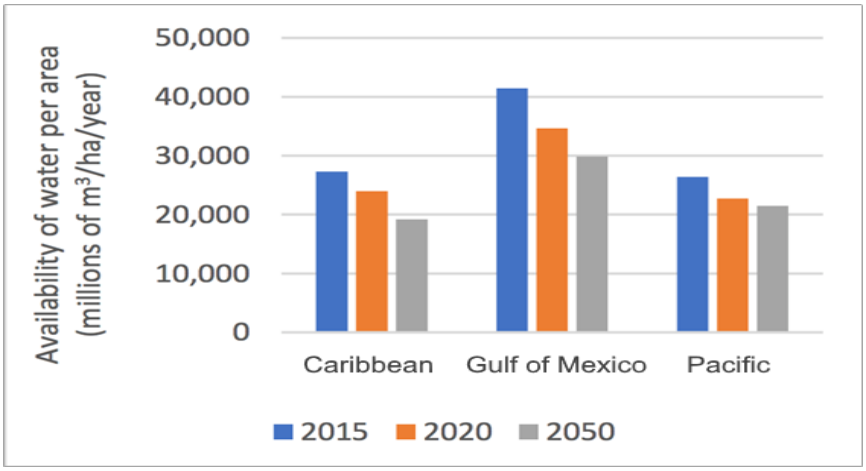
In support of ILM, Guatemala's agriculture and environment accounts provided information for strategic decisions on issues of food security and sovereignty, which are critical for future development and poverty reduction and are a primary concern of the National Development Plan. The ecosystem accounts were also useful for deepening the analysis of natural capital's potential for meeting the priorities of economic and social policy responses.

For climate change, the accounts provided the basis for a forward-looking perspective and useful information for appraising at least four of the six lines of adaptation considered by the National Action Plan on Climate Change, namely:

1. Agriculture, livestock and food security;
2. Forest resources, ecosystems and protected areas;
3. Integrated water resources management; and
4. Marine coastal zones.

The strategic objective of the National Action Plan on Climate Change is to guide the actions of public institutions with the purpose of reducing the vulnerability of the country to climate change, preventing and reducing its negative effects, prioritizing the protection of the vulnerable population and their livelihoods, and identifying opportunities for better development of the country.

Figure 2.8 Forecast availability of water under climate change scenarios for three ecological zones of Guatemala



As an example of the information that the accounts provided and that was used to inform climate change policy, Figure 2.8 shows climate change scenarios for the availability of water in the future for three different ecological zones within the country. The modelling shows declining water availability across all areas. It enables national and local agencies to plan for reduced levels of water and to assess development options. For the latter, options that use less water would be preferred, but this needs to be balanced against the need for food security within the country.

The fundamental drivers of climate change are GHG emissions and the main source of energy in Guatemala was fuelwood. The accounts showed that the total human contribution to GHG emissions from the combustion of different energy sources accounted for 45.6 million carbon dioxide metric tons equivalent.

Climate change is also related to forest extent, condition and use, including fuelwood extraction from forests and agricultural areas expanding into forests. The forest accounts for Guatemala showed that 40% of forest cover was lost between 1970 and 2005, and moreover that forests in nine out fourteen ecoregions were severely fragmented – to a point where their integrity and the provisioning of natural goods and services can no longer be guaranteed. The economic costs of forest loss and degradation, such as loss of the ability of forests to control erosion and their capacity to store carbon, were equivalent to Q2,919.4 million (~US$374.3 million) between 1991 and 2003.

A key finding of Guatemala's forest accounts was that over 95% of this deforestation occurred outside the control of government institutions. Furthermore, analysis of the accounts showed that the impact of the harvest of fuelwood on the forest was greater than previously thought. While there was a loss of forest, the contribution of forest products to the national economy was noteworthy, accounting for 3.15% and 2.57% of GDP for the years 2001 and 2006, respectively.

The natural capital accounting work in Guatemala has already been used by a number of government agencies and their policy documents. For example:

- The Ministry of Public Finance's Environmental Fiscal Strategy 2018 established strategic lines for incentives and taxes to reduce and manage environmental impacts.[65]
- The Ministry of Environment and Natural Resources used accounts in the report of the State of Guatemala for monitoring and evaluating environmental trends in

[65] http://www.minfin.gob.gt/index.php/acuerdos-ministeriales/2-uncategorised/3502-estrategia-fiscal-verde

Guatemala[66] and in the Base Document of the environmental pact in Guatemala 2016-2020.[67]

- The Climate Change Science System first used the accounts in a report that systematizes the climate change knowledge of Guatemala and uses this to assess the probable repercussions for the country.[68]
- This use of accounts bodes well for embedding NCA, helping to better integrate Guatemala's institutional arrangements

2.5.4 Rwanda: integrating land and water management in catchment planning

Rwanda is one of the most densely populated African countries, with an area of 26,338 km^2, a population of about 12 million meaning there is an average of 455 people per km^2. Considering that the country has limited natural resources and land availability is a constraint to achieving food security, agricultural productivity must be increased. However, the high population density leads to plot fragmentation, land scarcity, and land degradation.

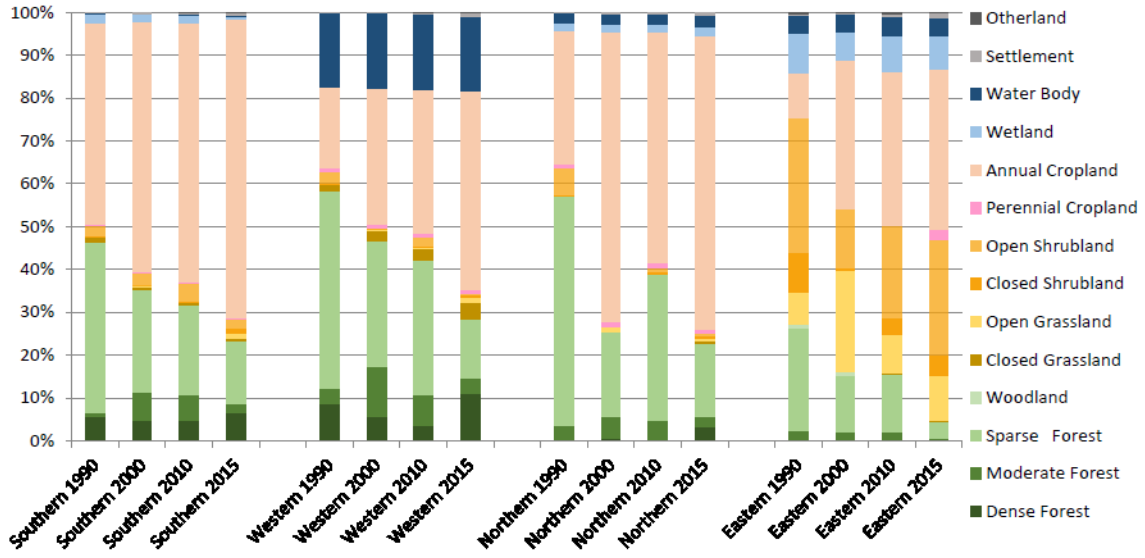
Rwanda has been developing NCA as a tool to enhance the sustainable management of the environment and natural resources as well as a green growth strategy. The NCA work began with land[69] and water[70] accounts, with some preliminary work on minerals, these three areas having been identified as the key pillars of economic development and sustainable growth in Rwanda. The information from the land accounts (Figure 2.9) shows that from 1990 to 2015 forest and woodland areas decreased, while agricultural areas increased. This development was most dramatic in the Western Province, where the area covered by forest and woodland has more than halved and the agricultural area more than doubled.

Even though Rwanda is a naturally water-rich country and its water resources include a dense system of lakes, rivers, marshlands, ground water and soil water, these resources are under pressure due to population growth, intensification of agriculture, rapid urbanization, industrialization and climate change coupled with more weather extremes. In turn, these pressures have led to water-related soil erosion, land degradation and sedimentation.

[66] Http://www.marn.gob.gt/Multimedios/8879.pdf
[67] Http://www.marn.gob.gt/Multimedios/2547.pdf
[68] Https://icc.org.gt/wp-content/uploads/2018/06/Infor_reporte_ESP_2018-05-28.pdf
[69] See Rwanda Natural Capital Accounts - Land
[70] See Rwanda Water Accounting Report 2012-2015

The changes in forested and agricultural areas were analyzed by combining maps from the land account with precipitation and watershed information from the water account which provided insight in changes in various ecosystem services. Over the period 1990-2015 the average runoff increased by 35%, potentially indicating problems with flooding and water quality. The analyses also showed that the land cover changes resulted in increased sediment flow into water bodies, which was most pronounced in the Western Province, and impacted on the productivity of agricultural activities. Such consequences pose increased risks to the horticultural investment programmes being developed in the country and the Western Province in particular.

Figure 2.9: Land cover change per province, Rwanda, 1990-2000-2010-2015



Source: NISR Rwanda land account, 2018

In order to tackle these challenges, the government, supported by various partners, proposed landscape catchment planning, an instrument commonly used to promote integrated water resource management. The catchment plan for the Sebeya catchment, located in the affected Western Province, is one of the first to be implemented in Rwanda in a truly participatory manner.[71] 30 years ago, most of the Sebeya catchment was covered in dense natural forest. But with population pressure, people have cut the forest and started cultivating the deforested areas. The nature of the topography – with many steep slopes combined with open land and bare soil where forest used to be – means that

[71] https://waterportal.rwfa.rw/node/3135

the catchment is now prone to high levels of soil erosion, lower rates of groundwater infiltration, and faster runoff. Devastating floods in the lower parts of the catchment and highly sediment-rich rivers and watercourses have been the consequences. Emergency restoration measures in the catchment had shown that it was possible to reduce erosion and reduce flooding in downstream areas. As a foundation for the catchment plan, stakeholders formulated a shared vision, stating that "a well-managed catchment is home to prosperous communities, living in harmony with nature and drawing social and economic benefits from water and environmental resources". The overall agreed objective was to: "effectively manage land, water, and related natural resources, to contribute to sustainable socio-economic development and improved livelihoods, taking into consideration environmental flow, downstream water demands and resilience to climate change, and minimize water related disasters". Catchment restoration work, including reforestation of high-risk areas, combined with terracing and climate smart agriculture practices, should now allow farmers to continue farming in the Sebeya catchment without causing further soil erosion and increasing run-off.

Many innovations were involved in developing Rwanda's NCA, both in process and in content. A Strategic Environmental Assessment (SEA) was performed and inter-district collaboration around natural resources was promoted. This was done by establishing a catchment task force comprising of district vice-mayors, district technical staff, and representatives of NGOs, National Women Council, and Private Sector Federation. Water monitoring systems were rehabilitated and developed to provide better information in support of catchment planning and IWRM in the future. Catchment restoration opportunity maps (CROM) and a decision support system were developed using the national land use and cover data and are also relevant for the improvement and use of the land and water accounts. In this, seeing how the data in the accounts is used in the decision support system, enables key data to be identified and improved or missing information to be added.

2.5.5 Netherlands: supporting integrated landscape planning

Each spatial planning strategy in the Netherlands has been a product of its time, followed and adjusted as necessary to the political, economic and societal context. In the 1980s, the Netherlands had a centralized spatial planning system supported by 'hard' (financial and regulation) instruments; but this gradually transformed into a decentralized planning system with 'soft' (guidelines and stewardship) planning instruments.

Today, Dutch spatial planning policies are mostly decentralized. With the exception of cultural heritage, the Natura 2000 conservation areas and the National Ecological Network, policies are decentralized and managed by individual provincial and municipal authorities. Decision-making on possible extensions of natural areas, and the way they are developed and designed, was also delegated to the provinces.

Responsibility for the environment is covered by a range of legislation that is scattered over numerous laws at different levels of government. This scattering of legislation gives rise to disagreements and coordination issues. To simplify this situation, the national government is currently working on the new Environment and Planning Act (expected to enter into force in 2021) and a National Environmental & Planning Vision. The new Environment and Planning Act defines how the spatial plans of the national government, provinces and municipalities are to be coordinated and interlinked, promoting more and more an ILM type of approach to planning by exploring the choices available at the landscape level (Figure 2.10).

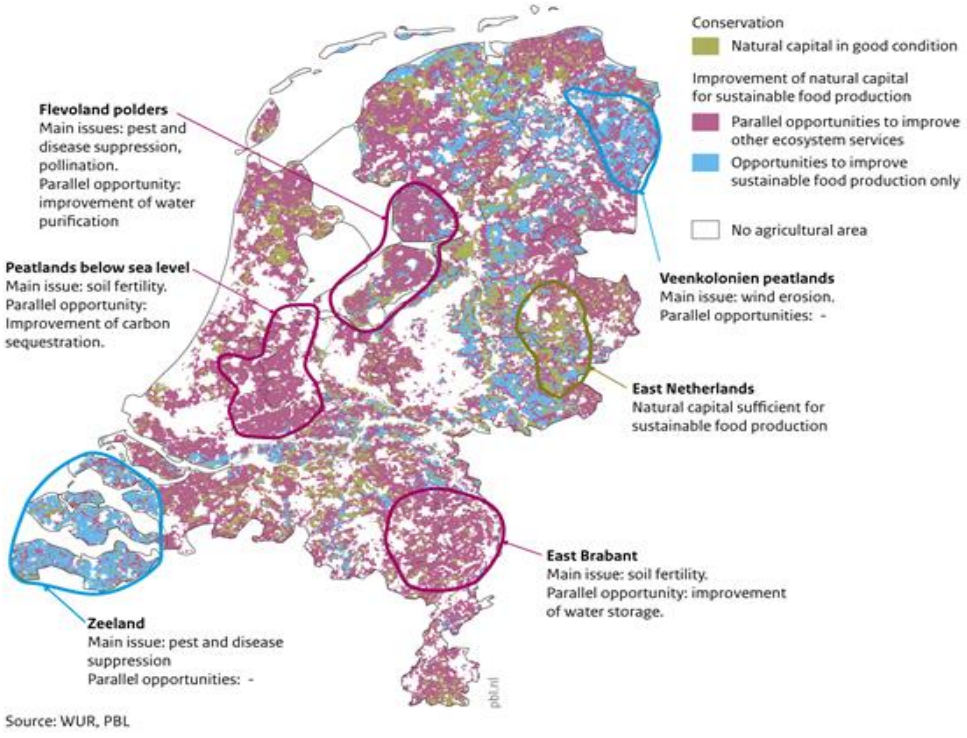
Figure 2.10: Exploring landscape level choices towards a high value living environment

To support this, the new Act seeks to modernize, harmonies and simplify currently fragmented rules and integrate them into one legal framework. Land-use planning, environmental protection, nature conservation, construction of buildings, protection of cultural heritage, water management, urban and rural redevelopment, development of major public and private works, and mining and earth removal will all be brought under one act.

In this, the landscape is recognized as an important scale for planning and negotiation on spatial developments. An important strategic question is: how can the values of the natural capital be maintained and sustainably utilized?

To support planning and decision making, the online Atlas of Natural Capital was initiated, containing information about natural capital and ecosystem services. Following the decentralization of policies, in 2016 the spatial resolution of this information was improved to support regional and local planning. For this, Statistics Netherlands developed a range of biophysical ecosystem service supply-use accounts, following the SEAA Experimental Ecosystem Accounting guidelines (CBS 2018; Remme et al., 2018).

Figure 2.11: Challenges identified in selected landscapes for conservation and improvement of natural capital supporting sustainable food production, 2016



Source: WUR, PBL

These accounts showed that the supply of ecosystem services varies, depending on the availability and condition of the ecosystem. The demand for services also varies by region. Based on this, various landscapes and provinces have explored planning strategies that promote sustainable food production. The main outcomes are shown in Figure 2.11. On the one hand, these strategies aim to promote sustainable use and protection of existing natural capital, like a healthy soil and natural agricultural field margins. On the other hand, they also aim to increase the use of natural capital by improving particular ecosystem services focusing on pest control, pollination, erosion control and soil fertility. Local projects were set up by public, private and civil society actors to realize this ambition. Potential synergies derived from this for other stakeholders within given landscapes were also assessed to promote a multi-functional planning approach. All of this is in line with the intention of the new landscape- and stakeholder-oriented spatial planning framework.

2.6 Connecting ILM and NCA processes

The ILM and NCA processes have come together in only a few places in the world, so a collective understanding between these two communities is only just beginning. While interaction is still in its infancy, the work to date is encouraging and demonstrates that accounts can be produced and that decision makers at various levels can see opportunities for using NCA in ILM and also how ILM can inform the development of accounts.

Below we report on interviews with people who are experts in ILM, NCA or both. They were asked to reflect on: what ILM and NCA are; how the two might benefit from closer interactions; how such interactions can be set-up to design and produce accounts; and, finally, to maximize the possible uses of NCA in ILM. [72]

Expert views on connecting ILM and NCA

Below we discuss the interviews under the main themes that emerged:

- Awareness of NCA in the ILM community;

[72] The interviews were conducted via skype. Potential interviewees were identified by the authors and members of the Organising Committee of the 4th Policy Forum. The people identified were contacted via email with information about the 4th Policy Forum and its focus on ILM. In some cases, those initially identified referred the request for interview to others within their organisation or area of expertise. After agreeing to be interviewed, a two-page briefing, covering basic information on both ILM and NCA, was supplied along with some general questions to prompt thinking ahead of the interview. 12 people have been interviewed. The Annex of this document contains the briefing note and questions.

- Benefits from bringing natural capital accounting and integrated landscape management closer together in countries; and
- How to bring natural capital accounting and integrated landscape management closer together.

In the discussion some quotes for the interviews are provided to highlight particular issues. The identity of the interviewees remains confidential, although some information on their role in ILM or NCA is provided.

Awareness of NCA in the ILM community (and vice versa) – A key issue is that the concept and products of NCA, in general, are not well known, if at all, by many people in the ILM community. For example, a senior representative from a global NGO involved in ILM said:

> "*I see NCA as a means to an end. And in that framing, the use of NCA and national level accounting and economic planning makes a tonne of sense to me on a conceptual level. But the use of it at a landscape level, I can see how it can be valuable in some cases, but it's not obvious to me that it's the most important thing or that it would be all that relevant in other cases*."

And similarly:

> *"As part of the work we're doing on landscape progress monitoring, we have been doing a lot of scoping about the different methodologies and metrics that are used to document different aspects of sustainability within landscapes. And I would say we haven't come across [NCA]."*

Besides the limited awareness, there is a view that NCA was mainly about economics and putting a price on nature and biodiversity. For example, another senior representative from a global NGO with an extensive research background in agricultural economics said:

> *"…there's the social value versus the financial value of something, and that's very central to the natural capital world . . . we see that biodiversity actually delivers all of these incredible benefits to people, but they're not benefits that can be monetized."*

Access to and understanding the NCA data is also sometimes a barrier, for example for private sector actors, as noted by a senior strategic officer from an international financial institution:

> *" . . . what I feel from the private sector is they'd like to have data that is more conducive to their uses and that they can access more easily. A lot of the natural capital data that say, in Colombia with the work we did there, was difficult for a company to figure out what to do with that data or if they could even access that data."*

Using different languages to talk about the same topics might also be a challenge in bringing these communities closer together, as put by a senior conservation finance expert:

> *"All of these things are very good. Problem is that none of them [those in the ILM and NCA communities] talk to each other. And the challenge now is to find a common gauge where all of these different systems for the finance world, for the corporate world, for the government, etc., where they could all travel between each other's worlds."*

While the answers to the first interview question confirmed that there was very little knowledge of NCA and its use in the ILM community and vice versa, it also showed that much of the activities and research that is undertaken in ILM can be related to accounting, such as work on ecosystem services and modelling. To quote from a senior government research economist:

> *"I had never heard the term ILM, so I went to that Ecoagriculture Partners document which had a page of synonyms and related terms and I'm familiar with quite a few of those…..having a background in ecology and being a very regular user of GIS it intuitively makes a lot of sense. And doing anything aside from ILM seems really haphazard and piecemeal, a.k.a. ineffective . . . so it's an intuitive approach to me. I just wasn't familiar with the term and a lot of my past research outside of the accounting world has been about how we do landscape scale modelling and mapping that could support decision making. So, I think it's a pretty good fit for integrated landscape management."*

Bringing environmental information into monitoring frameworks that assess broad landscape development is clearly a desire in the landscape community and several interviewees touch upon this shared ambition with NCA.

> *"Is there a distinction between natural capital accounting as it's being defined here and a systematic indicator set around landscape performance? Because if they're*

the same, then I would say yes, there are a variety of landscape sustainability indicators sets."

There was also recognition that things have changed in recent years.

"I had a lot of interaction with natural capital people . . . . quite some time ago. And then I've dipped into it every few years. And to tell you the truth, for the longest time, I was intensely frustrated because all the natural capital modelling work was using this incredibly simplistic accounting standard for looking at agricultural lands. And in many of the early years, they would actually mark agricultural lands as having zero ecosystem service value. I think that's changed in the last five years."

Benefits from bringing natural capital accounting and integrated landscape management closer together in countries – While a diverse range of benefits was identified, a key benefit was simply identifying the data that are available and could be used for ILM with or without the construction of NCA. Not knowing all about or having access to data is a common issue. Gaining and enabling ongoing access to data, as well as the models and assumptions behind them is a critical issue, as noted by a senior government researcher involved in the production of accounts:

"As a more general goal and something that's very near and dear to my heart, the data needs to be kept open, transparent and easy to use. Which isn't always the case, but that to me is the broader prerequisite of how we design and manage the data."

Another issue was different data sources giving different answers. As one interviewee noted:

"We cannot get data from different sources that actually replicates the data from each other . . . . So it's interesting. It's a challenge."

Even when data were made available and accounts produced, it was often at scales which were not helpful for local level planning or for business. As one business sector representative noted:

"It seems daft that we've also got national natural capital accounts which are being developed with whole teams looking at gathering data and gathering spatial information. And yet the businesses feel like they can't really either get to that data

or use it because it's so big, so clunky. It's also spatially irrelevant. The granularity is just useless to them because it's so aggregated."

Interviewees also recognized that in data-poor environments, data from NCA might be the best available, while still acknowledging its limitations, as noted by a senior researcher at a global conservation NGO:

"…I think one thing that the community is not really appreciating, or you don't see a whole lot of discussion, is that in some cases the accounts are on and off themselves. They're not sufficient for the types of planning at the landscape level. In some cases, when you are looking to a landscape and you really want to monitor changes [of] the forest cover over time, then the accounts are basically it."

But when official detailed accounts are available, the opportunity of being able to make development plans more coherent, between sectors and levels, was mentioned by a government official:

"The accounts can help if you know what the total balance is. You can put two plans next to each other and see how does the data add up, then how does it fit with the big plan, and where do we need to tweak. Either make the lower plans more ambitious to actually be able to achieve the big plan, or lower the expectations at a higher level."

The different starting points of ILM and NCA were noted, including by an environmental scientist working for a business group who said:

" . . .natural capital accounting seems to be focused around delivering a product. Which is really impressive: solid, technically accurate accounts. Whereas integrated landscape management is more of a process and more about engaging people and figuring out the significance of things and the consequence of things."

The statement highlighted the need to recognize the differences and to demonstrate the benefits of linking the two. Some real examples of benefits were noted. A government official working from an embassy in Africa who is an expert on integrated water management spoke about a project that highlighted the potential link between ILM and NCA:

"There were some interesting things happening that link the two. We recently had an assessment done in preparation for the establishment of the Water Resources Board. This assessment started from the premise that if [country] wants to reach its economic goals that it has set, the water requirements to get there are in the range

> *of 50 per cent of total renewable water, and this requires massive inter-basin transfer of water and massive storage for the dry season. The water availability targets were put next to the economic growth targets and the implications were reviewed. One implication is that there's just not the money to build the dams. So we need to look at alternative ways of getting to the economic growth targets. I think that's a really useful example of how NCA can inform decision making."*

Similarly, a proponent for the development of accounts in a provincial jurisdiction noted:

> *"It seemed to me that we needed a way to be trying to get the message to Treasury in a way that they understood……I think that the accounts really can speak to Treasury. I don't think we've got as good at that, as we could be without the central banks that, say, Costa Rica and others have. That makes a real difference. Getting to Treasury was one of the things that I thought was probably going to be opened up to us if we were able to do more in terms of accounting."*

On the way forward, having real examples is vital. As one interviewee said:

> *"There have to be demonstrations of why blending these approaches would be useful. And how it would help decision making. And that's maybe a space for donors to say, hey, here's a country that has some pressing natural resource issues. They've got a government and a civil society that's really interested in working together. And they've got solid accounts and solid data. Let's make it happen."*

A similar sentiment came from another interviewee:

> *"I think it could be a really interesting experiment for a set of pilot landscapes to take input data and run an NCA-type model and see what happens – and see whether that information is somehow a lot more salient to the decision makers."*

And further encouraging that:

> *"…if NCA can help formulate information in a way that increases the likelihood that those actors will institute more sustainable land use plans – that are putting agriculture and development in appropriate places and are conserving natural ecosystems and land-based carbon and rights of indigenous peoples and things like that, then by all means."*

It was noted that for NCA and ILM to be used, they both need to be trusted and processes established to ensure this. As noted by a very senior government decision maker:

"Setting up a quality assurance framework would lead to better natural capital accounts data produced. For example, we have Technical Working Groups made up of key stakeholders (sectoral agencies, finance ministry and statistics agency) that work together regularly to develop, quality check and approve the accounts and their findings before the senior government officials meet in the National Steering Committee to provide guidance and approve the NC accounts. It is important to focus on the quality of data and priority questions to inform policies and decision-making processes."

How to bring natural capital accounting and integrated landscape management closer together – Bringing the ILM and NCA communities closer is a challenge. It has seldom happened and the 4th Policy Forum's focus on ILM was perhaps the first genuine attempt at this, at the international level at least. As such, the 4th Policy Forum can be said to have initiated the discussion. The challenge now is to ensure that the two communities keep talking and that something happens after the Forum. A practical approach is needed and the development of accounts for particular landscape areas and problems would provide a reason to keep talking.

A point made by several interviewees was that, if NCA is to be used for ILM, then the intended use would have to be well-defined and that account design and construction should be based on user needs. It was seen as important that the publication of the accounts is not an end point but rather a key point where potential users become the actual users who then provide feedback to the producers to make the accounts better.

To ensure this, a suitable process would have to be established. In general, two important roles have to be allocated: the first is outlining the problem and steering the process of account design, development and use. The second is the technical construction of the accounts. For both tasks high-level support is needed from the organizations that will produce or use the account. This support is needed to provide the platform for collaboration between agencies as well as the reasons, resources and encouragement needed for account production. At the technical level, such support is needed, especially to access and share existing data, as well as to generate new data (e.g. from additional surveys of farmers) or to develop new models for estimating missing data. The general experience of WAVES Partnership countries has been that a high-level steering committee is established, led by an agency, usually a central agency (e.g. national planning department) that could use the accounts.

Leadership from the user side was stressed as important by several interviewees, including a senior government official responsibility for environmental reporting who said:

> *" . . . The lead should be a policy agency. I think that you need good facilitation, and I don't think you're going to get that necessarily from a data agency. Now, that's not always going to be the case."*

It was also noted by several interviewees that the NCA and related technical analysis were inputs to decision making, but that the actual decisions had to be made by people.

> *"We should not be optimizing a natural capital account analysis in order to decide what you're going to do in the landscape. I think those things need to be negotiated by people in the landscape, but they need to understand what it is they're negotiating away."*

In response to a question on how to get started and on addressing different audiences, a senior government official responsible for environmental reporting said:

> *"In my view, narrative and storytelling. It sounds really trite, but when you look at what happens with some ministers, you know that they will pick up an issue and run with it because of who's raised it with them, and because it's an issue they care about [even if] they might not be the central bank economist who's got an overarching view of the whole gamut of policy."*

This person went on to say that the accounts needed to address "squeaky wheels" – that is the issues generating public and political interest.

In addition to carefully defining the possible use of accounts, the spatial areas for decision making and hence the data needed for these areas was critical

> *"One challenge here is scale and boundary delineation. So, if you're talking about a framework that tries to take disparate social and environmental dimensions and resolve them down to a more standardized or distilled metric like one around economic valuation. Probably that approach has the most value if it's directly linked to a jurisdictional scale where there is a policymaking entity that would be poised to make decisions based on that information"*

The SDGs and National Development Plans were noted as possible entrées for ILM and NCA. As noted by one senior NGO representative:

> *"[we need to] have the NCA work with SDGs and look at places like Colombia that is both committed to integrating the SDGs and has lots of integrated landscape management places that would be a valuable lace."*

Scale and the associated need to bring local and national processes together was another theme. As noted by a development official working on projects in an African country:

> *"We need to find a way to bring the national and the local planning process together. One very strong thing here is there is a vision 2050 and the targets are there, and everyone works towards them. But then you need to translate that locally and that translation is a challenge. I can imagine that if you want to do local planning with land accounts, you want to be able to calculate what the impact of the intervention will be on the accounts, but also have the information from the accounts sufficiently localized to help you make the calculation."*

Many saw the accounts as way of assisting communication with financiers and of providing some trusted information.

"There are a few lenders out there that are interested in directing finance and capital to sustainability-oriented land projects, whether that's restoration or regenerative agriculture. But they need to know something about the risk of those investments. There is definitely still a dearth of trusted information on landscape sustainability performance for use in decision making."

On the financing, a very senior government decision-maker noted:

> *"Funding mobilization would start with integrating NCA activities in the national budgeting processes for concerned sectoral and statistics agencies. Then also consider development partners with interest and initiatives in the NCA work and sustainable land management development processes."*

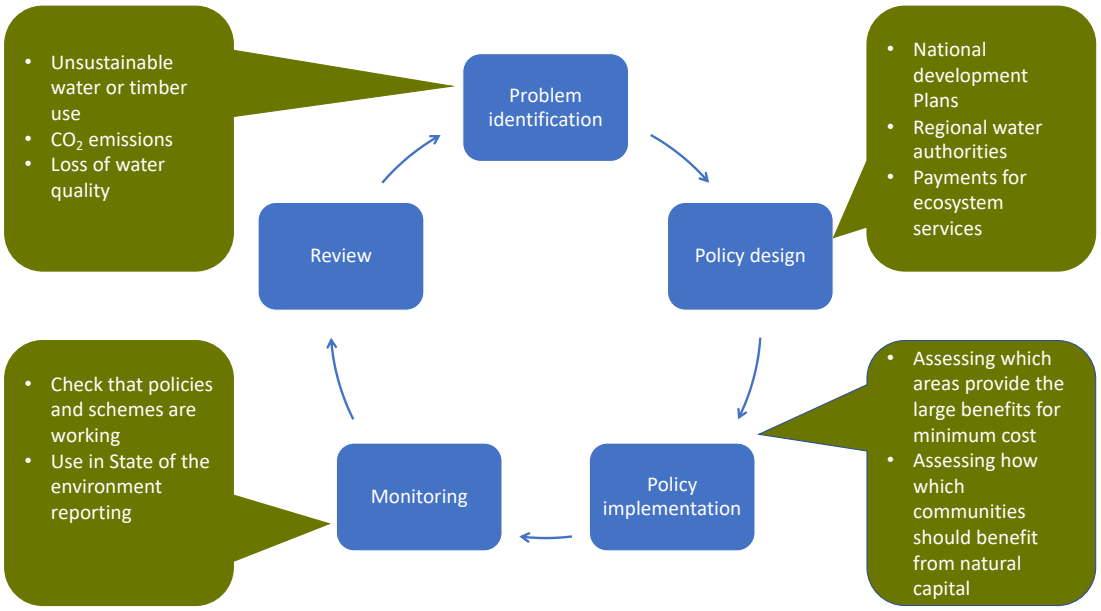
In this, communication between government and business was essential. As a representative from the business sector noted:

> *"If business is going to do anything scalable, it needs policy behind it. But also if policymakers want the policy to be taken out and understood and supported, they're going to need businesses involved as well. So it's a classic kind of trying to bring two communities together."*

2.6.2 Connecting NCA and ILM in the policy cycle

The policy cycle has been used as a way of showing the many ways that NCA can link into decision making (Vardon et al., 2016), a framing which has been used in previous fora (e.g. Bass et al., 2017). A version of this cycle and its connection to integrated landscape management is presented in Figure 2.12, which draws on information from the previous sections including the interviews of people involved in ILM and NCA.

Figure 2.12: How NCA can inform integrated landscape management in the policy cycle



Problem identification – Work to date indicates that NCA has a key role in identifying problems and especially for spatially locating existing problems. In this, the maps of accounting data have been particularly useful for communicating to decision makers where the problems were. The accounts, when coupled with appropriate modelling, were also useful for predicting where problems might be in the future.

Policy design – While accounts have not yet been used specifically to design interventions at the landscape scale, their use in modelling and other analysis has been used to show landscape-level trade-offs. For example, modelling has shown how changing levels of forest cover could cause changes in the amount and quality of the useable water available from watersheds managed for water supply, and this modelling can be combined with

information on other services provided by forests and by alternative land uses. Such combined information could then inform new policy instruments, such as payments for ecosystem services, or encourage the finance sector to examine the broader benefits and risks of investments in major infrastructure projects.

Policy implementation – A potential revealed by experience to date is that accounting could be used to identify particular places and communities that might benefit most from improved natural resource management, allowing policies to be more efficiently targeted. This could be the poorest communities or the areas either at most risk of degradation or that would deliver the greatest and multifunctional benefits from the least investment (i.e. the low hanging fruit).

Monitoring and review – This is consistently identified as the key benefit of accounting. Presenting integrated environmental and economic data regularly and consistently would be a significant advance of value to national governments, regional authorities, local landowners and financiers alike. It enables regular discussion between stakeholders and helps to redress the power imbalances between national and local stakeholders who cannot always access such information. The regular production of the accounts would also lead to improvements in data availability and quality as well as increasing the trust in the accounts at all levels (local to national).

2.7 Going forward

The development of ILM and experience with it around the world – and with land and ecosystem accounting in particular – has demonstrated that structuring information in the form of accounts can reveal information that is critical for landscape-level policy. Accounts can show important interactions between human activities and ecosystems, and how this impacts on levels of use of ecosystem services in particular areas, as well as on the extent and condition of ecosystem assets (e.g. Vardon et al., 2019). Accounts have already provided information in support of policy improvement (e.g. Bass et al., 2017; Ruijs and Vardon, 2018). But there are still several general issues for discussion where progress still needs to be made if information and landscape-level management and governance are to improve (Box 2.2).

Box 2.2 Issues for discussion for better integration of ILM and NCA

Data coverage and quality mismatch – data access and data quality are recurring issues for both ILM and NCA. What are the key datasets needed for ILM and NCA?

Boundary selection – the management areas of ILM seldom directly match the data output areas available. How best to select the policy boundaries and then to match these to the data available?

Landscape-level decision-making criteria – what approaches, like 'carrying capacity', 'catchment planning' and 'social value', are paramount for ILM and how can NCA best serve them?

Institutional reform – how can ILM and NCA together shift institutional set-ups from silos to synergies, from overly-centralised to usefully decentralized?

Inclusion – how can NCA and ILM work together to reduce the risk of entrenching top-down approaches? How can better landscape-level data put power in local stakeholders' hands to ensure ILM is equitable?

Pilots – what scope for pilot joint ILM/NCA work that would address the above?

Before moving to general lessons from the work examined, we need to recognize that a significant barrier to the use of NCA, particularly in the conservation community, has been misunderstanding about NCA. That is, that NCA (and in particular accounting for ecosystems) is an attempt to value everything and favor "the commodification of nature" – and hence is part of the dominant economic paradigm that has caused the very problems we face (e.g. Monbiot, 2014). Others argue that if ecosystems are not valued, then they are effectively given a zero value, and hence will always be secondary to mainstream economic values (e.g. Schröter et al., 2014).

That noted, drawing on the examples discussed in this document as well as many examples presented in previous Policy Forums and elsewhere, it is clear that a wide range of developed and developing countries have produced accounts. In various countries and to varying degrees these accounts have been used to inform integrated landscape management processes. A range of valuable insights and lessons for integrating ILM and NCA are summarized in Table 2.6 which looks at: the processes and governance; data sources and methods; challenges in construction; funding and finance; communication, and; potential and challenges in the policy cycle and decision making.

The applications of NCA span broad themes, such as the SDGs, natural capital and ecosystem services, through to major topics such as climate change and biodiversity conservation. Management of land for the provision of particular natural resources is also apparent for water, timber and non-timber forest products (e.g. fuelwood, honey) in specific areas, where there are sometimes competing land uses. Ecosystem services are often mapped to assess the trade-offs of certain policies, although assessments of trade-offs are usually not included in formal accounts of government agencies. Furthermore, for many landscape initiatives, basic information describing the characteristics of the landscape and trends in land use and water use are often lacking. While it is not yet fully, demonstrated it seems practical for top-down NCA and national or sectoral level policies to be linked to bottom-up NCA and applied at the landscape level.

While there is work which demonstrates potentials, the actual use of accounts in landscape level management has been limited to date. A key reason for this has been a lack of understanding of accounts and accounting on the part of decision makers involved in (integrated) land management. Two ways forward can help: workshops to introduce decision makers to NCA prior to their release have been effective (e.g. in Australia); as has linking the accounts to forecasts of what might change under different management scenarios (e.g. in Indonesia).

Exploring scenarios and spatial modelling using NCA can help to improve stakeholders' awareness about landscape dynamics and the relative importance of different drivers of landscape change, such as a growing population and increasing urbanization, the expansion of agricultural production, and the development of infrastructure and mining. Indeed, modelling of alternative future scenarios can be a catalyst for building landscape partnerships, and for bringing to the surface and refining stakeholder assumptions, analyses, and negotiating positions around strategy, production and resource management practices, and spatial planning.

This brings us to a final consideration: quality. Getting accounts used means getting them trusted by decision makers. Greater understanding about what accounts are and what they can do certainly assists this. But it needs to be complemented by a process for assuring the quality of accounts. The accounting community recognizes that, while there may be discrepancies between different data sources as well as data gaps, government and business must continually make decisions with imperfect information. Statistical agencies recognize the six dimensions of data quality – relevance, accuracy, timeliness, accessibility, interpretability and coherence. For individual data sources the focus has

mostly been on accuracy (i.e. closeness of estimate to the real number) but accounting addresses all of the six dimensions and NCA offers particular strengths in timeliness, accessibility, interpretability and coherence, providing data when it is needed in a consistent format. Over time the quality of both the accounts and the underlying data improves overtime (Vardon et al., 2018).

Table 2.6: Summary of insights and lessons for integrating ILM and NCA in decision making

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Process and governance	(1) Complexity (and inclusivity) increases with the number of stakeholders (2) Geographical areas relevant to ILM do not always align with jurisdictional boundaries (3) Managing multi-stakeholder relations is challenging	(1) Needs a process that brings the different data holders together (2) Needs formal arrangements for sharing and using data e.g. high-level agreements between agencies (3) Account users need to be involved in account design and construction so accounts are relevant and 'decision-centered'	(1) Senior representatives of key stakeholders in the ILM and NCA communities need to be brought together as early as possible (2) Need to form a high-level strategic body as well as technical groups that cover both construction and use of accounts (3) Production of the first accounts is not the end point, but the start of an interactive process to both improve the accounts continuously and further embed their use in ILM processes.
Data and methods (information needed)	(1) ILM is inherently a process that needs to be fed by data and analysis (2) A more standardized approach to ILM data needs would likely assist with implementation (3) ILM requires data and methods that focus on multifunctional uses (like mosaics, agroforestry)	(1) Data is scattered between different agencies (2) Some key data could be missing (3) Models and assumptions are needed to the absence of complete data (4) Regional and local data are essential to ILM (5) Need GIS technology and expertise to produce ILM-usable accounts	(1) Need to accurately represent the quality of data in information products (2) Need to have data quality assessment processes in place (3) Need to continuously improve data sources for the accounts

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Challenges in project implementation	(1) Challenge of integrating data originating from various administrative classifications (e.g. districts, watersheds, economic growth zones) (2) Socioeconomic data often lacking, compared with remote sensing derived data (3) Dealing with spill-over effect beyond landscape boundaries	(1) Breaking down national level information to match landscape (regional or local) area (2) Scaling up local data to match regional or national data (3) Spatially representing information can create issues with confidentiality (security, ownership, etc.) (4) Gaining an understanding of ILM and landscape-level decision-making terminology	(1) Defining boundaries for NCA that align with ILM regions (2) Gaining common understanding of terminology between ILM and NCA communities (3) Need to highlight existing NCA potentially useful to topical landscape decisions and produce NCA quickly to demonstrate usefulness to ILM community
Funding and finance	(1) Lack of financing of ILM has been mentioned by a small number of governments and international organizations and NGOs (2) Challenge of connecting large investors and funds to small landscape interventions (3) Strong link to sustainable finance and corporate social responsible activities	(1) So far finance has been mentioned by a limited number of governments and international organizations and NGOs	(1) A compelling case can and should be made for pilot studies of applying NCA to ILM (2) Funding by national governments and international agencies is important initially (3) Funding can come from a range of international, national and local stakeholders. Joint funding may increase commitment to on-going production and use of accounts

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Communication	(1) ILM is not a well-known term but the general concepts of it are recognized and understood by land managers (2) The concept is strong in illustrating interactions, either between activities in landscapes, or trade-offs in SDGs	(1) NCA is not well understood; need to address this early in account production (2) Need a plan for communicating NCA results to users and the general public (3) Diagrams, maps and charts work better than pages of tables	(1) Very important to identify the different audiences for NCA and ILM (2) Very important to be able to demonstrate the value of account production to the ILM community (3) Good examples are important (4) Need to recognize the limits of data quality
Potential in decision making (use in policy cycle)	(1) So far mainly useful in the identification of issues, bringing stakeholders to the table, development and implementation of interventions at local level (2) Could be scaled up to be useful at higher levels (national and multi-country) (3) Strengthen role as participatory mechanism in achieving global goals for sustainable development	(1) So far mainly used in monitoring, review and problem identification at national level (2) Could be used at subnational levels and in other parts of the decision-making cycle with additional analysis and modelling (3) Could be used in policy design and implementation, mainly useful in the identification of issues, development and implementation of responses	(1) Monitor and review the sustainability of current land use and land management (2) Assess trade-offs between land use, management and investment decisions (3) Identify hotspots in need of land use and land management change (4) Can be applied to international agreements such as the SDGs and CBD

Category	ILM perspective	NCA perspective	Better integrating ILM & NCA
Challenges in policy cycle use	(1) ILM developed as a bottom-up approach; national level (sectoral) policies could be more aware and supportive (2) Decision making at local level influenced by many factors including poverty, immigration and large government and non-government businesses involved in resource use	(1) Account producers are often statistical officers, who deliberately do not extend into policy interpretation and analysis (2) Accounts are usually at the national level. We need landscape-level accounting to be useful for ILM decisions	(1) Need to align international, national and sub-national decision-making processes and priorities (2) Information needs to be seen as important (3) Information needs to be available when decisions are being made. Hence ILM and NCA need to be "ahead of the game"

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2.8 Annex: Interview briefing note and questions sent

Background information and questions for the interview on ILM and NCA

Natural Capital Policy Forum 2019

Understanding and increasing the synergies from linking Integrated Landscape Management (ILM) and Natural Capital Accounting (NCA) is the main topic of the Natural Capital Policy Forum being organized by the World Bank and UN Statistics Division (UNSD) to be held on 17-18 November 2019 in Uganda.[73]

Examining how NCA can inform ILM, for example decisions on land use and ecosystem protection is a key part of this. Providing a platform for sharing experiences between those working on ILM, NCA and associated data providers is another key part of the forum. The intent is to increase understanding of the policies aiming at improving landscape governance and management as well as the information needed for this.

Natural Capital Accounting

Natural capital accounting integrates natural resource and economic analysis, providing a broader picture of development progress than standard measures such as GDP (Gross Domestic Product).

Natural capital accounts are a set of objective data that show how natural resources contribute to the economy and how the economy affects natural resources. These accounts can provide detailed statistics for better management of the economy, such as accounts for the inputs of water, timber and energy as well as the outputs of pollution, that are needed to achieve green growth or to model green-growth scenarios. The use of ecosystem services by the economy and people are also important and are part of this.

The concept of accounting for natural capital has existed for more than 30 years. In 2012, the United Nations Statistical Commission adopted the System for Environmental and Economic Accounts (SEEA)[74]. This system provides internationally agreed-upon concepts and methods for account production. Accounting for ecosystem services is relatively new, with an experimental framework published in 2014.[75]

[73] https://www.wavespartnership.org/en/forum-natural-capital-accounting-better-policy
[74] https://seea.un.org/content/seea-central-framework
[75] https://seea.un.org/ecosystem-accounting

Connecting to Integrated Landscape Management

Spatial planning and land governance are becoming more and more important as cumulative pressures from the demands for food, feed, biofuels, nature conservation, and urban expansion, lead to increasing competition for natural resources and also have an impact on the flows of ecosystem services.

The actions that are required to achieve the 2030 sustainable development vision, defined by the Sustainable Development Goals, will need to be planned and implemented at both national and sub-national scales. At sub-national scales stakeholders are able to implement and more clearly understand the impact of specific actions. This follows the desire to holistically balance multiple goals related to both environmental and non-environmental processes, for example, livelihoods and sustainable resource management (Freeman et al., 2015). In conjunction with national and regional spatial planning, interactive and adaptable spatial and land-use-planning processes need a strong bottom-up component. Here the overlapping interests of a range of stakeholders can best be integrated within a multifunctional landscape (CBD, 2014; UNCCD, 2017).

A landscape is a socio-ecological system that is organized around a distinct ecological, historical, economic and socio-cultural identity[76]. In a landscape approach, stakeholders aim to balance and reconcile competing social, economic and environmental objectives[77]. Integrated Landscape Management (ILM) is the actual process that builds on a multi-stakeholder approach, combining and integrating sustainable use of the environmental resources with economic development.[78]

In theory NCA could play a useful role in building the knowledge base required for successful ILM. In this, NCA would be bringing detailed an on-going information on the stocks, flows, quality and value of environmental resources such as water, soils, forests and biodiversity.

That being said, the explicit application of NCA in ILM seems limited so far. With the Policy Forum session, paper and various interviews with experts in the field of NCA and ILM, we aim to find and describe various fruitful opportunities that could or already are bringing the fields of ILM and NCA together and enable more informed decision making and planning.

[76] https://ecoagriculture.org/publication/the-little-sustainable-landscapes-book
[77] https://www.pbl.nl/en/publications/the-landscape-approach
[78] https://ecoagriculture.org/publication/defining-integrated-landscape-management-for-policy-makers/

Key interview questions

Question 1. Can you please tell us a little about yourself, your profession, where you have worked, (related) achievements you are proud of, your current main project or activities?

Question 2. Are you familiar with landscape approaches and/or integrated landscape management?

Question 3. What is your experience with natural capital accounting or other forms of environmental or ecosystem accounting?

Question 4. Are you aware of natural capital accounts that have been designed for use in landscape level decision making, or, vice versa, landscape management decision making that has been informed or could be, by natural capital accounts? If not accounts, then what about account-like data (e.g. on ecosystem services)

Question 5. What benefits do you think are possible if natural capital accounting and integrated landscape management were brought together in countries?

Question 6. What can be done to bring natural capital accounting and integrated landscape management closer together?

Question 7. What practically needs to happen for natural capital accounting and integrated landscape management to be developed and used in countries?

3. World Bank Landscape Projects: What Role for Natural Capital Accounting?

Stefano Pagiola[1] and Shun Chonabayashi[1]

[1]The World Bank

3.1 Introduction

The landscape approach refers to taking both a geographical and socio-economic approach to managing land, water, and forest resources that form the foundation for meeting the goals of food security and inclusive green growth. The landscape approach takes into account the interactions between these core elements of natural capital and the ecosystem services they produce, rather than considering them in isolation from one another. It thus provides opportunities to maximize productivity across the landscape, improve livelihoods, and increase the production of ecosystem services.

The World Bank Group has started to use landscape approaches in its lending and non-lending programs, promoting integrated management of land, water, and living resources, and their sustainable use and conservation.

This note reviews the World Bank's portfolio of active landscape management projects and examines three main questions:

- What role has Natural Capital Accounting (NCA) played in the design and implementation of landscape projects?
- What does the experience of current projects show about how NCA could contribute to developing and improving landscape projects?
- How might NCA measurement efforts be designed to be most useful to landscape projects?

3.2 World Bank Landscape Projects

We began the analysis by taking stock of World Bank projects that use a landscape approach. The projects reviewed include all projects listed as having a 'landscape management' theme in

the Bank's internal Operations Portal that were approved during the fiscal years 2016 through 2019.

[1] Themes are assigned to projects by a Central Coding Team and then submitted to Task Team Leaders (TTLs) for their review and approval.2 A full list of these projects is given in Annex Table A1. There was a total of 62 projects that meet the above criteria. However, some projects that are listed individually in the portal are essentially one project, with separate listings for different funding sources (for example, one P code for the Bank loan or IDA credit and a separate P code for a GEF grant). These different project codes for a single project have been combined for the review, bringing the total number of projects to 58 projects.[3]

There is no official definition of 'landscape projects' within the World Bank, nor is there a single widely accepted definition of the 'landscape approach' or 'integrated landscape management (ILM)' in the literature.[4] In general, landscape projects differ from traditional rural development or conservation projects by considering multiple land uses and the interactions between them and the effects of these land uses outside the immediate project areas—for example, through their impacts on ecosystem services such as hydrological services, biodiversity conservation, or carbon sequestration. Several projects that are tagged as having a landscape management theme do not meet any reasonable definition of landscape projects as they do not deal with land use at all. These have been omitted from the review[5,] leaving a total of 54 projects.

The remaining 54 projects include many that follow some form of landscape approach and consider interactions between landscape elements and effects beyond the project, and some that are arguably standard rural development or conservation projects rather than landscape projects. In many cases, the PADs of the latter projects do not even include the word 'landscape' except in a generic sense. These projects are retained in the sample, but as a

[1] The World Bank's fiscal year (FY) begins on July 1 and ends on June 30.
[2] Codes are initially assigned at the Project Concept Stage and then reviewed after Project Approval. TTLs are notified of the coding reviews for their projects at each stage and may propose changes to the assigned codes.
[3] The projects combined are as follows: *Zambia Integrated Forest Landscape* (P157521/P161490), *Madagascar Sustainable Landscape Management* (P154698/P157909), *Moldova Climate Adaptation* (P155968/P163720), and *Haiti Resilient Productive Landscapes* (P162908/P165551). For these projects, the shares assigned to sectors and themes are the averages of two projects weighted according to gross commitments.
[4] Annex Table A2 lists the definition of 'landscape approach' used in the projects that provided one; however, many did not.
[5] They are: *China Hebei Air Pollution Prevention and Control Program* (P154672), which focuses solely on air pollution; *Kenya Electricity Expansion* (P153179), which focuses solely on electricity production and distribution; *India Bihar Transformative Development* (P159576), which focuses solely on nutrition; and S*ri Lanka Transport Connectivity and Asset Management* (P132833), which focuses solely on roads. Omitting these projects does not imply any judgement on their quality, but simply that they are not landscape projects.

subset.[6] It is important to note, however, that some projects that appear narrowly focused are considered as landscape approach projects if they are part of a broader program addressing landscape issues.[7] The analysis focuses on the narrower set of 'landscape approach' projects, but sometimes covers the entire group of 'landscape-themed' projects.

Table 3.1: Landscape projects approved in fiscal years (FY), 2016-2019

	Follow landscape approach	*All landscape-themed*
Number of projects	44	54
Gross commitments (USD million)		
Total	3,554	4,162
Average	81	77
Minimum	6	5
Maximum	500	500
Projects by region		
Africa (AFR)	23	31
East Asia and Pacific (EAP)	3	3
Europe and Central Asia (ECA)	2	3
Latin America and Caribbean (LCR)	11	11
Middle East and North Africa (MNA)	1	1
South Asia (SAR)	4	5
Projects by fiscal year (FY)		
FY 2016	5	7
FY 2017	12	14
FY 2018	16	19
FY 2019	11	14

Our sample thus includes 44 projects that follow a landscape approach ('landscape projects' hereafter). The main characteristics of this sample are summarized in Table 3.1. Note that, except for Africa (AFR) and Latin America and the Caribbean (LCR), most regions have few landscape projects, and so the regional averages in the discussion below can be heavily

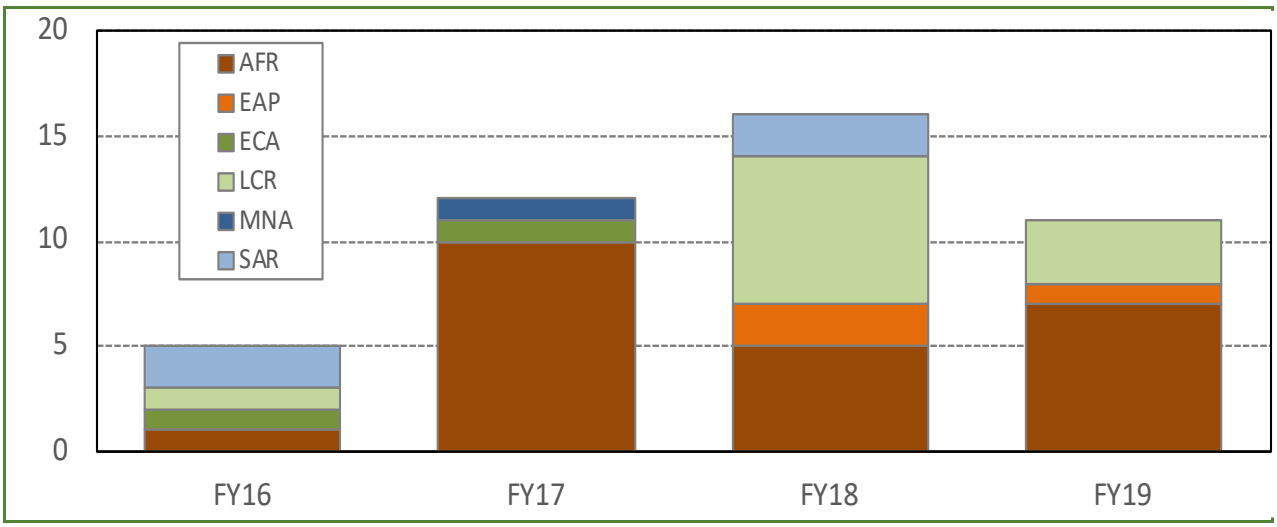
[6] They are: *Belarus Forestry Development* (P165121); C*had Emergency Food and Livestock Crisis Response* (P163258); *India Himachal Pradesh Horticulture Development* (P151744); *Niger Community Action Phase 3* (P163144) and *Community Action Project for Climate Resilience* (P165397); N*igeria Third National Fadama Development* (P158535); *Rwanda Transformation of Agriculture Sector Program 4 Phase 2* (P161876), *Transformation of Agriculture Sector Program Phase 2* (P169514), and *Transformation of Agriculture Sector Program Phase 3* (P161000); and *Uganda Development Response to Displacement Impacts in the HoA* (P164101). Again, treating these projects separately does not imply any judgement on their quality, but simply that they are not follow a landscape approach.

[7] The *Mozambique Conservation Areas for Biodiversity and Development - Phase 2 Project* (P166802) is an example of a project that,appears to be a traditional conservation project, but that is considered to be a landscape approach project because it is part of a broader landscape program. See also Figure 3.11 below.

affected by individual, possibly idiosyncratic projects. It is interesting to note that 14 of the projects that follow a landscape approach are additional financing to earlier projects.

Figure 3.1 shows the number of landscape approach projects approved in each fiscal year by region, and Figure 3.2 shows the corresponding total commitments. The number of landscape projects grew from fiscal year (FY) 2016 to FY 2018. It dropped slightly in FY 2019, but this may well reflect the vagaries of pipeline development and board approvals rather than any change in overall trends. To support this point, Figure 3.2 shows that total commitments to landscape projects have continued to grow. Most landscape projects have commitments of between USD10 million and USD100 million, with a few smaller projects and a few much larger projects. There was a big increase in total commitments in FY 2018 and FY 2019, driven by a few very large projects approved.[8]

Figure 3.1: Number of Landscape projects approved, by fiscal year (FY) and World Bank region (no. of projects)



The increase in interest in landscape projects has not been limited to the World Bank. Figure 3.3 shows total commitments to landscape projects by donors from FY 2010 to 2017, based on data in the OECD Creditor Reporting System (CRS) database.[9] The United States was the largest donor for landscape projects in this period, committing a total of USD208 million, followed by Germany (USD84 million), the United Kingdom (USD82 million), Norway (USD29million), the

[8] Including the USD400 million additional financing to the *Nigeria Erosion and Watershed Management* (P164082), approved in FY 2018, and the USD500 million *Ethiopia Climate Action Through Landscape Management PforR* (P170384) and USD350 million *Ethiopia Lowlands Livelihood Resilience Project* (P164336), both approved in FY 2019.

[9] This analysis is based on projects with a title that includes a word 'landscape' but does not include modifiers to the word 'landscape' such as 'political', 'industrial', 'cultural', etc. Only the ten largest financing sources for landscape projects are shown.

Netherlands (USD27 million), the European Union (USD19 million), and Sweden (USD10 million). Among multilateral agencies, the Global Environment Facility (GEF) provided the most funding for landscape projects in this period, with USD184 million, followed by the Climate Investment Fund (USD24 million).

Figure 3.2: Commitments under Landscape projects approved, by fiscal year (FY) and World Bank region (USD million)

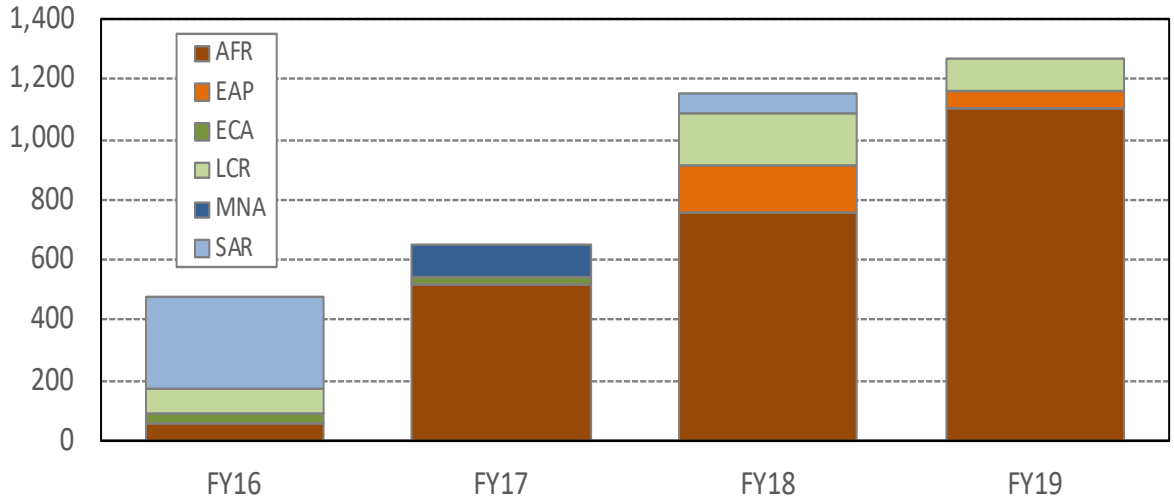
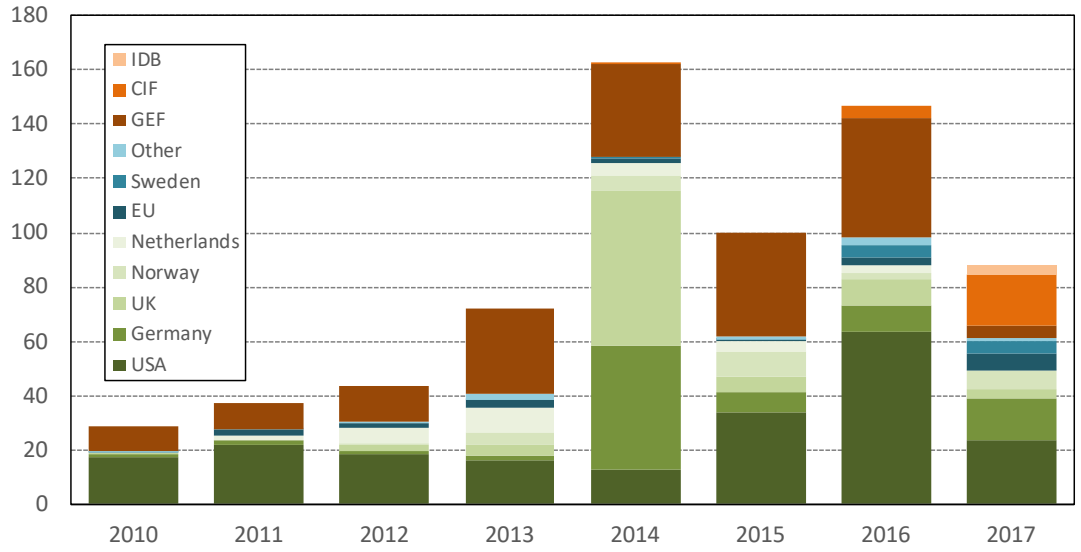


Figure 3.3: Commitments to landscape projects, 2010-2017, other donors and multilateral development banks, calendar years (USD million)



Source: Based on data in OECD Creditor Reporting System (CRS) database.

3.2.1 Methodology

Our review is based on the World Bank's Project Appraisal Documents (PADs), or on the Project Papers (PPs) in the case of Additional Financing (AF). This imposes limitations, in that PADs do not necessarily cover all the aspects that are of interest. In particular, the methodologies and data sources used in project preparation are not always described in detail. These limitations should be borne in mind throughout the discussion below.

A separate issue is that reductions in the time and resources available for project preparation within the World Bank mean that many activities that might previously have been undertaken during preparation are now undertaken in the early phases of implementation. Several projects, for example, defer the choice of project areas and/or of specific activities to be supported to the implementation phase. In such cases, the project documentation will have no information on these aspects beyond the general principles to be applied.

3.2.2 Objectives of landscape projects

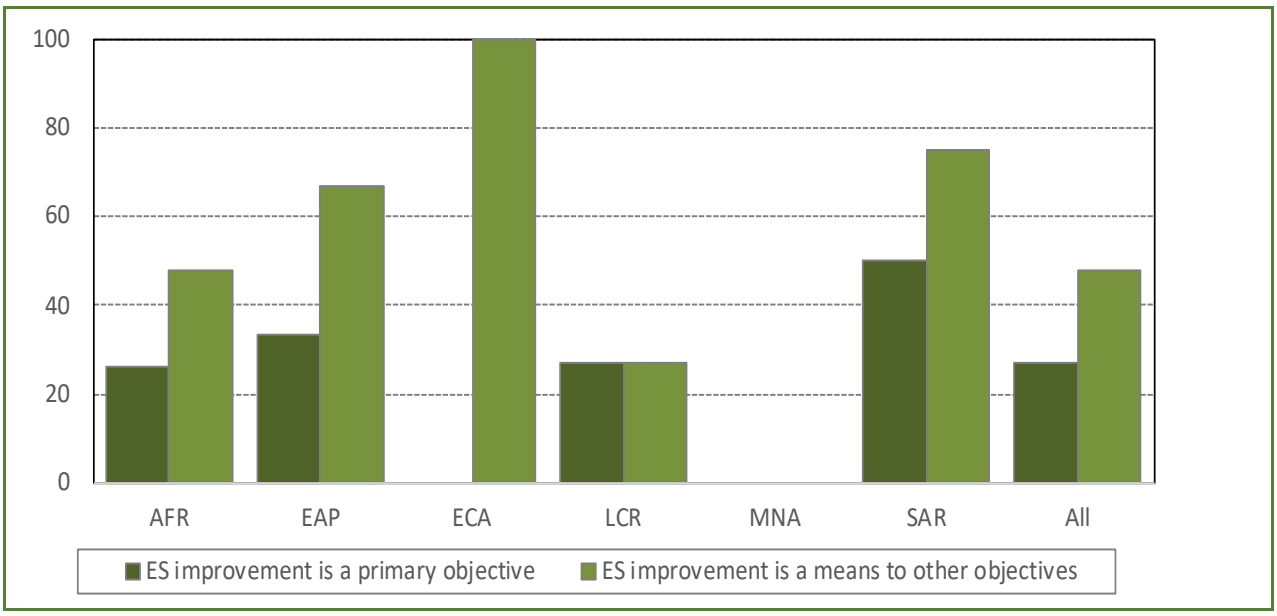
Many projects use a landscape approach because of the perceived limitations of narrower approaches. In Madagascar, for example, a succession of projects seeking to increase the productivity of irrigated areas have resulted in very little improvement. This was thought to be due to the degradation of the surrounding watersheds (caused, at least in part, by people seeking additional income by clearing additional land because of the low productivity of irrigated areas) damaging downstream irrigation infrastructure and reducing water availability. Only by addressing the entire landscape, including both downstream and upstream areas, could these problems be resolved. Accordingly, the Sustainable Landscape Management Project (P154698/P157909) addresses upstream, midstream, and downstream parts of select watersheds. Similarly, conservation projects have come to realize that effective conservation requires working with populations in the surrounding areas (and sometimes within the protected areas themselves) to reduce threats and increase connectivity of different habitats.

The increased scope of activities does not necessarily imply a change in fundamental objectives as stated in the Project Development Objectives (PDOs). The objectives of the landscape approach projects are listed in Annex 3. Many of these objectives would not have been out of place in traditional rural development or conservation projects.

Figure 3.4 shows the extent to which ecosystem services improvement is either a primary objective of landscape projects (in which case, the focus is usually on conserving biodiversity or sequestering carbon) or a means to achieve other objectives (for example, many projects seek to improve hydrological services so as to increase yields in downstream irrigated areas,

extend the life of reservoirs, or reduce flood risk). Overall, about a quarter of landscape projects seek to improve ecosystem services as an end in itself and about half seek to improve ecosystem services as a means to other ends; and any given project could do both.

Figure 3.4: Ecosystem service improvement as an objective in landscape approach projects by World Bank region (% of projects reviewed)



It should be noted that even when ecosystem services improvement is a primary objective, it is rarely included in PDO statements. As per current World Bank guidance, PDOs have to reflect first order results of project interventions and thus are worded as short- and medium-term outcomes. Most ecosystem services are highly variable and occur beyond the project period and thus carry potential attribution problems.[10] As a result, PDOs usually do not refer to ecosystem service objectives explicitly but may mention them in the section on Higher-Level Objectives and/or in the Theory of Change as long-term outcomes (impacts).

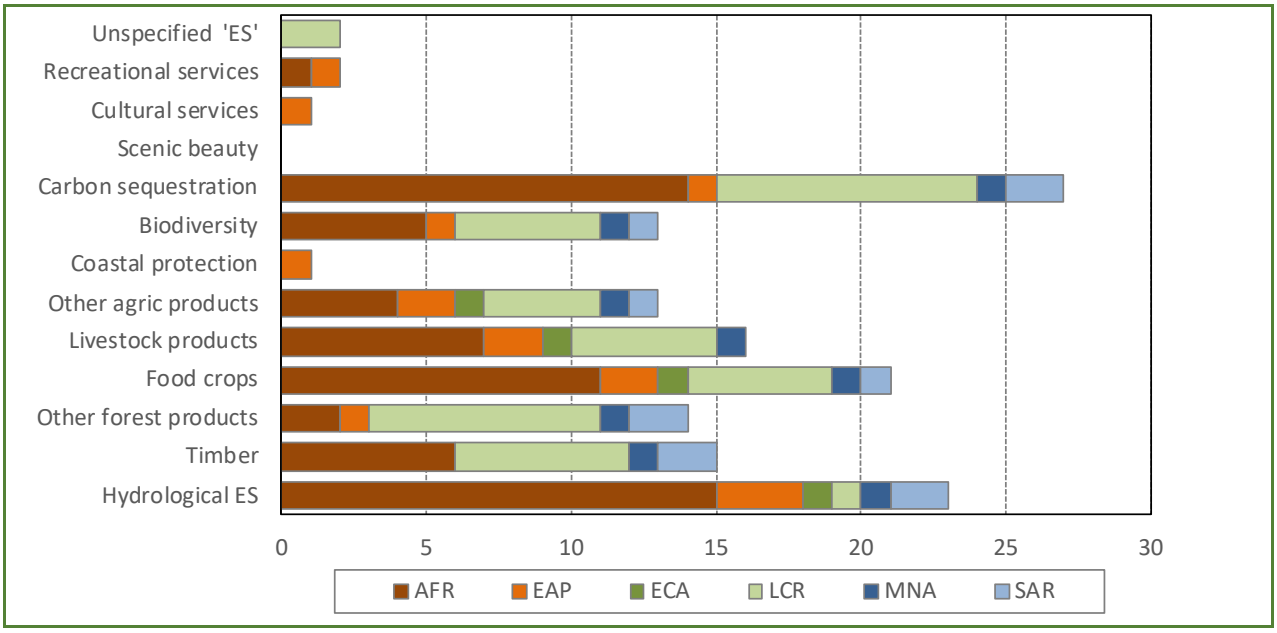
Figure 3.5 shows the specific ecosystem services targeted for improvement in landscape approach projects. Of course, any changes in land use are likely to affect a broad range of ecosystem services, whether such an effect is intended or not.[11] However, Figure 3.5 only includes ecosystem services that the project explicitly seeks to improve or for which it states that it expects an improvement. Provisioning services of various kinds (food crops, timber and other forest products, livestock, etc.) are the single most important objective in most

[10] Likewise, objectives such as reducing poverty or increasing income are also not often stated explicitly in PDOs, for similar reasons.

[11] The Environmental Assessment is intended to identify potential adverse effects so that the project design may be modified to avoid or mitigate such effects.

landscape projects. Carbon sequestration is included in the largest number of projects (27, or 61% all projects reviewed), although in many cases is not explicitly targeted, but is a by-product of activities undertaken for other reasons. The importance of carbon sequestration in the sample is due to the mandate that all projects should seek to estimate their contribution to mitigating climate change and the availability of the EX-ACT tool to do so. Hydrological benefits of some kind are the second most common ecosystem service (see below for more details), with 23 projects (52%) targeting at least one hydrological benefit. Biodiversity conservation is mentioned in 13 projects (30%), many of which are GEF-financed. Cultural and recreational services and coastal protection are mentioned in a few projects.

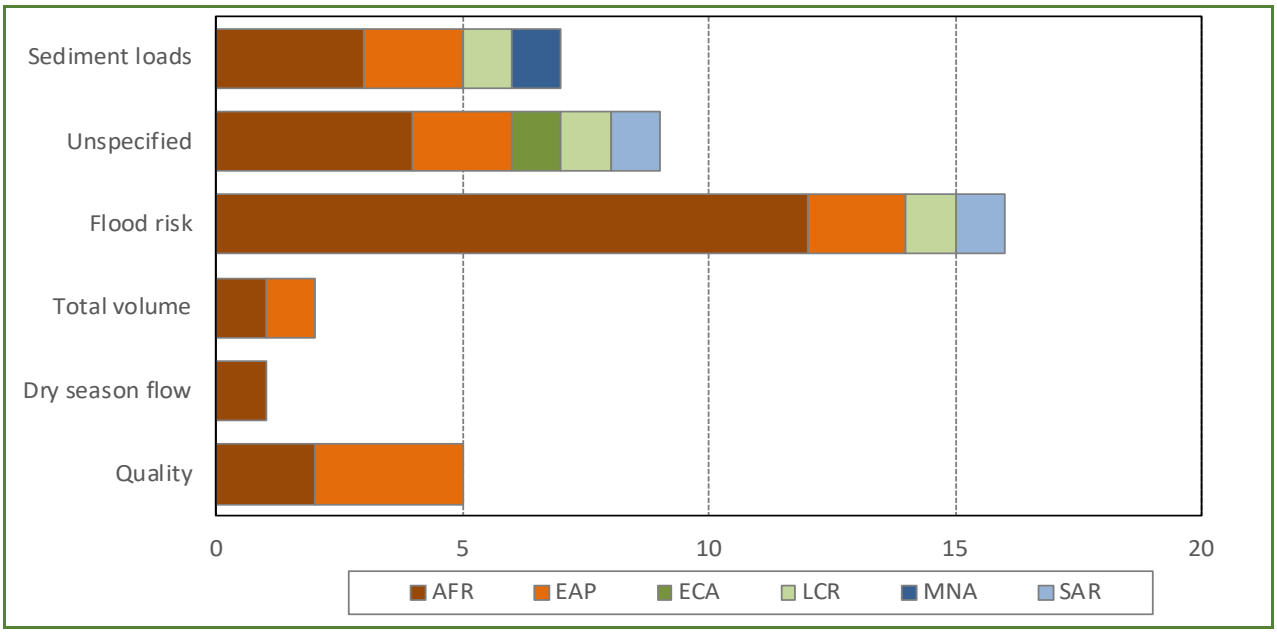
Figure 3.5: Ecosystem services targeted for improvement in landscape approach projects by World Bank region (number of projects)



Hydrological services are the ecosystem services that are most often targeted for improvement: half of all landscape approach projects explicitly seek to improve hydrological services in some way. Hydrological services are important for well-being, irrigation, industrial production, recreation, and many other purposes. Depending on the specific use, different aspects of water may be more important than others. Although some projects only consider 'hydrological services' in general, others are quite specific about seeking to improve water quality, dry season flow, total flow, reduce flood risk or sediment loads. Figure 3.6 shows the specific hydrological services that projects seek to improve; again, only effects that are

explicitly mentioned are included. Note also that many projects named more than one hydrological service. Reducing flood risk is the single most mentioned benefit by 16 projects (36% of all landscape approach projects, 70% of projects that target hydrological services). Reducing sediment loads that affect downstream reservoirs is mentioned by 7 projects (16% of all landscape approach projects, 30% of projects that target hydrological services).

Figure 3.6: Hydrological services targeted for improvement in landscape approach projects by World Bank region (number of projects)



Despite the high level of interest in water services, there is very little apparent effort to quantify them. Many hydrological models are now available (InVEST, SWAT, etc.), but only one project reported using a hydrological model. This was the China Zhejiang Qiandao Lake and Xin'an River Basin Water Resources and Ecological Environment Protection Project (P159870), which used SWAT to identify priority areas for inclusion and plans to use it for monitoring results (see below).

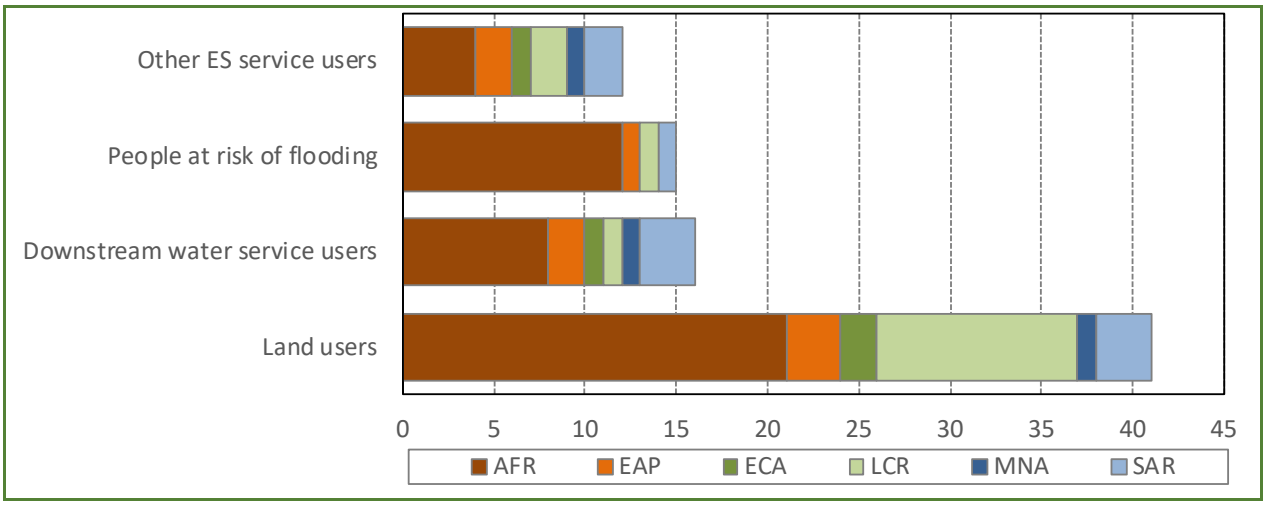
An important constraint here is that the time and resources available for such modeling are very limited. NCA could help provide such information without taxing project preparation resources. WAVES efforts have often focused on water accounts and estimates of the value of forest ecosystems have often included their effects on water services. In the absence of NCA initiatives, other efforts have sometimes been made to generate the required data. For example, extensive analytical work has recently been conducted in Pakistan and Nepal, using

modeling tools to develop cost-effective catchment area management plans in selected catchments so as to improve the sustainability of hydropower plants.[12]

3.2.3 Expected beneficiaries

Figure 3.7 shows the expected beneficiaries of the landscape approach projects (again, only beneficiaries that are explicitly mentioned in PADs are included). All but three projects name land users as the primary—and in many cases, the only—direct beneficiaries of the project. Downstream users (for example, irrigation systems, hydroelectric power plants, potable water supply systems) and people at risk of flooding are other important expected beneficiaries.

Figure 3.7: Expected beneficiaries in landscape approach projects by World Bank region (number of projects)



3.2.4 Activities

By their nature, landscape projects include a broad array of activities covering a large variety of land uses that varied between regions. Overall, activities focusing on land use (crops, livestock, forestry, etc.) account for a little under half of total commitments, with the proportion being lower in LCR and MNA and higher in other regions. Agricultural support (e.g., technical assistance) and commercialization (e.g., improvements to the value chains of agricultural, forest, or fishery products) complement these activities, accounting for a little under a fifth of all activities, although their share was very low in SAR and EAP. Other common elements include investments in irrigation and drainage (which is particularly significant in

[12] See: World Bank. 2019. "Valuing Green Infrastructure: Case Study of Kali Gandaki Watershed, Nepal." Washington: World Bank; and World Bank. 2019b. "Valuing Green Infrastructure: Case Study of Mangla Watershed, Pakistan." Washington: World Bank.

LCR) and in public administration (which was significant in all regions except EAP and ECA). Roads form a very large component of commitments in SAR, but this was driven by a single project with a large road component.

Livestock-specific activities were important in AFR and to a lesser degree in LCR, while crop-specific activities were important in LCR and AFR. Forestry-specific activities were important in LCR and AFR, but if all activities that include forestry are considered, their share of commitments on land use activities rises to a third of the total, and was particularly high in MNA (72%), ECA (54%), and EAP (43%).

3.2.5 Participation

Practically all projects in our sample adopted participatory approaches in their implementation, usually by leaving the choice of specific activities to be implemented to local communities or landholders. When land management plans were prepared, these too were usually prepared in a participatory manner and 84% of landscape projects used such approaches. These participatory approaches have become common in many rural development and environmental projects and it is not clear whether landscape projects are significantly different in this respect. Whether landscape project preparation has been more participatory is less clear, mainly because most PADs provide relatively few details on how preparation was conducted. In some cases, participatory processes were explicitly mentioned, but explicit mentions probably understate their prevalence.

3.3 Use of NCA data in landscape projects

None of the landscape projects reviewed explicitly used NCA in their preparation. This is not surprising: efforts such as those supported by WAVES are relatively recent and are only just starting to come to fruition in many countries. The results of WAVES-sponsored NCA data simply would not have been available in time to provide inputs. This is especially true for the earlier projects in our sample (for example, those approved in FY 2016) and for those that are AFs to even earlier projects. In Madagascar, for example, appraisal of the Sustainable Landscape Management Project (P154698/P157909) was completed just before the first draft of the country's WAVES-generated NCA was ready for comment.

In this review, we examined what data projects used in their preparation and are using in implementation. Although this data was not NCA data per se, in some cases it was very similar to what data an NCA exercise would have produced. We call such data 'NCA-like'. We also explore how NCA data could have helped improve projects, if it had been available.

3.3.1 Diagnosis

The first stage in any project development consists of identifying and diagnosing problems. To the extent that landscape approach projects use quantitative measures to do so, they are usually broad measures such as 'loss of forest area' or 'rate of deforestation'—often at the national level. These broad measures are then linked to others primarily in qualitative terms (e.g. 'deforestation causes increased erosion'). Reliance on such qualitative measures may make it difficult to convince decision makers (e.g. in Ministries of Finance) to undertake a project at all or to allocate sufficient resources, thus leading to fewer projects, or to projects that are smaller than optimal.[13] NCA data could provide a clearer picture of problems, indicating how severe the consequences of ongoing trends would be for the national economy.

Alternatively, in some cases ad hoc research conducted to gather the necessary data. For example, a study was conducted of the cost of coastal degradation in several West African countries; it found that this cost was equivalent to over 5 percent of their GDP[14], thus helping make the case for the West Africa Coastal Areas Management Program (WACA). However, resources are not always available for such research, and there may not be sufficient time to conduct it. The availability of Natural Capital Accounts would enable such analyses to be conducted without having to rely on ad hoc research.

Beyond showing the importance of problems, NCA data could also help understand what is driving the problems. When an ecosystem or landscape provides many local benefits (for example, harvestable products), the incentives for local resource managers to conserve should be strong. If incentives are not strong, then the ecosystem or landscape may be degraded because of factors like open access resources or insecure tenure. Better management to reduce degradation and increase local benefits would require investments that are not feasible due to lack of expertise, capital, or other inputs in countries. If the bulk of benefits provided by an ecosystem or landscape are not local (e.g., downstream hydrological benefits, carbon sequestration), then local incentives to manage them sustainably are weak, and interventions such as payments for environmental services (PES) may be appropriate.

3.3.2 Prioritization

While some landscape projects support broad reforms, most focus efforts on target areas, which immediately poses the problem of how to select these areas. Not all landscapes provide

[13] This obviously is not an absolute bar as all the projects in our review were approved despite little or no economic valuation of the problems they were addressing. It is plausible to think, however, that there might have been more projects approved (and so, more to review) if better evidence of the importance of landscapes had been available, and that more resources would have been allocated to landscape projects. As NCA estimates slowly become more widely available, it might be possible to test these hypotheses.

[14] Croitoru, L., J.J. Miranda, and M. Sarraf. 2019. "The cost of coastal zone degradation in West Africa: Benin, Côte d'Ivoire, Senegal, and Togo." West Africa Coastal Areas Management Program. Washington: World Bank.

the same level of benefits. The extent and composition of benefits can vary substantially, depending on the characteristics of the landscapes, and on the characteristics and number of people who depend on the landscape services. If projects can be targeted to the areas and activities that generate the greatest net benefits, or where failure to intervene would result in the largest net losses, then project benefits can be maximized.

Landscape projects use a variety of criteria to select areas. For example, the Burundi Landscape Restoration and Resilience Project (P160613) selected areas based on the following criteria:

> (a) most degraded land and high levels of soil erosion;
>
> (b) higher incidence of poverty;
>
> (c) greatest risk of floods and landslides;
>
> (d) greatest potential to protect downstream infrastructure (roads, houses, power, water supplies, and so on);
>
> (e) proximity to [protected areas];
>
> (f) coverage by other ongoing projects, and;
>
> (g) visibility for demonstration purposes (proximity to major highway).

Such criteria are a clear attempt to select areas of high value, but do so in an *ad hoc* way. Many of the criteria listed are only qualitative and where they are quantitative, they are incommensurate. For example, the criteria above cannot be compared to each other. Often, the procedure to use them is not much more sophisticated than listing the various possible project areas according to each criterion, and then picking those that score relatively high on most lists. In at least one case, however, a Multi-Criteria Analysis (MCA) was conducted.[15]

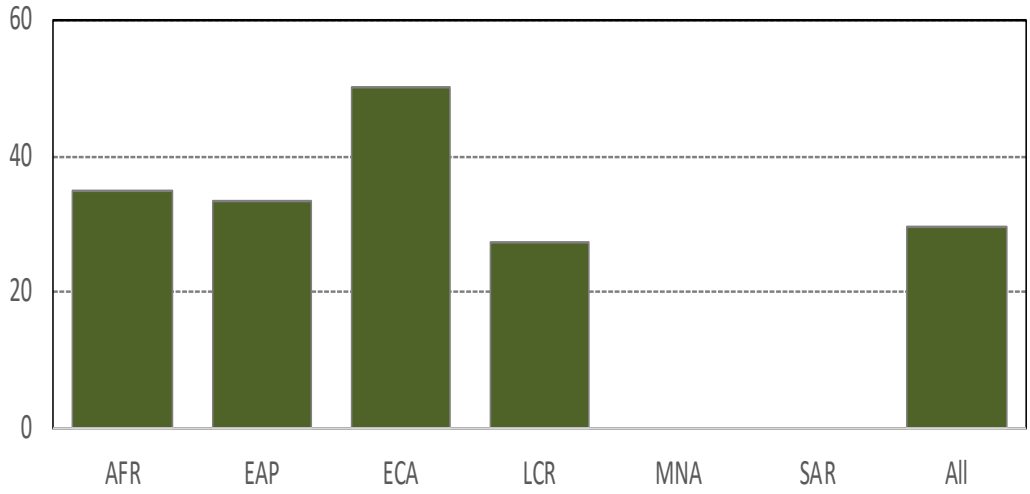
A project that focuses on watershed protection may use an indicator such as the number of downstream water users to identify and prioritize potential project areas. Where there are many different types of water uses, however, such simple indicators quickly break down. Should a watershed with many domestic water users and no hydroelectric power production be prioritized over one that has fewer domestic water users but several hydroelectric plants, or over one that has neither but has a large irrigated area? If watershed benefits can be valued in monetary terms, then prioritization can be undertaken on a more consistent basis. NCA would provide a way to do such comparisons more systematically, using monetary value as a common metric.

[15] In the *Brazil integrated Landscape Management in the Cerrado Biome Project* (P164602).

There is practically no within-area targeting in the current landscape projects (for example, to specific parts of a watershed).[16] This is an important limitation, as the extent to which particular parts of a landscape contribute to ecosystem service production often varies substantially. NCA estimates that reflected this heterogeneity could allow a much greater degree of targeting, thus potentially increasing project effectiveness. For this to happen, however, NCA estimates would probably need to be undertaken at a much finer level than is currently done (much is still at national level).

Because some details of implementation are often decided after project approval, there is still scope for NCA-like data to contribute to the within-area targeting in some cases. For example, on-going work in Vietnam to estimate the monetary value of coastal ecosystems such as mangroves will help inform the implementation of the Forest Sector Modernization and Coastal Resilience Enhancement Project (FMCR) (P157127), including helping to select priority areas and determining how much of the available resources should be invested in each area. Moreover, several of the landscape projects reviewed (about a third, overall) are part of broad, long-term programs (see Figure 3.8). Thus, even if NCA-like data could not have contributed to the present projects, it might well contribute to future phases of these programs.

Figure 3.8: Extent to which landscape approach projects are part of long-term programs (% of projects), by World Bank region



[16] The *Madagascar Sustainable Landscape Management Project* (P154698/P157909) targets broad sections of each watershed (upper, middle, lower), but within them does not specifically target, say, areas with steep slopes or in riparian corridors.

3.3.3 Design of appropriate responses

Many projects often base their choice of activities on technical considerations, and then assess whether their use brings net economic benefits. Often this assessment is conducted for the whole project package, without looking at its individual components. Landscape projects do not appear to be exceptions to this pattern. Landscape projects consider a broader range of activities than traditional projects (including, for example, both forest conservation in upper watersheds and improved irrigation in the lower watersheds), but still tend to consider each activity largely on its own merits. None of the landscape projects in our sample explicitly examined the potential tradeoffs between different land uses.

NCA data could help illuminate tradeoffs and inform discussions with stakeholders. In this, the accounts themselves do not necessarily show the tradeoffs directly. However, the process of constructing the accounts often involves using models and other means to assess how natural resources affect ecosystem services and these models could be used to examine tradeoffs.

Designing appropriate responses also means identifying who stands to gain or lose from current trends and from the possible solutions. Those who stand to lose if project activities affect them negatively may need to be compensated (e.g. upstream landholders who face land use restrictions aimed at protecting downstream water users), to secure their participation or to avoid adverse social effects. Project activities might also be modified to reduce or eliminate such impacts. Conversely, those who stand to gain are likely to participate voluntarily and may even be tapped as a funding source. The Madagascar Sustainable Landscape Management Project (P154698/P157909), for example, promotes upstream conservation to help improve the productivity of downstream irrigation; the user associations who stand to benefit from improved irrigation are expected to pay the long-term costs of upstream conservation activities. At present, analyses of potential winners and losers are often limited to the project's social assessment and economic analysis and, given the limitations of project preparation budgets, generally use whatever data are available and often rely heavily on benefits transfer methodology. Even though many landscape management activities may affect a large number of people and groups through their effect on various ecosystem services, the analysis is often limited to the most direct beneficiaries (usually land users) with other groups only considered in qualitative terms, if at all.

NCA involves identifying those who benefit from ecosystem services and the magnitude of these benefits, as this information is required to construct the accounts. The availability of such accounts would enable a faster and more complete analysis of likely winners and losers.

3.3.4 Economic analysis

Almost all projects name land users as the main project beneficiaries, and there is almost always some measure of quantification of expected benefits they would receive from improved land uses (e.g. higher crop yields, lower costs, more valuable outputs). In some cases, this may include an estimate of the contribution of ecosystem service to the benefits enjoyed by land uses. The economic analysis of the Madagascar Sustainable Landscape Management Project (P154698/P157909), for example, attempts to incorporate the effect of watershed protection on returns to irrigation in the lower part of the watershed.

Other beneficiaries, if mentioned at all, are mentioned in very general terms. One result of this is that the likely net benefits of landscape projects are almost certainly under-estimated. This underestimation is not necessarily a problem: all the projects in our sample were approved as they had shown sufficient benefits to justify their costs. For example, the Mexico Forest Entrepreneurship Project argued that even though measurable benefits were insufficient to justify the project by themselves, they were only a small part of total benefits and non-measured benefits did not need to be very large for total benefits to exceed costs. However, if benefits had been better measured, and likely showing much larger net benefits, a decision might have been made to undertake a larger project. Better measurement of benefits might also have resulted in changes in the mix of activities undertaken.

NCA data would allow for a much more comprehensive and systematic view of likely project benefits—both through the information contained in the accounts themselves and through the ability to use the tools and models used to construct the accounts to estimate the likely results of project interventions.

3.3.5 Monitoring of outcomes

Monitoring usually focuses on the area brought under 'improved' or 'sustainable' land uses, or on the number of users of such practices. Even where improvements in land use benefits are an explicit project objective, they are not often included in the main indicators. Crop yields, for example, could fluctuate significantly due to weather conditions, making it difficult to attribute observed changes to project activities. Even in projects that explicitly target biodiversity improvement, the indicator is usually along the lines of 'areas brought under enhanced biodiversity protection.'[17] In a few cases, some projects are attempting to go further. The China Zhejiang Qiandao Lake and Xin'an River Basin Water Resources and Ecological Environment Protection Project (P159870), which used SWAT to identify priority areas for

[17] There are some individual exceptions. The *Mozambique Conservation Areas for Biodiversity and Development Phase 2 Project* (P166802), for example, has as explicit target of maintaining or increasing populations of certain key wildlife species.

inclusion, is also planning to use this model to quantify the pollution reduction associated with land management interventions made during the project period.

By systematically tracking changes in stocks and flows of a broad range of natural resources and ecosystem services, NCA could make it much easier to monitor the outcomes of landscape projects. That does not mean that the existence of accounts would solve all problems. For NCA data to be useful, it must first be collected at the appropriate level of spatial disaggregation. Second, the problem of attribution would remain—of distinguishing the effects of project activities from those of other factors, such as droughts. Here, too, it is likely that the data and models used to construct the accounts may prove to be of as much use as the use than the accounts themselves.

Once it has been determined how NCA data can be used to track project outcomes, NCA also has the great advantage that it is not tied to project timelines. Many project outcomes may only be observable well after the project is completed; others may be observed during the project itself, but may not persist after the project ends. Yet whatever monitoring the project itself undertakes usually ceases entirely at project end. NCA processes, on the other hand, are intended to be ongoing, and so should continue to allow project outcomes to be tracked long after the project itself has ended.

3.3.6 Designing NCA to support landscape projects

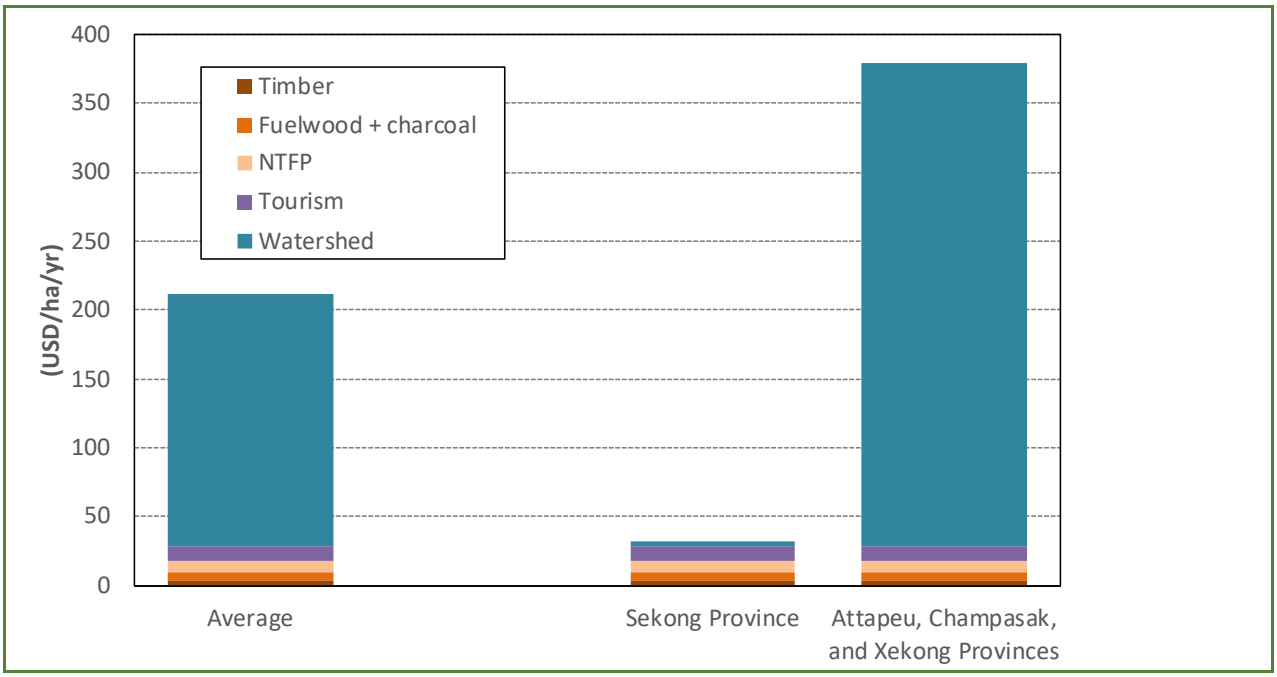
The preceding discussion makes it clear that NCA could be extremely useful to landscape projects at all stages, from the policy dialog that precedes the decision to undertake a project, to project design, through implementation, and even long after the project has ended. Yet the discussion had also highlighted that the mere existence of NCA might not be sufficient. NCA can be conducted in a number of ways and all may not be equally useful for different types of landscape projects.

An important question, therefore, is how NCA measurement efforts might be designed to be most useful to landscape projects. This is a question that will only be answered definitively by experience. It is also likely that there will be many different answers depending on local conditions. Nevertheless, two aspects can already be identified as being important: that NCA needs to be conducted at an appropriate level of spatial disaggregation, and that the data and models used to construct the accounts are as important, if not more important, than the accounts themselves.

National level accounts have been the norm until now. Figure 3.9 illustrates the importance of undertaking NCA at a disaggregated level. The first column shows the value of damages from

forest loss in Laos, from a study of the cost of environmental degradation, an NCA-like exercise. On average, forests in Laos were said to generate USD183/ha/year. Watershed protection was the largest component of forest value by far.[18] This average value, however, is based on an average of several studies from the region.[19] Two of these studies were from Laos itself, and they show very different watershed protection values from different parts of the country, as can be seen in Figure 3.9. To be useful, NCA estimates must show these differences, not obscure them within averages.

Figure 3.9: Estimated value of forests in Laos (USD/ha/year)



Sources: Average from Groby and Strukova (2018); provincial values from Emerton (2013).

For example, the province-specific data for Laos (Figure 3.9) shows that forest conservation efforts should focus on Attapeu, Champasak, and Xekong Provinces rather than taking a broader approach. Sub-provincial data, or data based on natural units such as watersheds, would allow more fine-tuned targeting. Data that further distinguish different landscape elements (for example, different kinds of forests, pastures, crops) would be more useful still, as it would also allow project activities to be selected. If the accounts are intended to cover

[18] Groby, M., and E. Strukova Golub. 2018. "Degradation of the Mekong Basin in Lao PDR: An Economic Analysis." Washington: World Bank.

[19] Emerton, L. 2013. *The Economic Value of Ecosystem Services in the Mekong Basin: What We Know, and What We Need To Know*. Gland: WWF.

the entire country (or a large area), resource constraints could limit the extent of spatial detail. This restriction is less significant when the accounts are undertaken at a sub-national level, as in the Targeted Technical Assistance efforts that the GPS program is supporting.[20]

For targeting landscape management, initial diagnosis and problem identification, a broad NCA coverage of a country would be most helpful. For project design, more detailed information on the target areas would be most helpful. Thus, there is a tension between the NCA data needs for these different roles. A solution could be an initial broad analysis with deeper dives in some areas, which could not just provide data for those areas, but also experience in identifying and measuring the ecosystem service flows so that they could be replicated more rapidly in other areas when other projects require them.

Even if NCA are conducted at the appropriate level of spatial disaggregation, the accounts themselves will only provide part of the information needed for landscape projects. NCA tracks how natural resource stocks and flows change over time, in both physical and monetary terms. This is already very useful in identifying problems and prioritizing them. Designing appropriate responses, however, requires an exploration of alternatives. What would happen if the landscape were modified in particular ways? Given that there are many possible ways in which landscapes might be modified, how do we determine which sets of changes would produce the most desirable sets of outcomes? Natural capital accounts would not ordinarily answer these questions, but the same data and models which are used to construct the accounts could be invaluable in helping to answer them.

A current technical assistance program in Cambodia, for example, seeks to assess the value of the Cardamom Mountains. An important component of this landscape's value is the contribution it makes to the hydrological services used by downstream irrigated agriculture and hydroelectric power production. An analysis that simply notes that the landscape in its current condition supplies a given flow of hydrological services, which in turn enable a certain amount of irrigation and hydroelectric power production, would be interesting but not very useful. Being able to distinguish the effect of different parts of the landscape would be much more useful: how much less are the services generated by degraded portions of the landscape compared to better conserved portions? Which portions of the landscape (spatially, qualitatively) are particularly important for the provision of hydrological services? Answering these questions requires a suitable hydrological model that can assess the relationship between upstream land use and downstream water flows. But this same model, once it has been constructed and validated, will also allow many more questions to be answered—How would hydrological flows change, for example, if degraded areas were restored?

[20] For example, the TTA estimates are focuses on Khammuane Province in Laos and the Cardamom Mountains in Cambodia.

3.3.7 Leveraging landscape projects to improve NCA

Landscape projects could support future NCA work by carrying out targeted monitoring and research. Projects that are part of long-term programs lend themselves to this as they could collect data over a long time period on things like:

- Monitoring flows of ecosystem services from given landscapes, prior to and during project implementation (and, ideally, also after the end of the project).
- Undertaking targeted research to better understand ecosystem flows. This could take the form of measuring flows in test parcels with and without project interventions or monitoring hydrological flows from paired catchments, for example.[21]

Many projects already invest in improved monitoring: 21 of our sample (or 48%) did so. However, this monitoring is generally targeted at simply observing ecosystem flows, not at attributing them to project activities or to different landscape elements. Only 8 projects (18%) include efforts to undertake an impact evaluation; all but one of these were in Africa, with the other one is in LCR.

The China Zhejiang Qiandao Lake and Xin'an River Basin Water Resources and Ecological Environment Protection Project (P159870), used SWAT to identify priority areas for inclusion in project activities. As part of this it is planning to undertake a water quality survey which will be used to evaluate the assumptions underlying the SWAT model.

3.4 Conclusion

The landscape approach takes geographical and socio-economic perspectives into account for managing land, water, and forest resources. This review of the World Bank's portfolio of active landscape management projects and examined how could contribute to project design and implementation. Although NCA efforts are too recent, in most cases, to have played a role in current landscape projects, the review showed that NCA could be extremely useful to landscape projects at all stages; from the policy dialog that precedes the decision to undertake a project, through project design and implementation, and even long after the project has ended. However, the mere existence of NCA might not be sufficient to ensure this. NCA can be conducted in a number of ways and all may not be equally useful for different types of landscape projects. In particular, accounts need to be at subnational levels to be most useful, while additional analysis and modelling will be needed to help assess different policy and management options.

[21] For example, the *Colombia Mainstreaming Sustainable Cattle Ranching Project* (P104687) undertook extensive research on the linkages between biodiversity and the silvopastoral practices it supported. (This project is not in our sample as it was approved in FY11.)

4. Africa Forum on Natural Capital Accounting and recommendations for future actions

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This chapter reproduces the Executive Summary of the report that resulted from the "Africa Forum on Natural Capital Accounting and recommendations for future actions" which was held 21st November 2019, and back-to-back with the 4th Policy Forum. The full workshop report, agenda and presentations may be found on-line[1,2].

4.1 Background

Africa's natural resources – including forests, wildlife and minerals – play a crucial role in the continent's economies. According to *The Changing Wealth of Nations 2018*, natural capital accounts for between 30% and 50% of the total wealth of countries across Africa.[3] Ecosystem services[4] provided by natural resources form the basis for many economic activities in Africa – including crop production, fuel wood production, and tourism – especially among the poorest sectors of the community.[5] As Africa's population grows, however, the sustainability of these ecosystem services— and by extension the livelihoods of the people who rely on these ecosystem services — are threatened. It is clear that there is a need to manage and measure the trade-offs associated with development at the cost of nature.

Natural Capital Accounting (NCA) – underpinned by the System of Environmental-Economic Accounts (SEEA) as the international statistical standard for environmental-economic data – **is an important tool for evidence-based policy making on the role of nature in sound economic**

[1] See: https://www.wavespartnership.org/en/knowledge-center/towards-regional-community-practice-africa-accelerating-mainstreaming-nca-through
[2] See: https://www.wavespartnership.org/en/africa-regional-nca-policy-forum
[3] Lange, Glenn-Marie; Wodon, Quentin; Carey, Kevin. 2018. The Changing Wealth of Nations 2018 : Building a Sustainable Future. Washington, DC: World Bank. World Bank. https://openknowledge.worldbank.org/handle/10986/29001 License: CC BY 3.0 IGO.
[4] Ecosystems provide a large number of services necessary for human survival that range from a reliable flow of clean water, to carbon sequestration, and productive soils.
[5] African Development Bank (2015) Payment for Ecosystem Services – A promising Tool for Natural Resource Management in Africa. AFDB CIF Knowledge Series

planning and development. [6] NCA allows countries to systematically measure and value their natural resource assets in both monetary and non-monetary terms. When mainstreamed into decision-making, this information can allow nations to appreciate, understand, and manage assets about which they previously had limited information.

In Africa, the development and implementation of Natural Capital Accounts[7] has been ongoing since the late 1980s,[8] with dozens of pilot accounts developed by numerous countries across the region.[9] In the past, NCA efforts have been discontinuous and fragmented. With NCA now gaining global momentum, however, governments are seeking embedded and routine approaches to mainstream the results of accounts into decision making.

4.2 African Forum on Natural Capital Accounting:

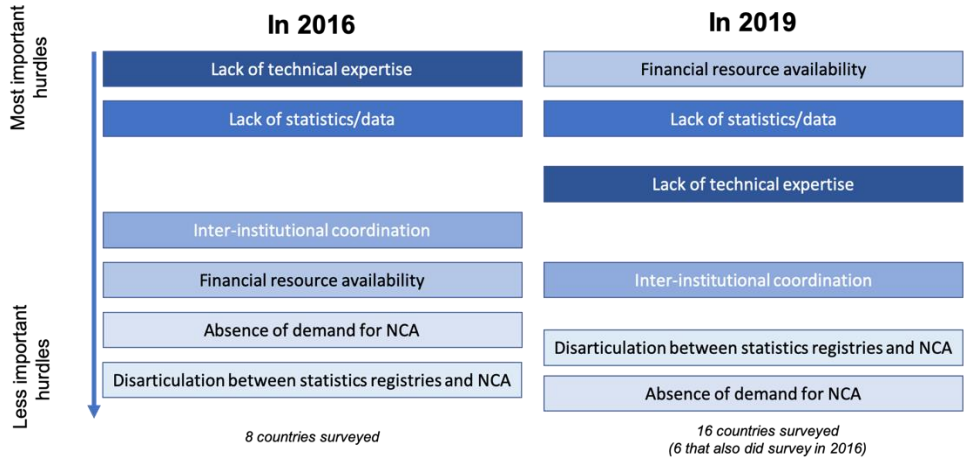
In November 2019, **the first Africa Forum on Natural Capital Accounting was held in Kampala, Uganda and brought together 72 participants from 18 African countries** as well as regional and international agencies working on NCA. The forum was co-organized by the World Bank Wealth Accounting and the Valuation of Ecosystem Services (WAVES) program, the Secretariat of the Gaborone Declaration for Sustainability in Africa (GDSA), and the United Nations Statistics Division (UNSD).[10] This Forum built on engagement started in 2016, when WAVES and the GDSA[11] held a first meeting to gauge interest on whether the momentum on NCA in Africa could benefit from a regional Community of Practice among practitioners, as well as a 2019 workshop organized by the UNSD, Statistics South Arica, GDSA and UN Environment Program on the SEEA Experimental Ecosystem Accounting for countries in Africa, where a Community of Practice was also discussed.

The Africa Forum on Natural Capital Accounting was convened to **provide a space for African stakeholders to shape a Community of Practice on NCA in Africa**. Participants were encouraged to identify common challenges and opportunities, and to consider how regional support could promote the mainstreaming of natural capital considerations into policy. The outputs of the Forum included recommendations on implementing an effective Community of Practice for preparing and using NCA in Africa[12] and this workshop report.

[6] More information available online: https://seea.un.org/
[7] *Development* in this context referring to the production of accounts and *implementation* referring to the use of accounts in decision-making.
[8] Reuter, K.E., Juhn, D., Portela, R., and Venter, J. 2016. Natural Capital Accounting across the Gaborone Declaration for Sustainability in Africa: A Desktop Scoping. Report Prepared for the Gaborone Declaration for Sustainability in Africa: Gaborone, Botswana. Pp. 188
[9] More information available online: http://www.gaboronedeclaration.com
[10] More information available online: https://www.wavespartnership.org/en/forum-natural-capital-accounting-better-policy
[11] The 2016 workshop report can be found online: http://www.gaboronedeclaration.com/s/NCA-Workshop-Report-Compressed-n6jt.pdf
[12] Building upon the 2016 Natural Capital Accounting Statement drafted following the regional NCA workshop organized on 23 June 2016 in Nairobi, Kenya by the GDSA and the World Bank WAVES program. The Declaration can be read on the GDSA website, here: https://static1.squarespace.com/static/52026c1ee4b0ee324ff265f3/t/580aac15b3db2b5c74f77c70/1477094421538/GDSA+NCA+Statement+Final.pdf

The Forum demonstrated the willingness of countries and agencies to share their expertise and experience. A pre-forum NCA questionnaire completed by 16 African countries, combined with information collected by the UNSD, highlighted good progress on NCA in Africa on a range of accounts with some success in mainstreaming NCA outputs into national policies, plans, and other decisions. In addition, the questionnaires highlighted barriers to implementing NCA, including financial resources availability, lack of statistics/data for accounts, and lack of technical expertise (Figure 4.1). Lessons learned were also shared, including the need to ensure good coordination at the national level on NCA while building strong technical capacity and links to policy-relevant topics and decision-makers.

Figure 4.1: Hurdles faced in the implementation of NCA as captured by questionnaires administered in 2016 and 2019.



4.3 Recommendations for a Community of Practice on NCA in Africa:

The objective of the Forum was to shape a Community of Practice on NCA in Africa. Throughout the day, it became clear that there was strong support for a Community of Practice, particularly given the importance of social processes, such as networking, peer support, and access to high-quality learning and conversations, in the development and use of natural capital accounts. It was noted several times that the return-on-investment from a regional Community of Practice could be more than the resources spent on the platform itself. The participants recognized the benefits of establishing a mechanism to share experiences in NCA and work collaboratively to apply accounting principles in support of natural capital outcomes. **No such systematic and sustained regional collaboration network currently exists**

in Africa for NCA, though there have been a number of standalone regional training workshops, bilateral exchanges, and some early work by a few institutions and entities.

For the Community of Practice to be successful, and based on lessons learned from other Communities of Practice in Africa, it was clear that the following elements were needed: 1) clear and achievable objectives for the Community of Practice with a timeline attached; 2) grounding of the Community of Practice within the region and building on existing work; and 3) enabling conditions such as Focal Points within national countries.

The Community of Practice can be implemented at relatively low cost, but there must be some resources allocated towards it to – at minimum – **fund the cost of staff time to manage the Community of Practice** as well as **funding for an annual meeting**. Given that coordination and annual meeting costs are unlikely to be provided initially by governments (though in some cases, governments may be willing and able to co-finance trainings and workshops), **such catalytic roles might be played by non-government entities including the GDSA Secretariat, World Bank, UNSD, UNEP, UNECA, Natural Capital Coalition, and others**.

Based on discussions at the Forum, **the organizers propose that the NCA Community of Practice in Africa be established through a six-month start-up phase, followed by the first year of implementation (culminating in an in-person annual meeting in mid-2021), leading into rolling two-year implementation phases.** These implementation phases would be designed to ensure the Community of Practice remains goal-oriented and focused on relevant issues with high traction at both country and regional scales.

4.4 Key messages and next steps

In bringing together relevant expertise and experience from African countries and around the world, the Africa Forum on Natural Capital Accounting held in Kampala in November 2019 provided a strong platform to further advance NCA in the region. There is important experience in NCA across Africa on which to build, and a clear policy demand for integrated information to support sustainable development policy and analysis. **Establishing a Community of Practice is a real and practical step towards supporting best practices in NCA, by building capacity and momentum across the African continent to mainstream NCA into statistical production and policy in all African countries. As such, the Forum closed with representatives from the World Bank, the GDSA Secretariat, UNSD, and UNEP each committing to see this Community of Practice launched and resourced.**

Building on the momentum initiated during the Forum, next steps will include:

- A call for interested organizations and institutions, including the Forum organizers, to commit resources towards the Community of Practice and the identification of a host organization to lead in the coordination of the Community's activities;
- The convening of a volunteer Working Group for the Establishment of the NCA Community of Practice which – together with key institutions including the Forum organizers and other interested organizations – will develop a Community of Practice workplan for input and implementation; and
- The planning of the next Forum, at which the Community of Practice can convene to continue its lessons sharing and grow its reach.

4.5 Acknowledgments

This event "Africa Regional Natural Capital Accounting Policy Forum" was organized by the World Bank's Global Program on Sustainability (GPS), the Gaborone Declaration for the Sustainability of Africa (GDSA) Secretariat and the United Nations Statistics Division (UNSD). Financial support was provided by World Bank; as well as by the Government of Botswana, UNSD and UN Environment that funded the participation of selected Government delegates. This workshop would not have been possible without the participation of many key organizations and individuals. Their experience, knowledge, and hard work have been essential to the outputs of the workshop, including a co-production of a high-level roadmap, and we extend our sincere gratitude for their significant contributions. We also wish to thank Steve Bass for valuable comments on an earlier version of this report.

The full workshop report is found online[13] and should be cited as: Reuter K., Ahlroth S., Castaneda J.P. (2019) Africa Regional Natural Capital Accounting Policy Forum: Workshop Report and Next Steps. Report Prepared for Wealth Accounting and the Valuation of Ecosystem Services [WAVES], Global Program on Sustainability (GPS), Gaborone Declaration for Sustainability in Africa [GDSA], and United Nations Statistics Division [UNSD]. Pp. 57

[13] See https://www.wavespartnership.org/en/knowledge-center/towards-regional-community-practice-africa-accelerating-mainstreaming-nca-through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