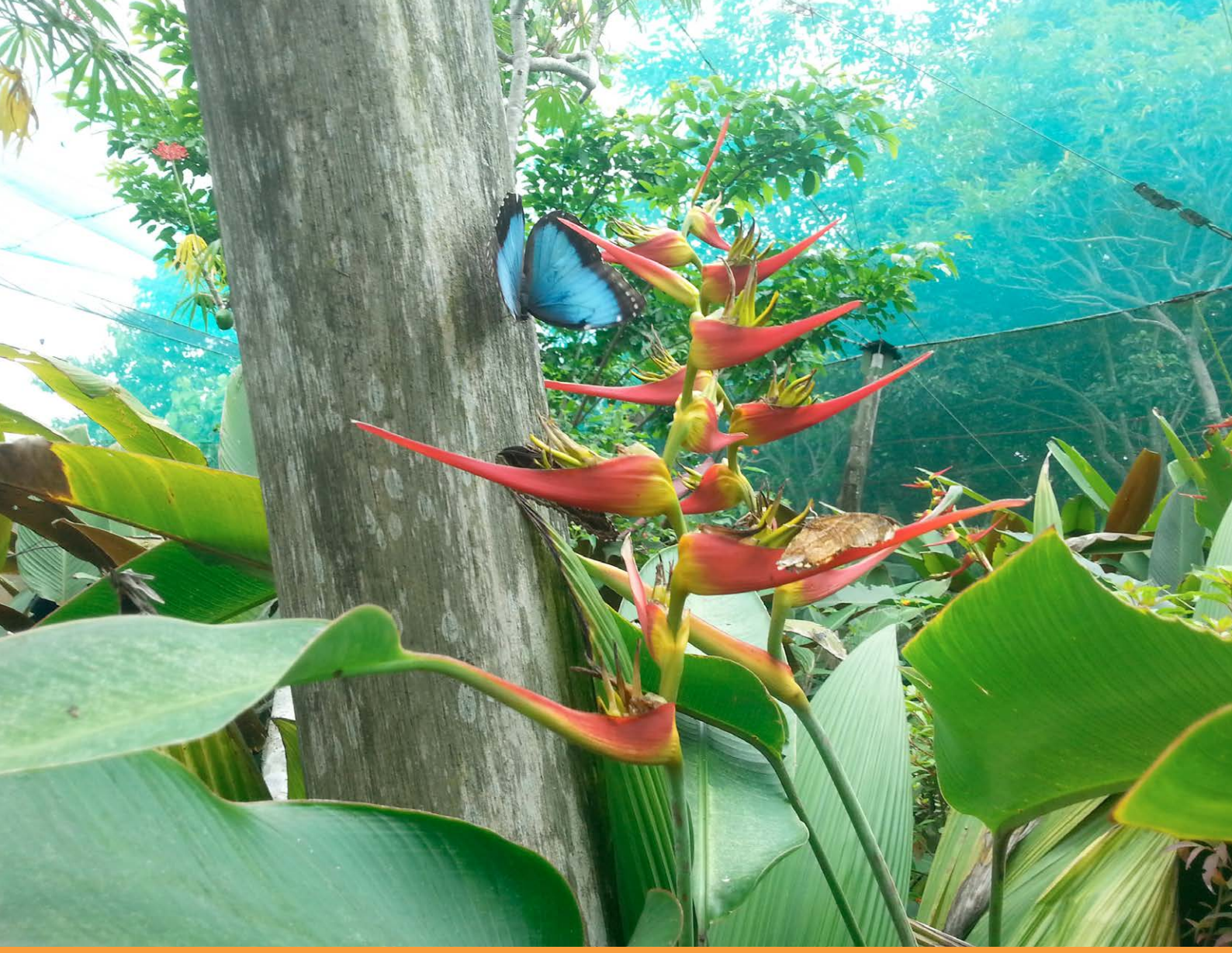

Ecosystems, poverty alleviation and conditional transfers

Guidance for practitioners

Edited by Ina Porras (IIED) and
Nigel Asquith (Fundación Natura)

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Preface

Evidence from the international research community shows that careful management of nature results in benefits to people's wellbeing. Poor people especially depend more heavily on the quality of the ecosystems, and have less access to substitutes when they are degraded. Making meaningful impacts in the way ecosystems are managed requires governments to step in and scale up, but the evidence also shows that empowered communities can make strong calls to enact and implement change at the local level.

Positive incentives like payments for ecosystem services (PES) and other forms of conditional transfers can provide important signals to enact this behavioural change into positive actions. Carefully designed, these incentives can also contribute to the wellbeing of people, especially poor and vulnerable groups.

New tools emerge that can help with scaling up and dealing with inevitable trade-offs, but more efforts are needed to bring this information closer to those making decisions.

This handbook and accompanying materials help to bridge this space by: 1) making evidence accessible, bringing the latest evidence from research on PES in theory and practice with documented case studies written for practitioners; and 2) supporting capacity building to 'train the trainers', through teaching modules which can be used to promote capacity building of practitioners.

Acknowledgements

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Produced by IIED's Shaping Sustainable Markets Group

The Shaping Sustainable Markets group works to make sure that local and global markets are fair and can help poor people and nature to thrive. Our research focuses on the mechanisms, structures and policies that lead to sustainable and inclusive economies. Our strength is in finding locally appropriate solutions to complex global and national problems.

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Cover photo: The creation of the National Park System in Costa Rica evicted many people and caused significant social and economic disruption. Over the years, PES has become an important incentive for families engaged in eco-friendly businesses like ecotourism in the resulting buffer areas. These new enterprises promote local jobs, help reduce migration and encourage conservation in private properties along biological corridors. Photo credit: Ina Porras/IIED.

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Contents

List of tables

List of figures

Acknowledgements

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All errors and omission remain the responsibility of the authors.

Acronyms

CDM	Clean development mechanism
CT	Conditional transfer
EFR	Environmental fiscal reform
ES	Ecosystem services
GHG	Greenhouse gas
INDC	Intended Nationally Determined Contribution
MEA	Millennium Ecosystem Assessment
NDC	Nationally Determined Contribution
NGO	Non-governmental organisation
PES	Payments for ecosystem services
REDD	Reducing emissions from deforestation and forest degradation
SDG	Sustainable Development Goal

Executive Summary

Social conditional transfers (CTs) and payments for ecosystem services (PES) have the same starting point: the assumption that direct, conditional incentives are the most effective way to change behaviour. However, contextual disadvantages affect the capacity for the very poor to comply. Recognising this is important in the design of inclusive, pro-poor instruments.

We draw lessons from experiences that have achieved scale by moving beyond pilots or projects into established programmes. Successful CT/PES schemes exhibit a series of enabling conditions: high level political support, sustainable financing streams, lean institutional set-ups, tools and systems for effective implementation, and a clear ability to demonstrate impact.

Ecosystem services and conditional instruments

CTs and PES are positive incentives to change behaviour, by providing a reward for `good behaviour' expected to result in better delivery of ecosystem services. They also offer a platform for raising new streams of revenue by mainstreaming ecosystem services (ES) into other sectors of the economy (hydropower, water utilities, carbon reduction commitments, tourism), collecting revenues (eg from taxes and royalties, carbon and biodiversity offsets), and re-directing these to improved ecosystem management.

CT/PES and poverty

PES is not inherently equitable, nor does it automatically promote fair benefit sharing. Rather, PES needs to be specifically designed for fairness as a trickle-down effect – not automatic. Systematic issues that affect the poor (access to water, control of resources, access to markets to sell produce) will ultimately determine whether they can comply with PES conditions. For the ultra-poor, unconditional transfers may provide better opportunities to improve wellbeing.

Designed well, CT/PES can improve the wellbeing of the poor by addressing different aspects of poverty: short-term rewards that help compensate the cost of land use investments, and long-term benefits that provide technical support to enhance ecosystem resilience and improve livelihood options.

CT/PES can promote financial inclusion, by providing reliable cash flows to individuals, communities or groups that could be used as collateral, to promote risk-sharing in pro-poor investments, or to strengthen micro-credit arrangements at community level. Banks can provide financial agility to deliver payments, reducing the risk of misappropriation of funds.

Emerging policy pointers

- Increasing political support and visibility by integrating with big issues (eg NDCs and SDGs).
- Empowering women and vulnerable groups through targeted payments. Attention to heterogeneity of ecosystem service providers can help create more equitable solutions to environmental protection.
- Aiming for pluralistic finance, such as Trust Funds, for bringing in different funding streams for different objectives.
- Embracing information systems: advances in science and technology improve programme design and management and can promote financial integration of the very poor.
- Supporting South-South dialogue and collaborative learning, including technological transfer.

CT/PES in practice

Designed carefully, conditional incentives can contribute to the wellbeing of people, especially poor and vulnerable groups. We look at two types of schemes to evaluate how CT and PES programmes have managed to reach scale, and to assess if lessons from CTs for social protection can help design programmes for the maintenance of ecosystem services:

- Direct environmental interventions using social conditional transfers, such as the South African Environmental Public Works Programme. Although focused on social outcomes, such as jobs and poverty alleviation, some programmes have had large-scale environmental impacts.

- Programmes that seek to change behaviour towards positive environmental actions, using different conditional incentive packages that include mixes of cash and in-kind rewards. Some of these are top-down national programmes, such as the China Sloping Lands Conversion within the Eco Compensation Programme, or bottom-up initiatives, such as water deals in South America and carbon offsets for mangrove protection in Kenya.

CTs and direct interventions

The Mahatma Gandhi Rural Employment Guarantee Act programme, India	Social protection/public environmental works. Provides at least 100 days of wage employment for unskilled labour during lean agriculture season, through self-selection (rather than targeting) application. Cash payments made directly to beneficiary through personal bank accounts. It grabs major political attention, with funding guaranteed by parliamentary Act.	US$57.4 million in 2015 from central and state budget (75:25). It covers all rural districts in India, 50 million jobs in rural areas per year, and 53% of projects targeting soil and water conservation activities.
Environmental public works programme, South Africa	Social protection/public environmental works. Provides jobs for vulnerable groups such as low-income workers, single-parent families and HIV/Aids affected people. The programme works with partners such as the Planned Parenthood Association of South Africa (PPASA) in the Eastern Cape, who select and manage the workforce.	About US$33 million/year from central budget from social responsibility and environmental portfolio. About 30,000 jobs/year, and 1 million hectares of invasive alien species cleared.

CTs for behaviour change: scaled-up national programmes

China Sloping Lands Conversion and Eco-Compensation Programmes	Innovative top-down and decentralisation design to manage very large scales. The `poverty' agenda gains importance in current programme stage. Combination of cash and in-kind payments throughout history of the programme. First of the expanding Eco-Compensation Programme underpinning China's EcoCivilization strategy.	Over US$69 billion and 32 million households since 1999.
Bangladesh Jatka conservation programme	A step forward linking social and environmental authorities. Perceived increased number of mature hilsa fish, hatchings and juveniles. Reported noticeable impacts on supply chains. PES/social protection. Combines prohibition (temporal fishing restriction) with in-kind payments to fisher families (rice).	US$23 million, funded by the government through the Vulnerable Group Feeding programme, with 223,000 families involved across 88 sub-districts in Bangladesh.
Costa Rica PES Programme	Direct cash transfers to private landowners for five-year contracts for forest protection, reforestation, sustainable forest management and agroforestry. It relies on strong partnerships with local organisations that provide technical support and other national and international stakeholders	US$30 million per year from central budget, mostly through earmarked revenues from fuel and water taxes. About 15,000 contracts signed by 2014 and about 1 million hectares of forest targeted per year.
Payments for Environmental Services programme, Mexico	Created since 2003, this programme has evolved significantly. Payments in cash (US$36/ha for cloud forest and US$27/ha for other types of forests – adjusted annually for inflation). Distribution of payments within communities (*ejidos*) is decided by internal rules.	US$651 million by 2013, with most funding from central budget. About 7,500 beneficiaries of which around 5,000 are *ejidos*, covering 4.3 million hectares of forest.

CTs for behaviour change: scaling out local schemes

The Bolsa Floresta programme in Brazil	Combines transfers at household and community level as incentives to conserve forests in Brazil. It works in selected sustainable development reserves of the state of Amazonas, and successfully combines multiple streams of funding from the public and private sector. Incentives are a mix of cash payments to homes; support to alternative income generating activities; group associations and investment in social infrastructures like schools. Participants agree to activities that reduce deforestation and prevent forest fires, as well as social requirements, such as sending children to school.	Over US$1 million/year, or about US$70,000 for each of the 15 participating Amazon reserves. It involves over 30,000 people in remote areas and has contributed to 12% reduction in deforestation in relation to the beginning of the programme.
Watershared: Bolivia and spreading to Colombia, Ecuador and Peru	Grassroots-led, reciprocal agreements emerging from out-scaling the successful scheme in Bolivia. In-kind transfers, with `tokens of appreciation' rather than money transfers in an attempt to strengthen and formalise pro-conservation social norms, by publicly recognising individuals who contribute to the common good by conserving their `water factories'.	Started with one community in Bolivia (Los Negros). By 2017, 50 Bolivian municipalities had adapted the *Watershared* model, involving 5,635 upstream farmers and 245,000 downstream users transferring about US$500,000/year.
Community carbon: mangrove protection in Kenya; Scolel'Te, Mexico; Trees for Global Benefits, Uganda	Starting as single carbon offset deals, many now seek to upscale, for example linking to the government and the national REDD+ strategies. Cash payments from carbon sales go towards supporting activities such as ecosystem-based adaptation (EbA), afforestation, reforestation, agroforestry and conservation and rehabilitation of mangroves. Activities are led by communities. Offsets sold under the Plan Vivo Standard require that a significant amount of the revenues are invested back to the communities.	Small-scale projects reaching important scales by grouping smallholders and selling carbon offsets. Kenya generates about US$38,000/year. Mexico's Scolel'Te project has issued almost 520,000 tCO2e, working with 1,280 smallholders in 9 communities. Uganda has issued over 1 million carbon offsets involving over 5,300 farmers.

There is significant potential for cross-learning from social and environmental CTs. Moreover, this can be a valid argument to promote greater integration across traditionally separate government departments (social and environment). New tools developed by academic research can help policy makers improve the efficiency and effectiveness of these programmes.

Fulfilling commitments like the Nationally Determined Contributions (NDCs), the Sustainable Development Goals (SDGs) and the Aichi Targets will require a combination of the environmental protection and poverty alleviation agendas. There is a need to develop PES programmes that learn from the social protection programmes with environmental components, such as South Africa's Expanded Public Works Programme. For example, public funding might provide short-term investments: eg watershed works, removing invasive species, or supporting changes to cleaner technologies, while revenues from PES could encourage a long-term change in behaviour to prevent future ecosystem degradation.

Successful CT/PES schemes exhibit a series of enabling conditions: high level political support, sustainable financing streams, lean institutional set-ups, tools and systems for effective implementation, and a clear ability to demonstrate impact. Cross-learning from our cases has proved to be an effective way to build capacity, and to improve CT/PES programmes from the ground up. Capacity building, bringing in scientific advances in modelling, monitoring, and understanding behaviour should include mid-level technical government staff as well as universities. Research into the gaps and potential of including poor and vulnerable people into environmental policy needs to reach a wider audience that

includes not just environmental ministries and conservation professionals, but is also mainstreamed into the agendas of the Ministries of Finance, Ministries of Employment and the private sector.

CTs and PES have the same starting point: the assumption that direct, conditional incentives are the most effective way to change behaviour. However, although many PES schemes have rural development as an objective, they have struggled to implement mechanisms to engage the poor and alleviate poverty. In contrast, CTs have made great strides in promoting social protection and income stability, but their environmental impact has been limited. The table below highlights the differences between CTs and PES, but also suggests that there is significant scope for developing hybrid programmes that take advantage of model complementarities. Indeed, such hybrids are already being tested.

CTs tend to:	**PES tend to:**
Have a clear social objective and are able to focus on the poor and ultra-poor.	Have rural development as a secondary objective, but often as an afterthought.
Promote direct, one-off interventions with short-term impacts, which may not change long-term behaviour.	Provide continuous low-level support that can change social norms and behaviour over the long term.
Provide tangible benefits to the ultra-poor, including people without land.	Support landowners and land managers, and so cannot effectively alleviate extreme poverty.
Undertake environmental projects at large scale, but struggle to do so efficiently.	Have environmental objectives as their primary goal.

PES practitioners need to recognise that focusing on poverty alleviation can catalyse important political support and new budget lines. However, the potential challenges of such an approach, such as high transaction costs and the risk of targeting sites with low environmental value, must be built into programmes to both protect the environment and enable transformative and sustainable livelihood improvements. An acknowledgement of the benefits and the trade-offs is a first step towards designing response actions.

Introduction

The multiple interactions of ecosystems and people became clear with the milestone publications of the Millennium Ecosystem Assessment (MEA, 2005) and The Economics of Ecosystems and Biodiversity (TEEB, 2011). Subsequent publications stress the importance of nature in providing good quality of life, supporting people and communities "free from poverty and disease" (Díaz *et al.*, 2015; Fisher *et al.*, 2014), while the growing emphasis on green growth and natural capital unequivocally link nature and ecosystem services to wealth (Cohen *et al.*, 2017).

This convergence of multiple agendas opens a policy window to bring traditionally `niche' issues – such as poverty alleviation or watershed protection – into mainstream economic policy. This means an opportunity for actively designing policy instruments to deliver multiple objectives and for bringing in tools and systems to help manage the inevitable trade-offs that will emerge. This document focuses on the potential of using conditional transfers to support the provision of ecosystem services and help alleviate poverty for vulnerable groups.

Conditional transfers (CTs), such as guaranteed job schemes, pensions and food transfers, have been used for achieving social objectives and raising the living standards of vulnerable people. They have also been used to pursue environmental objectives, for example promoting agroforestry or forest protection with incentives such as environmental subsidies and payments for ecosystem services (PES). Both social CTs and PES have the same starting point: the assumption that direct, conditional incentives are the most effective way to change behaviour. Designed carefully, these incentives can contribute to the wellbeing of people, especially poor and vulnerable groups.

There are a considerable number of existing descriptions of how PES has been implemented in practice (Asquith and Wunder, 2008), the components for successful PES (Engel, 2016), and practical 'how to' guides (see Table 2). Nevertheless, and despite our increased understanding of how PES programmes work, most PES fail to achieve scale, either by `scaling-up' through a single large programme or `scaling-out' small schemes into multiple local adaptations. There are, however, several successful programmes that have managed to emerge and can provide additional pragmatic lessons on moving things forward. **We focus on these programmes, exploring the enabling conditions that allow them to emerge, implement and replicate, delivering change at scale**.

Countries as far apart as Costa Rica and China have developed national schemes, through which individual landowners are paid up to US$60 per ha per year to leave their forests standing. Since 2003, Mexico alone has spent almost US$480 million on paying land managers to adopt practices that maintain reliable water flows and sequester carbon. In such schemes, payments may take the form of economic incentives and subsidy payments, cost-sharing arrangements, land-purchase deals, direct transfer payments, and subsidised public–private funds with conditions attached to ecosystem management. Most of these national and regional government-led PES schemes focus on hydrological services either explicitly (eg China and Mexico) or implicitly (eg Costa Rica). However, PES at scale remains rare.

Increasingly common in South America are small-scale private PES schemes, in places such as Cuenca and Pimampiro in Ecuador. Payments are made directly by one private entity to another to cover the purchase of land or development rights to land. Despite intense academic focus on the value and efficiency of the PES model, only four countries (China, Costa Rica, Ecuador and Mexico) have developed national programmes. These experiences offer new insights into willingness to collaborate, but often struggle to achieve scales to have impacts on the ecosystems (e.g. water quality).

We draw lessons from conditional transfer schemes that combine social and environmental objectives and that have managed to achieve scale by moving beyond pilots or projects into established programmes. We use scale as an indicator of the potential to achieve important programmatic impacts for both people and the environment, not as an indicator of geographical reach.

What this handbook is about

There is growing interest in `practical actions' to implement and refine conditional environmental transfers such as PES, both in terms of designing and bringing compensations to ecosystem managers, and in how to raise sustainable resources to fund long-term actions. The objective of this handbook is

to facilitate the use of training materials for practitioners, especially in developing countries. Our specific goals are to:

- **Make evidence accessible:** we bring together the latest evidence from research on PES in theory and practice, with documented case studies written for practitioners.
- **Support capacity building**: we provide a complementary series of teaching modules to `train the trainers', which can build the capacity of practitioners and inform university lecturers with an interest in PES and similar tools.

This document distils practical lessons from large programmes that use conditional transfers as means to promote poverty alleviation and the protection of ecosystems. We find that successful schemes exhibit a series of enabling conditions: high level political support, sustainable financing streams, and lean institutional set-ups. The most successful programmes continually experiment with tools and systems to improve effectiveness, engage with vulnerable groups, and demonstrate impact.

How to use this handbook

The handbook is organised into four modules, accompanied by downloadable PowerPoint presentations and links to other downloadable materials.

Table 1. Modules

Module number	Description
Module 1	CTs and PES in context
Module 2	Compendium of experience
Module 3	Systems and tools for sustainable financing
Module 4	Systems and tools for effective implementation

We start with the observation that PES is not a stand-alone concept that was recently developed within the conservation movement. Rather, PES is a form of conditional transfer (CT) with a strong environmental component (Ma *et al.*, 2017; Rodríguez *et al.*, 2011) that in practice often operates alongside other policy instruments (Barton *et al.*, 2017b). We therefore base many of our lessons on the extensive global experiences in conditional transfers for social protection, and in particular the large-scale public works programmes that have already had important environmental impacts (Devereux, 2009; Kakwani *et al.*, 2005; Koohi-Kamali, 2010; McCord, 2013; Uraguchi, 2011).

We build on previous publications and guides (see Table 2) with new research findings, such as those from ESPA researchers, and add practical knowledge of practitioners and researchers on key enabling conditions for success, brought together at several recent international workshops in Cambridge, UK (Sept 2016), Kunming-PRC (November 2016) and Chongqing, PRC (December 2017).

Table 2. Useful toolkits available for PES and poverty

Topic	Description and source
Ecosystem-poverty linkages	• ESPA book on ecosystem services and poverty alleviation (Mace *et al.*, 2018). • PROFOR (2017) Poverty-Forests Linkages Toolkit. http://bit.ly/2nf751v
PES	• FAS (2017) PES guidelines for the Amazon region. PES toolkit: designing innovative schemes for environmental services. http://bit.ly/2DRSt26 • Birdlife International (2017) Toolkit for Ecosystem Service Site-based Assessment (TESSA). http://bit.ly/1XGAF9n • World Agroforestry Center (Namirembe *et al.*, 2017) Co-investment in ecosystem services: Global lessons from payment and incentive schemes. http://bit.ly/2DBv0Py • Payments for Watershed Services: The Bellagio conversations (Asquith and Wunder, 2008). http://bit.ly/2DMHKaf
Conservation finance	• Credit Suisse AG and McKinsey Center for Business and Environment (2016). Conservation Finance. From Niche to Mainstream: The Building of an Institutional Asset Class. http://bit.ly/2zngacJ • UNPEI handbook for planning and budgeting (Forbes *et al.*, 2015). http://bit.ly/2ncwCrV • BIOFIN (UNDP, 2016) Workbook: Mobilizing Resources for Biodiversity and Sustainable Development. http://bit.ly/2wi6vpU • UNDP Financing solutions for sustainable development: www.undp.org/content/sdfinance
Quantification and valuation	• ValuES: Methods for integrating ecosystem services into policy, planning, and practice. www.aboutvalues.net/ • OpenNess Project: Integrated assessment and valuation of ecosystem services. Guidelines and experiences (Barton *et al.*, 2017a). www.oppla.eu • AmbioTek/Kings College London: Policy Support Systems and online models. www.policysupport.org

Module 1: Conditional transfers in context

This guidance focuses on the use of conditional transfers (CTs) – such as PES – in the context of ecosystems and poverty alleviation. CTs are a type of economic incentive that often works alongside regulatory instruments such as standards and prohibitions. Incentive-based policies provide inducements – monetary and otherwise – to encourage good behaviour (ie investments in watershed protection) or discourage bad practices (ie pollution or forest degradation). In this module we discuss some of the main elements of designing CTs for ecosystems and poverty alleviation. Modules 2 and 3 bring in-depth lessons from practical experiences.

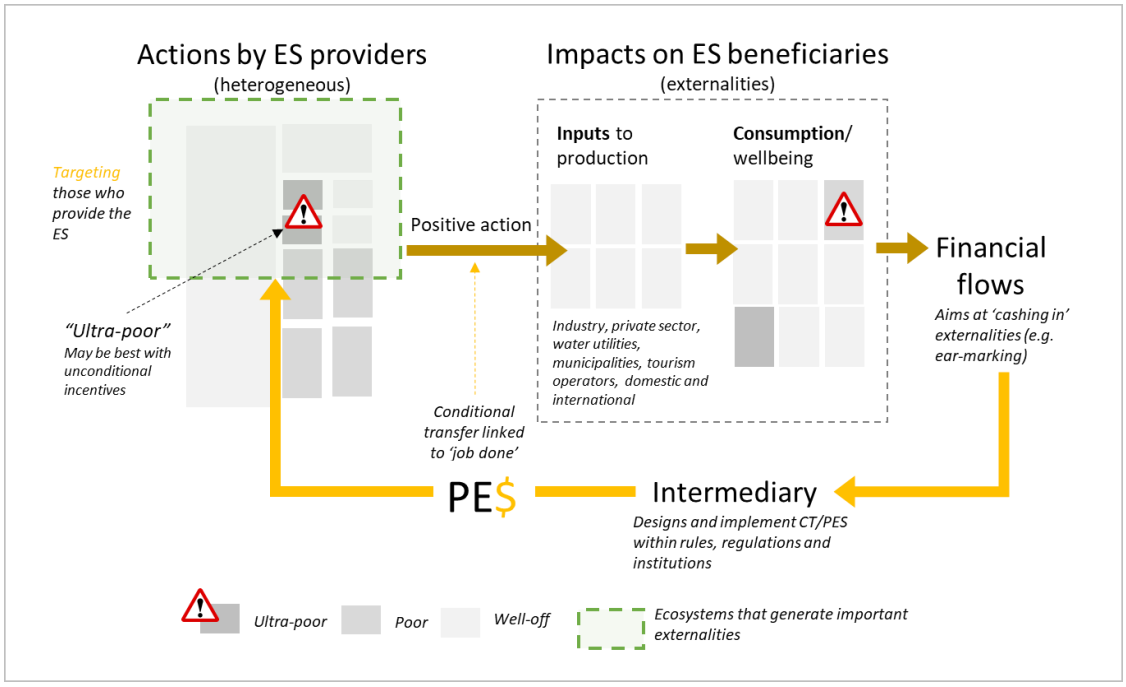
Defining CTs and PES

Conditional transfers (CTs) are social benefits used by governments to address welfare (Devereux, 2009; Fiszbein *et al.*, 2009). They are usually targeted at individuals economically at risk, chronically poor and/or socially vulnerable. Already in use for many years, they have also been widely evaluated. A wealth of knowledge has been produced on the way that conditionality affects outcomes (see for example Abdoulayi *et al.* (2017) and Rodriguez *et al.* (2011). CTs are designed to have short-term impacts on wellbeing (usually through a direct cash injection), long-term impacts (eg improving the health of people when linked to 'actions', such as visiting a clinic), and potential multiplier benefits across the economy, such as pushing the demand for better education facilities (Kakwani *et al.*, 2005).

Payments for ecosystem services (PES) have been defined in many different ways, from a `true-PES unicorn' to a `PES-umbrella' (Menton and Bennet, 2018; Wunder, 2015) – see Table 3. Here, we define PES as an instrument that:

- Addresses an environmental externality through variable payments made in cash or kind, with a land user, provider or seller of environmental services responding to an offer of payment by a private company, non-governmental organisation (NGO), or local or central government agency.
- Makes payments or rewards on the expectation that pre-agreed actions (eg sustainable land use) will enhance or protect specific ecosystem services (eg water quality). Monitoring compliance is most often conditional on these actions (input-based) than the actual delivery of the ES (output-based).

Figure 1. PES/CT framework



Source: Authors' own

Table 3. Definition of PES by different communities of practice

Focus	Definition of PES
International organisations	• **World Commission on Environment and Development. Brundtland Report** (1987): we should economically reward resource managers for the provision of ecosystem services and are thus characterised by (i) an ecological function subject to trade; (ii) the establishment of a standard unit of exchange; (iii) and supply, demand and intermediation flows between those who sell and buy ecosystem services. • **World Bank:** The central principles of PES are that those who provide environmental services should be compensated for doing so and that those who receive the services should pay for their provision (Pagiola and Platais, 2007). • **OECD (2010):** PES is a direct and flexible incentive-based mechanism under which the user or beneficiary of an ecosystem service makes a direct payment to an individual or community whose land use decisions have an impact on the ecosystem service provision. • **Global Environmental Facility (GEF)**: the PES concept has been about arrangements between buyers and sellers of environmental goods and services in which those that pay are fully aware of what it is that they are paying for, and those that sell are proactively and deliberately engaging in resource use practices designed to secure the provision of the services. The adoption of a wide-angle view of PES by the GEF is further justified by the fact that the different GEF agencies have adopted different definitions of PES (Cavelier and Gray, 2014).
Focus on economic component	• **Wunder (2005):** "a voluntary transaction where a well-defined ES (or land use likely to secure that service) is being 'bought' by a (minimum one) ES buyer from a (minimum one) ES provider if and only if the ES provider secures ES provision (conditionality)". Wunder revised his definition ten years later as "voluntary transactions between service users and service providers that are conditional on agreed rules of natural resource management for generating offsite service" (Wunder, 2015). • **Engel (2016):** Two basic types of PES can be distinguished: `Coasean' PES result from a direct negotiation between ES beneficiaries and ES providers; and `Pigouvian' PES resemble an environmental subsidy, where payments are made by a government agency out of earmarked user fees (eg, a water charge) or general tax funds. Many existing PES schemes represent hybrids of the two types. • **Reed *et al.* (2017):** this definition extends Wunder's (2015) definition, providing three additional components relating to: multi-level governance; bundling or layering services across multiple scales; and shared values for ecosystem services.
Justice, equity and poverty focus	• **Muradian *et al.* (2010)**: use a simple, but open definition, with PES as a transfer of resources between social actors, which aim to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources. • **Farley and Constanza (2010):** adapt Muradian *et al.*'s definition because it is "more in line with ecological economics, in which ecological sustainability and just distribution take precedence over market efficiency in furthering social interests". • **Kosoy and Corbera (2010):** the narrow definition of Wunder (2005) is problematic because it excludes a variety of PES schemes operating under different principles, with ill-defined ecosystem services or under inefficient provision levels. PES can in turn alleviate poverty and establish a new 'urban–rural compact' by transferring funds from 'consumers' to 'providers' of these services. • **Vatn (2010):** PES, as defined by Wunder (2005) is mostly a theoretical reference point. It does not emphasise the specific problems involved when creating a market for environmental services, specifically how transaction costs influence the format of payments. PES reliance on state/NGO engagement (to clarify property rights, as intermediaries) means that in practice it is not a market mechanism.

Source: Menton and Bennett (2018)

Notwithstanding these definitions, in practice PES is often a *de facto* subsidy paid as a conditional transfer by the government to private or civil society actors (Vatn *et al.*, 2011), which promotes a `sense of exchange' by linking environmental actions to externalities in production (eg hydroelectricity, carbon offsetting).

As a relatively new policy instrument, PES schemes have attracted a lot of academic attention, but few authors have focused on the conceptual similarities between CTs and PES (but see Ma *et al.*, 2017;

Porras *et al.*, 2016; Rodríguez *et al.*, 2011). These similarities open a significant potential for cross-learning from CTs to PES, especially with regards to the social agenda where PES often struggles to deliver (Börner *et al.*, 2017). At the same time, emerging systems and tools from implementing CTs through behavioural changes can help improve the long-term environmental impact of direct environmental interventions through job schemes.

CT/PES in the policy portfolio

PES and CT instruments are often part of a wider portfolio that includes regulation, direct interventions, unconditional transfers, various fiscal instruments and education. The decision of when to use conditional transfers is linked to several issues, for example the nature of the market externality, ecosystem fragility/risk, social objectives (eg linked to wealth), and administration capacities (eg linked to pursuing targeting and compliance) (Barton *et al.*, 2011; Engel, 2016; Porras *et al.*, 2011; Rodríguez *et al.*, 2011; Vatn *et al.*, 2011). PES and CT also function at different scales, from the local level watershed reciprocal agreements, national-led programmes in China and the USA, and international transfer initiatives such as REDD+. Table 4 presents some examples of governance and operational levels for these instruments. Examples of environmental policies for watershed services – some of which pre-date PES being defined as an economic instrument – include best management practice contracts, conservation easements, land lease/conservation concession, salinity-friendly products, stream flow reduction licences, and water quality credits (Landell-Mills and Porras, 2002).

Table 4. Choice of instrument combination in line with governance levels

Level	ES	Instrument	Example
International	Carbon sequestration	REDD, Voluntary carbon markets, CDM (not active at the moment)	Norway/Brazil REDD initiative (Miljøverndepartementet, 2010) Fondo Bioclimático, Mexico (Brown *et al.*, 2004)
	Biodiversity, bird habitat protection	Donor grants (international)	Los Negros, Bolivia (Asquith *et al.*, 2008) - see also Watershared below.
National	Bundled, water, carbon	PES	Costa Rica (Pagiola, 2008; Porras *et al.*, 2013b), Mexico (Alix-Garcia *et al.*, 2014)
	Biodiversity and cultural services	Tenders, auctions	Northheim, Germany (Bertke and Marggraf, 2005)
	Soil erosion	Agricultural incentives to retire sensitive land	Conservation Reserve Programme (USA), EU Common Agriculture Policy (Börner *et al.*, 2017)
	Salinity control		Wimmera Auction for Salinity outcomes (Whitten and Shelton, 2005; Wünscher and Wunder, 2017)
	Habitat restoration	Prohibition, food compensations	Hilsa fish conservation programme, Bangladesh Sloping Lands Conversion Programme, PRC (Jin *et al.*, 2017)
Local	Watershed services (mix)	Upstream/ downstream agreements	Watershared, South America; various direct arrangement in Nepal (see Module 2 in this handbook)

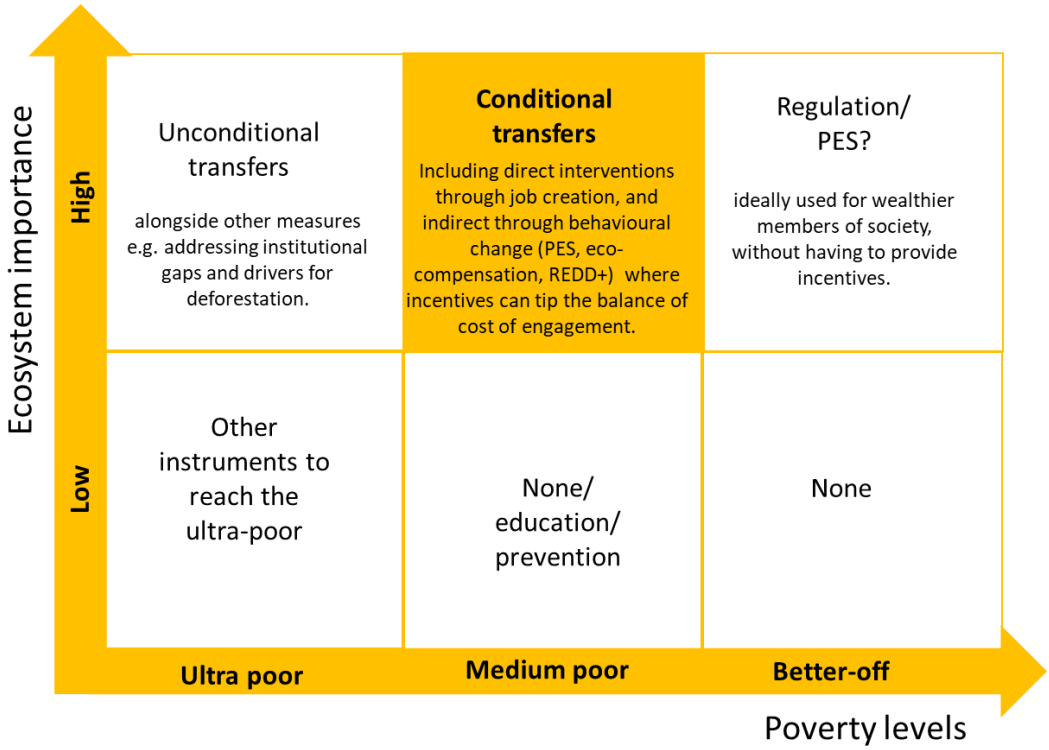
CTs and poverty alleviation

The linkages between ecosystems and poverty alleviation are neither simple nor linear. Mace *et al.* (2018) summarise the latest evidence on the nature of these relations and governance structures that help improve the wellbeing of vulnerable people.

In this handbook, we ask whether conditional transfers such as PES can help alleviate poverty, in the context of ecosystem management. Table 3 and Menton and Barret (2018) provide a synthesis on the arguments in favour and against. Our entry point in this handbook, presented in Figure 2, does not suggest a `one tool fits all' approach. Rather, it acknowledges that CTs operate within a wider range of policy instruments, which can be used to target ecosystems of high importance (eg fragile, or in need of restoration), while bringing forward the issues surrounding heterogeneity of ecosystem service providers.

As Figure 2 shows, the choice of policy instrument to use can be – and should be – linked to poverty levels. As presented, conditional transfers may work better in the `medium-poor' range, where incentives can be more competitive and 'tip the balance' of costs of engagement. Very poor members of society, or 'ultra-poor', may benefit better from unconditional transfers and other measures that address contextual and institutional gaps.

Figure 2. CTs and PES as instrument in poverty context



Notes: The `ultra poor' will usually require help without conditions attached. Such people live in extreme poverty with very little access to support. Imposing conditions on payments can make them worse-off and create further unbalances. The `medium poor' often refers often to smallholders with limited (but some) access to and control of resources. Conditional transfers tend to work better for this group. `Better off' refers to wealthier participants who are, in theory, better equipped to comply with regulation without incentives. In practice, however, these groups have more power and often appropriate resources available. Source: Adapted from Rodríguez *et al.* (2011).

As mentioned before, CTs are favoured by its proponents as a means to provide short-term poverty alleviation through a payment, and long-term benefits by improving their natural assets. These potential benefits could be significant, for example new forms of income, diversification, technological transfer, increased land security, capacity building, improved natural conditions, etc. But the poor may also be affected by significant barriers to access the programme, by being unable to satisfy the conditions and indeed to derive meaningful benefits. Constraints for the poor can be high, and can include high

transaction costs, unclear property rights, weak bargaining power, an unclear regulatory framework, inadequate skills, market contacts, knowledge, and coordination.

In practice, poverty alleviation can be addressed at least at three fronts: 1) by directly supporting the poor people located at project sites; 2) by making clear the linkages to poor people who benefit from ecosystems, and 3) through this, make the case to access social/rural development budget lines.

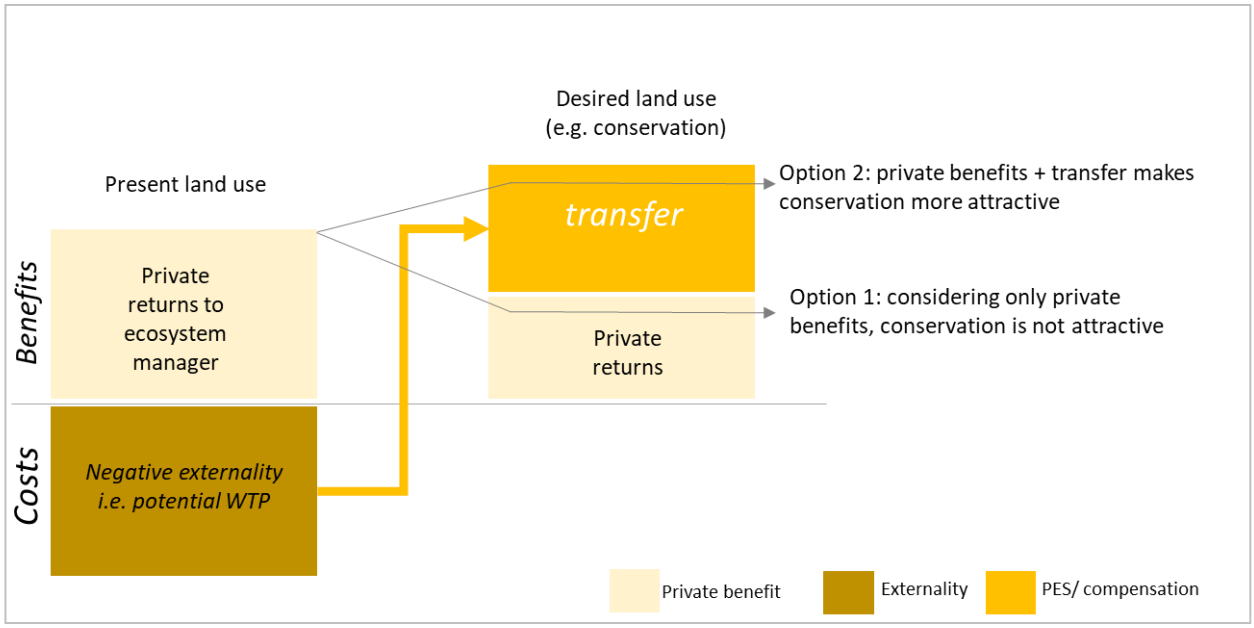
CT/PES and conditionality

Conditions attached to CT/PES are introduced as means to ensure that incentives effectively address environmental externalities.

Most environmental services have been considered public goods and externalities because they are not priced, for example, the water regulation benefits provided by forests and wetlands to hydropower or water utilities. These benefits (and costs) are not considered in the land use decisions made by private individuals. The ultimate objective of PES is to correct an environmental externality by making the alternative (ie conservation) more attractive (Pagiola and Platais, 2007; Wunder, 2015). Figure 3 presents the logic underlying externalities and PES:

- Under the current policy structures, the value of ecosystem services is not included in private decisions, making conservation options economically unattractive. The lack of provision of ecosystem services results in environmental externalities.
- `User-pay', or 'beneficiary pays" principle suggests that those who benefit from ecosystem services pay or share the cost of their provision.
- These resources are transferred as an incentive to ecosystem managers (`provider gets'), which can help make conservation more attractive.

Figure 3. ES externalities and PES



Source: Adapted from Pagiola and Platais (2007)

The conditionality element is what appears to make PES politically attractive. Conditionality offers a simple way to link policy (eg payment) to relatively simple outcomes (eg number of hectares of forest protected, number of jobs created). A wealth of knowledge has been produced on the way that conditionality affects outcomes (eg MIT Poverty Action Lab, 3ie, and the World Bank Impact Evaluation Group).

Conditionality is linked to:

- The understanding of the causal links between actions, ecosystem services and outcomes, which defines the `actions' promoted;
- The institutional context that enables ecosystem providers to comply with these actions, which includes property rights and collective action, as well as access to technical and financial resources; and
- The extent to which the programme implementers enforce compliance (Hejnowicz *et al.*, 2014; Porras *et al.*, 2013a; Wells *et al.*, 2017).

Module 2 looks into different ways in which conditionality is addressed by ongoing programmes and schemes. **Module 4** presents tools and systems that help improve the effectiveness of conditionality in the practice.

The conditions imposed by PES and conditional transfers can *de facto* exclude poor and vulnerable people, or affect their access to natural resources (Sikor, 2013). Some requirements, notoriously land titles or minimum plot size, preclude or reduce the participation of many smallholders (Grillos, 2017). Other limitations are less tangible, such as access to inputs or know-how. For example, a woman-headed household without access to water nearby will struggle to carry enough water to plant and care for trees in a reforestation programme. The strict regulations of international carbon markets with regards to additionality and monitoring can be a burden to participants in these projects, who must constantly measure and manage trees (Fisher, 2013).

Technical and capacity limitations like these are equally common in social protection programmes, and much can be learned from their strategies in the design of realistic expectations. Importantly, conditions imposed on the 'ultra-poor' can actually have a negative effect and add to their burden, and it may be necessary to consider lifting some of the conditions attached to PES. An evaluation of the Malawi Social Cash Transfer Programme showed that unconditional transfers can be successful in helping very poor households improve their livelihoods (Abdoulayi *et al.*, 2017). However, it is as yet unknown if unconditional PES might be effective.

An understanding of the heterogeneity of providers of ecosystem services can help understand the best instrument to implement.

Module 2: Compendium of practice

Designed carefully, conditional incentives can contribute to the wellbeing of people, especially poor and vulnerable groups. We look at two types of schemes to evaluate how CT and PES programmes have managed to reach scale, and to assess if lessons from CTs for social protection can help design programmes for the maintenance of ecosystem services:

- **Direct environmental interventions using social conditional transfers**, such as the South African Environmental Public Works Programme. Although focused on social outcomes, such as jobs and poverty alleviation, some programmes have had large-scale environmental impacts.
- **Programmes that seek to change behaviour towards positive environmental actions**, using different conditional incentive packages that include mixes of cash and in-kind rewards. Some of these are top-down national programmes, such as the China Sloping Lands Conversion within the Eco Compensation Programme, or bottom-up initiatives such as water deals in South America and carbon offsets for mangrove protection in Kenya.

We look at how these programmes manage to achieve scales, either by `scaling up' by designing and implementing national programmes, such as India, China and Costa Rica, or `scaling out' by replicating small-scale programmes for watershed protection in South America and Nepal or community deals in voluntary carbon markets. Each of the case studies is described in relation to their lessons on the key enabling conditions for success, presented in Table 5. This section presents a short overview and lessons from the schemes. Detailed description of programmes is available on the online links provided.

Table 5.Enabling conditions for success for upscaling CT programmes

Condition	Description
Political support	The ability to make a compelling case for initial (meaningful and sustained) investment and for the use of conditional transfers within a portfolio of economic and regulatory instruments.
Sustainable financing	How projects take the step from one-off, usually donor funded initiatives, to a programme/process with financial sustainability that allows for replication and scaling up.
Lean institutional setup	How programmes are designed to operate in practice, including the ways to coordinate across different government sectors (linking environmental and social departments to ministries of finance).
Tools and systems for effective implementation	How to improve programme effectiveness, such as by using the latest scientific and technological advances to help inform the design, implementation, replication and monitoring of these programmes.
Ability to demonstrate impact	How programmes reach people, how they manage ecosystems, how the incentives help reduce poverty or prevent people from falling into poverty, and how conditionality/compliance are implemented.

Notes: based on Porras *et al*. (2016a). An international workshop in Cambridge (co-funded by ESPA, September 2016) brought together policy makers, practitioners and donors to share practical experiences on the enabling conditions for PES. A full list of participants is available in the workshop report (Porras *et al.*, 2017). These conditions were discussed in more detail by participants to the 5th International Eco-Compensation Conference in Kunming, PRC, November 2016.

Direct interventions using CTs

This section describes two large-scale national programmes in India and South Africa that use social protection resources to promote investments in environmental works. The short-term nature of the benefit (job and guaranteed wage) is used to promote long-term environmental benefits (eg watershed conservation). Other examples include Ethiopia's Productive Safety Net Programme (PSNP), the largest social protection programme operating in sub-Saharan Africa.

India's Mahatma Ghandi Guaranteed Employment programme

Section contributors: Ina Porras, Nanki Kaur and (IIED)

The world's largest works-based social protection scheme, the Mahatma Ghandi National Rural Employment Guarantee Act (MGNREGA) has covered all of India since 2006 and aims at enhancing livelihood security in rural areas by providing at least 100 days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work (Kaur *et al.*, 2017). It also provides improved productive assets and livelihood resource in rural areas, proactively ensuring social inclusion and strengthening Panchayat Raj (local government) Institutions. The types of projects included are public works linked to natural resource management (mostly watershed-related projects), improving conditions of individual assets for vulnerable sections and building common and rural infrastructure.

MGNREGA provides a key example for PES to learn about successful combinations of social and environmental objectives to achieve political support, resources and scale. At the same time, PES experience elsewhere can provide MGNREGA with ideas on how to improve long-term environmental impacts on the ground.

Key lessons from the programme are:

- The legal backing of the scheme has ensured political attention and adequate budgetary allocation since its inception.
- Strong participation of local institutions in the programme design,
- Direct payment to bank accounts of beneficiaries reduces leakages and supports financial inclusion for poorer sectors of the economy;
- ICT infrastructure plays important role to improve effective programme implementation;
- The investments provide climate resilient and livelihood-linked assets in addition to wage guarantee for the poor.
- More efforts need to go into output-based monitoring (rather than only "jobs-done" approach) and to securing long-term quality of these environmental investments;

Overall, the programme has very clear, targeted and popular objectives: to directly tackle unemployment (thereby increasing livelihood security and reducing rural migration) and to promote sustainable development through improving rural assets, livelihoods and restoring the environment. Process outcomes of the programme include strengthening grassroot democratic processes and improve transparency and accountability in governance.

South Africa's Expanded Public Works Programme

Section contributors: Christo Marais and Luvuyo Mlilo

Inclusive green growth in South Africa has been primarily pushed forward by the environment authorities through a series of joint environmental/social protection job schemes. This social protection programme seeks to alleviate poverty through provision of temporary work and skills development through Learnerships, which are deployed to on projects to improve their local environments. Projects include, for example, clearing of alien vegetation, rehabilitation of wetlands, support of fire protection associations, waste management programmes, coastal management and eco-tourism projects. Starting with a water focus ('Working for Water'), it now mobilises about US$285 million per year and is managed under the Expanded Public Works Programme (EPWP).

Like India's MGNREGA programme, the Environmental Programmes in South Africa are managing to tackle high-level social problems in ways that contribute to environmental protection.

The EP umbrella programme has been very effective in combining environmental and socio-economic objectives through job creation. The investments in ecosystem services follow a sector development rather than programmatic approach. By using different individual components (WfWater, WfWetlands, etc) it is possible to target the specific ecosystem threat or issue, while using a similar social development model to provide social benefits. In addition, programme operations are supported by strong biophysical and hydrological science.

Given that the programmes are government-led, their challenges include those typically associated with bureaucratic processes such as delays in payments and contract approvals, which can be especially harmful for the participant vulnerable groups. In addition, engaging local authorities as implementing agents has in many cases proven both inefficient, as the transaction costs tend to be higher, and ineffective, with projects deviating from their intended focus. Overall, government agencies tend to be more expensive as implementing agents than NGOs, private sector agencies and other commercial entities.

There are also challenges that are programme-specific. For example, one of the main constraints of the Working for Water programme has been securing sustained control of IAPs in cleared areas. This requires ongoing follow-up or handover of land to landowners and it is unclear whether, once the land has been cleared, the landowners feel a greater obligation to maintain the land and prevent future infestation by IAPs. Another challenge has been unlocking significant investments from the water sector despite the restoration of ecological infrastructure and its impacts on watershed services being acknowledged in both the National Water Resources Strategy and the National Water Pricing Strategy.

CTs to change behaviour: scaling-up

Here we present several programmes that use a range of conditional instruments as incentives to change behaviour, including payments for ecosystem services. These schemes operate by scaling up their approach, using top-down national programmes. They are primarily funded by governments, and often use these resources as leverage to engage with the private sector.

China's Eco Compensation Programme and SLCP

Section contributors: Jin Leshan, Ina Porras, Paris Kazis and Alvin Lopez

The People's Republic of China (PRC) has been experimenting for many years now on eco-compensations programmes, as ways to redress missing market signals for ecosystem services (Zhang *et al.*, 2009). This section provides a quick insight into one of its larger programmes: the Sloping Land Conversion Programme.

The Sloping Land Conversion Program (SLCP, also known as "Grain for Green") is the largest ecological restoration project in PRC and PES initiative in the developing world, with a total current investment of more than US$69 billion (Liu and Lan, 2015). It was launched together with the Natural Forest Protection Program (NFPP) as a response to the widespread flood in the PRC in 1998 and has undergone several development stages. It is a key component of the Eco-Compensation Programme, which is a compendium of environmental policies and instruments, including environmental fiscal reform. The programme uses a series of conditional transfers alongside wider policies promoting off-farm income to encourage ecological restoration and contribute towards PRC's vision of EcoCivilization.

Several useful lessons can be drawn from the SLCP experience, all pointing to the crucial, inextricable link between the institutions, incentives, and ultimate success of a programme. Decentralisation under the SLCP focused disproportionately more on distributing responsibilities than on fostering a local sense of ownership, causing the programme to expand too fast in its Phase I and first half of Phase II (1999-2005) at the cost of its budgetary burden, its democratic character and effective targeting. Recognising the trade-offs inherent between scale and targeting, the critical importance of the latter should not be understated, as revealed by its connection with the SLCP's unintended, negative impacts on the environment (ie water shortages, decreased biodiversity) and local livelihoods (ie lower incomes, higher inequality, disempowering of nonparticipants). Therefore, implementation, including

compensation, should be sensitive to local heterogeneity and be guided by a management strategy that is flexible, inclusive and responsive to feedback (Yin *et al.*, 2014a). Beyond implementation, scaling up a program of such magnitude requires a strong focus on the initial phases of planning, demonstration and piloting, as well as on strong safeguards that will maintain the programme's incentive structures long after its implementation and thus guarantee its long-term success (Yin *et al.*, 2014b; Chen *et al.*, 2015).

Fortunately, some of the lessons learned from the previous phases of the Programme have been used to re-shape the Programme. For example, in its latest Phase IV, the Programme is targeting only those who are poor, willing to convert and whose crop lands are in a steep slope (25º in one circumstance, and 15-25 º in another). Adaptive management is vital for the Programme's success, yet absence of independent monitoring and evaluation might undermine its adaptive capacity in the long run.

Bangladesh Jatka marine conservation programme

Section contributors: Monirul Islam, Ina Porras and Essam Y Mohammed

The programme combines environmental and social objectives, using a mix of regulation (ban) and a payment for ecosystem services (PES) as compensation. PES rewards good ecosystem management agreements (such as improving soil conservation, or refraining from doing damaging activities like overfishing) expected to result in ecosystem benefits, like cleaner water, reduced carbon emissions (Engel, 2016; Wunder, 2015) or in this case an improvement in provisioning services, ie bigger juvenile *hilsa* fish (Islam *et al.*, 2016).

The primary goal of this scheme is the conservation of hilsa and associated biodiversity, but as it is funded through a national Vulnerable Group Feeding (VGF) programme, which aims to reduce food insecurity (Ahmed *et al.*, 2009; Uraguchi, 2011), it is intended also to improve the socioeconomic condition of affected fishers living inside and around the sanctuary areas (DoF, 2012; Haldar and Ali, 2014).

This programme provides useful lessons on the challenges of using conditional transfers in open-access resources. Fishery policies are particularly vulnerable to failure. Their open access characteristics make compliance difficult. Trade is often informal and non-regulated, with multiple pressure points across the supply chain that can render a PES incentive invalid. Attention to the social component of the policies is particularly important artisanal fisheries, as the main actors affected by regulation tend to be poor and vulnerable.

While economic incentive mechanisms of this kind have been hailed as the most cost-effective and efficient way to manage natural resources and alleviate poverty, their efficiency depends on how much the incentives cost to implement. The lengthy administration chain from the national government to fishers have low reported transaction costs – but it is long and time consuming. Other less reported costs include potential bribery, for example local union leaders withholding some of the rice for their own costs even if these are covered by the programme. There have been concerns regarding equity and political interference in the distribution of compensation, elite capture and high levels of inclusion and exclusion error (Haldar and Ali, 2014; Matin, 2000; Matin and Hulme, 2003; Rahman *et al.*, 2012). Impact on the ecosystem is difficult to measure, especially because of the open access nature of the resource, and the absence of counterfactual.

However, this programme represents a step forward linking social and environmental authorities. There is a perceived increased number of mature hilsa fish, hatchings and juveniles with important benefits on supply chains. Additional work -including the potential rethinking of the PES format and providing the "right" type of incentives, can help improve the programme's impact on poverty alleviation, for example addressing the problems of financial exclusion" by providing 'suitable' financial products to fishers. Importantly, the programme should also consider wider watershed management approaches and mitigate non-fishing related stresses such as upstream damming, river diversion, siltation, pollution that affect the health of the fish stock (Mohammed, 2015).

Costa Rica's Payments for Ecosystem Services programme

Section contributors: Ina Porras and Adriana Chacon-Cascante

This government-led PES programme is probably the most iconic PES example. The programme bundles the provision of four main ecosystem services: carbon sequestration, biodiversity protection,

water regulation, and landscape beauty. The programme makes direct cash transfers to private landowners for 5-year contracts for different modalities of forest protection, reforestation, sustainable forest management and agroforestry. Following results from a `conservation gap' analysis (forests with no protection at risk of change), the programme focuses on protecting these areas and improve connectivity between forests through biological corridors. Apart from giving priority to indigenous communities, the social focus of the programme is more as an added-on component that uses a priority filter for applications located in areas with low development index.

Created by law in 1996, the programme is a mix of rules and regulations (eg it is forbidden to cut primary forest) and positive rewards that invite stakeholders to respond to incentives and disincentives. The legal underpinning establishes the structure by which the PES programme secures funding, how it is managed, and who is eligible to participate.

The programme has been widely reviewed and provides several useful lessons on opportunities and challenges. This is the first national level programme making direct cash rewards for ecosystem services. Its legal foundations allow it to access a variety of funds, from Government allocations to deals with the private sector (national and international). Despite this, the programme remains over-subscribed and under-funded. The programme uses preference criteria to allocate contracts, published annually as ways to target participants and reach their objectives. This introduces flexibility in the design and the ability to take feedback. The programme does not have an explicit social component. Most owners of land in Costa Rica are relatively better off than those without land. Within this group however, the emphasis on protection contracts further excludes those who derive livelihoods from their land (absolute protection is required). Despite being oversubscribed, land prices in Costa Rica are generally increasing, reducing the competitiveness of the PES transfer in those places where forests is most at risk of change. PES needs to work stronger with other mechanisms and regulations and improve their target areas where the payment can make a change in behaviour.

Mexico's Payments for Ecosystem Services Programme

Section contributors: Sofia Cortina and Ina Porras

Mexico's PES programme is the combination of two previously separate programmes: the Payments for Hydrological Environmental Services Programme (PSAH) and the Program of Payments for Carbon, Biodiversity and Agroforestry Services (PSA-CABSA). These programmes were merged in 2006, at the same time that it introduced poverty alleviation as a programme objective (Alix-Garcia *et al.*, 2014; Muñoz-Piña *et al.*, 2008). It currently offers two types of cash compensation: payments for watershed services and payments for biodiversity conservation (Aemi *et al.*, 2013).

Implementing this programme is not an easy task. The country has nearly 125 million people, with an expanding urban network (almost 80 per cent now live in cities); a growing economy constantly exposed to global crisis and with highly unequal distribution of wealth in the country -especially in rural areas, and for indigenous groups. Almost 80 per cent of the country managed as *ejidos* (communal lands with emphasis on social benefits), a property regime that underpins the PES programme. Urban expansion and demand for resources drives deforestation and put significant pressure on water: to supply for cities, agriculture and industry, and dealing with waste and pollution. Both water and deforestation are considered national security issues by the government.

The programme targets private forest owners as well as *ejidos.* A contractual relationship is formed between the forest owner and the government's Forestry Department (CONAFOR), the latter assuming the role of the buyer of the environmental service. Landowners may enrol a portion of their property in which they must maintain existing forest cover and undertake sustainable management practices. Participants can make changes to land cover in the rest of their property. Verification of forest cover is made through satellite imagery or site visits. In the case of non-compliance, where CONAFOR verifies deforestation within the enrolled area due to conversion to agriculture or pasture, the participants are removed from the programme. Payments are also reduced for deforestation under natural causes such as fire or pests.

This long-term programme provides several lessons. It has clear sources of financing based on a legal mandate, and clear operational rules that promote accountability. The programme has been adapting along the way, improving its focus environmental impacts – at least in terms of targeting areas of high deforestation risk. The programme works in both private and communal lands (ejidos). In communal

lands, contracts are signed with the ejido board which decides how to distribute the money internally. A participation bias in favour of those already engaging in good practices versus those more likely to deforest (eg cattle ranchers) has been suggested, implying limitations to the programme's additionality. The introduction of social benefits was a requirement to make the programme politically acceptable, even if it led to trade-offs. However, evidence of such trade-offs in the programme has been contradictory: some show that it is possible to effectively combine social and environmental objectives (Alix-Garcia *et al.*, 2013), while others claim that it is counterproductive (Alatorre-Troncoso, 2014; Salafsky, 2011).

CTs to change behaviour: scaling-out

These are schemes that use different forms of conditional transfers to change behaviour through the promotion of local deals. They include watershed protection deals and voluntary carbon offsets. Funding comes through a mix of private sector, NGOs and local municipalities.

While individually small, some of these schemes are managing to replicate and scale-out, retaining the principles of community engagement and negotiation through dialogue.

Bolsa Floresta Programme, Brazil

Section contributors: Virgilio Viana and Victor Salviati, Fundação Amazonas Sustentável (FAS)

The *Bolsa Floresta* programme (BFP) is a state-level public policy that represents a hybrid of conditional transfers and PES. It involves a mix of direct cash reward and community-based investments in income-generating activities, social empowerment and capacity building, and social infrastructures. The programme successfully combines multiple streams of funding from public and private sector to make transfers at household and community level to conserve forests and improve people's wellbeing in sustainable development reserves in Amazonas. In order to join the programme, riverine participants should not deforest pristine forest, send their children to school, and live at the reserve for at least two years.

BFP is one of the oldest and largest programmes aimed at promoting environmental conservation and poverty alleviation in the world (Börner *et al.*, 2013; Viana, 2008). It began with a few communities in two protected areas and it now involves an area of 10.9 million hectares, 583 communities and 16 protected areas. Created in 2007, and initially implemented by the State Secretary of Environment, with support of Idesam, an NGO from the Amazon, BFP has been implemented by Sustainable Amazonas Foundation (FAS) since 2008. FAS, a non-governmental organisation, was created through a partnership of Bradesco Bank and the Amazonas State Government. The strategy to have the programme implemented by FAS was to increase efficiency, efficacy and equity in delivering benefits to communities, as well as to create resilience in light of possible change in government partisan politics.

The programme is a hotbed for lessons. The BFP needs to focus on several challenges, including ensuring the equity of non-cash components and the detailed monitoring of social, environmental and economic impacts of the program. In addition, the programme needs to secure long-term funding, beyond current sources. New opportunities may emerge within the framework of the Paris Agreement and the Amazonas legislation on ecosystem services. The programme has a strong gender component, with clear monitoring of indicators to measure progress that show how control of cash, active support to engage in economic activities and empowerment through dialogue all contribute to the reduction of inequality associated with gender.

An important lesson of the BFP is that using a simple message as a reference for the scheme (`standing forest') acts as a common denominator and improves the coherence of the programme. This helps to amalgamate resources from the scheme investors into a single budget with a common objective. This in turn helps to avoid duplication of efforts, double counting and reduces the risk of negative spillovers. The programme has been peer-reviewed in 2012-13 but requires continuous independent evaluations which can be expensive, and for which collaborations with academic and research institutions are key.

Based on the FAS experience implementing the BFP, there are five essential elements to build an environment of trust for PES schemes: (i) effective spaces for dialogue; (ii) valuing positive leadership

(iii) aligning expectations; (iv) shared agenda with short-term impacts (to show effectiveness) and; (v) presence, proximity, availability and connections. The lessons learned from the BFP could be used more widely to help the design and improvement of similar programmes in other areas. These lessons learned are also useful to implement other programmes for community-based sustainable development goals (SDGs), including adaptation to climate change, in Amazonia and other similar regions. FAS has recently launched a toolkit (FAS, 2017) on implementing PES in the Amazon: www.sdsn-amazonia.org/en-toolkit

Watershared: Reciprocal Agreements for Watershed Conservation

Section contributor: Nigel Asquith

Reciprocal Watershed Agreements – otherwise known as *Watershared* – are simple, grassroots versions of conditional transfers that help land managers located in upper watershed to sustainably manage their forest and water resources in ways that benefit both themselves and downstream water users. *Watershared* agreements focus on changing behaviour through economic and non-economic incentives and building institutional capacity: in other words, on showing local authorities and water users that watershed protection is in their own interests, and then on helping to create the institutional framework needed to plan and implement it (Asquith, 2011).

Watershared agreements do not rely on extensive hydrological and economic studies to define `correct' payment levels. Nor do they focus on the opportunity cost of conservation as the primary driver of levels and types of compensation. Rather, they attempt to strengthen and formalise pro-conservation social norms, by publically recognising individuals who contribute to the common good by conserving their `water factories'. They respond to one of the key findings of behavioural economic experiments, that "*money . . . is the most expensive way to motivate people. Social norms are not only cheaper, but often more effective as well*". *Watershared* `compensations' are thus tokens of appreciation rather than economic transactions and can comprise much lower amounts than neoclassical economic theory would predict.

In areas such as Bolivia's Los Negros valley, where the Andes meet the Amazon, extensive cattle grazing is the primary threat to forest cover and hence to the quality and quantity of downstream water. Cows enter forests, especially along riverbanks, to drink and graze. They defecate and urinate in streams, graze seedlings and compact soil; as a result, levels of faecal coliforms in the water increase, vegetation regeneration is reduced, and rainfall runs off compacted soils more rapidly. This leads to increases in flooding and sedimentation and decreases in dry season water flows and water quality. As a result, agricultural production, incomes and quality of life decrease.

The original *Watershared* agreement in Los Negros tried to reverse this vicious cycle (Asquith *et al.*, 2008). Upstream forests were protected from cattle incursion by landowners, who were compensated for their conservation efforts. Downstream water users provided alternative development tools, such as beehives, fruit tree seedlings and irrigation tubes. Biodiversity was protected, the quality and quantity of water increased, and livelihoods improved, with clear benefits downstream (more/cleaner water) and upstream (landowners had new development alternatives).

The *Watershared* model has been replicated remarkably quickly. In Bolivia, *Watershared* promoters first arrived in Cuevo municipality in March 2012. Less than 11 months later, the local government had committed to investing US$2,289 and was signing its first *Watershared* deal with 54 families, who received 46 rolls of barbed wire and wire staples in exchange for signing contracts to conserve 1,905 ha of forest for three years. In San Ignacio, Peru, authorities created a fully functioning Watershed Management Department in the municipal government within three years, even though funding from a supporting local non-governmental organisation (NGO) came to an end.

Watershared is so simple that a number of municipalities have been able to develop programmes of their own. Such is the case in the Bolivian municipality of Pasorapa, where the Mayor set up a *Watershared* fund with virtually no outside help. The community received a donation of 9 hectares of land above their water supply, and used funds raised by the water cooperative to fence out cattle from this area. The Pasorapa Fund is about to pay to conserve another 200 ha—with their own money, none of which has been provided by Natura. In Ecuador, as a direct result of participating the School in Loja, the community of Guachanamá set up a *Watershared* model to provide three landowners with barbed

wired, plastic tubing and a drinking trough for cattle in return for the conservation of 200 ha. Meanwhile the Ecuadorian community of Pozul has set up a water fund that is raising ~$350 a month, destined to buy the land around the water source.

The high level of local involvement is very similar to that of India's MGRNEGA, where local implementation of the job investments are determined by community institutions (Panchayat). The lessons from *Watershared* could help MGRNEGA improve their environmental targeting and look at options to secure the long-term environmental impacts of these investments.

Payment for Ecosystem Services in the Hindu Kush Himalayas

Section contributor: Laxmi Dutt Bhatta, ICIMOD

There are many "PES-like'' schemes in the Hindu Kush Himalayas (HKH) region, that aim at channelling financial and non-financial benefits (for example, as development projects) to the communities providing various ecosystem services, through an established institutional mechanism (Bhatta and Kotru, 2012; Bhatta *et al*., 2014; Patterson *et al*., 2017). Some of them include:

- Markhor (Siberian ibex) hunting in Pakistan, where 80 per cent of the total hunting revenues go back to local communities
- Incentive to communities for increased carbon stock through REDD+ pilots in Nepal
- Sharing of hydropower revenue with local government in Nepal, where 10 per cent of the hydropower revenue is ploughed back into local government
- Municipal support to local communities living in the upstream water source at Palampur city of the Himanchal state in India
- Compensation scheme for ecological restoration in China, where the government of China provides cash eco-compensation to local communities based on per unit of land for wetland restoration.

These schemes operate alongside a wider range of political and policy instruments used by governments. The experiences from these schemes show that they are opening new sources of conservation finance, helping to improve ecosystem at large, and providing experiences for empowering negotiations at local level.

Research and experiences show a promising potential for incentive-based mechanisms to encourage and acknowledge mountain communities for their efforts in conserving the ecosystem to maintain and/or improve it. However, several essential elements are necessary to make such schemes successful. These include clarity and transparency on conditionality, land tenure rights, contracting provisions supported by legislative instruments and equitable benefit sharing mechanisms and monitoring. Studies also suggest that if PES schemes are embedded within environmental impact assessment (EIA) plans for development projects, they would be more effective in ensuring long term sustainability of the project and benefits to the communities.

Existing experience strongly suggest focusing on a wider range of incentives rather than cash-only as means to improve quality and/or quantity of ecosystem services in the HKH region. Properly designed, these types of incentives have the potential to improve ecosystem management while increasing transparency and accountability. A "one approach only" may not be desirable, as the design of these PES schemes need to respond to local context, culture and environmental priorities. Rather, an overarching framework with common principles might be helpful to streamline such schemes at the national or transboundary levels.

Ethical land-based community carbon deals

Section contributors: Ina Porras, Geoff Wells, and Eva Schoof

Smallholder and community carbon projects have shown they can deliver local benefits and promote climate resilience (Grieg-Gran *et al.*, 2005; Milder *et al.*, 2010). Their emphasis on co-benefits – such as food, energy, carbon sequestration and the protection of water quality and habits for biodiversity – provides an advantage when it comes to selling carbon certificates in voluntary carbon markets, as they appeal to companies' corporate social responsibility (CSR) agendas.

There is real demand for carbon offsets from reforestation, forest conservation and 'climate-smart' agriculture (Hamrick and Gallant, 2017a). But to ensure the success of community carbon projects, project developers are needed to ensure delivery of carbon sequestration to offset buyers' carbon footprints and generate benefits for the farmers – providing credibility along the value chain through clear project design and monitoring and evaluation processes is also key.

Several ongoing local schemes are now reaching maturity (eg Scolel-Te in Mexico, Trees for Global Benefit in Uganda) and providing practical lessons on the behaviour of participants -as well as strategies of project developers, after carbon payments stop. Along with others elsewhere, these experiences show that sustainable smallholder agriculture can generate benefits for farmers and society, such as provision of food and energy, carbon sequestration, and the protection of water quality and habits for biodiversity. Ongoing experience shows that successful implementation relies on accountability, efficiency, flexibility and business planning.

The experiences from these voluntary markets offer an important new ideas and strategies to bring climate solutions that also support local livelihoods. These experiences could have strategic importance in the implementation of the Paris Climate Agreement (Abeysinghe and Prolo, 2016) and the countries National Determined Contributions.

But to emerge as tangible solutions for combating climate change, these projects need to work at a much larger scale, which will mean trade-offs, too, if local contact is reduced and the benefit sharing is compromised. The greatest risk, however, arises from plummeting carbon prices, as the existing pool of voluntary offset buyers may not be able to absorb the increased supply of offsets. This would drive prices ever further down, making a devastating impact on socially oriented carbon projects. To inspire the creation of new carbon markets, new legislation needs to be introduced. It needs, for example, to encourage demand from the private sector in developing countries, and to bring carbon prices closer to the real social and economic cost of climate change.

Module 3: Systems and tools for sustainable financing

Governments in India, China and South Africa pledge significant budget allocations to CT/PES. Costa Rica and Mexico show that it is possible to earmark water and fuel taxes for environmental activities. Local schemes such as *Watershared* in South America demonstrate a willingness from local governments and water utilities to pay towards watershed conservation.

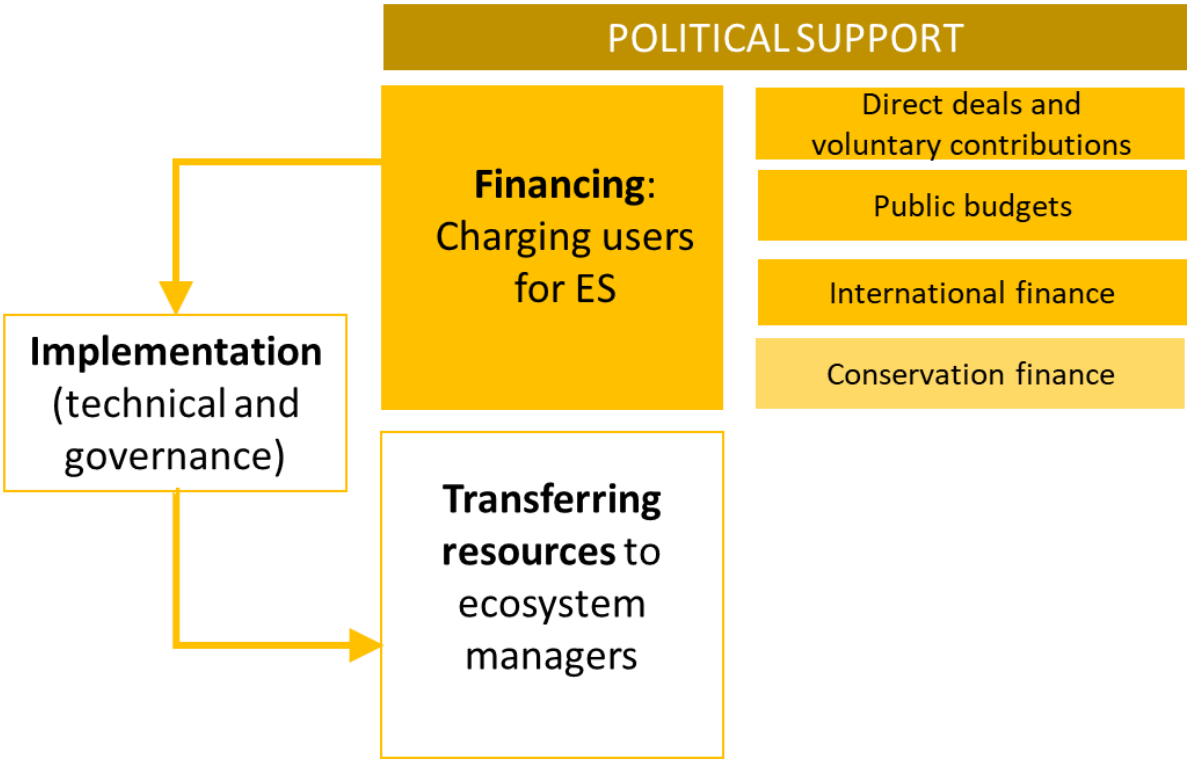
Climate change and SDG agendas bring the environment back onto the discussion table, as well as the potential to scale up financial flows towards conservation and restoration of ecosystems.

This section focuses on how PES/CT programmes are financed and presents strategies to secure sustainable financing to scale up and achieve long-term impacts of the programmes. It is based on lessons from ongoing programmes reviewed in Module 2 and emerging systems from international climate and conservation finance.

We identify three main types of funding for CT/PES (Figure 4): a) direct deals and voluntary contributions, especially for carbon and watershed local deals; b) public budgets, through ear-marking, general budget or public debt; and d) international finance, for example linked to REDD+ and climate change resources.

An incipient sector is linked to d) conservation finance, which focuses on the potential of initiatives to generate financial returns to investments. Political support and viability underscores any strategy for sustainable financing.

Figure 4. Implementing blocks of CT/PES



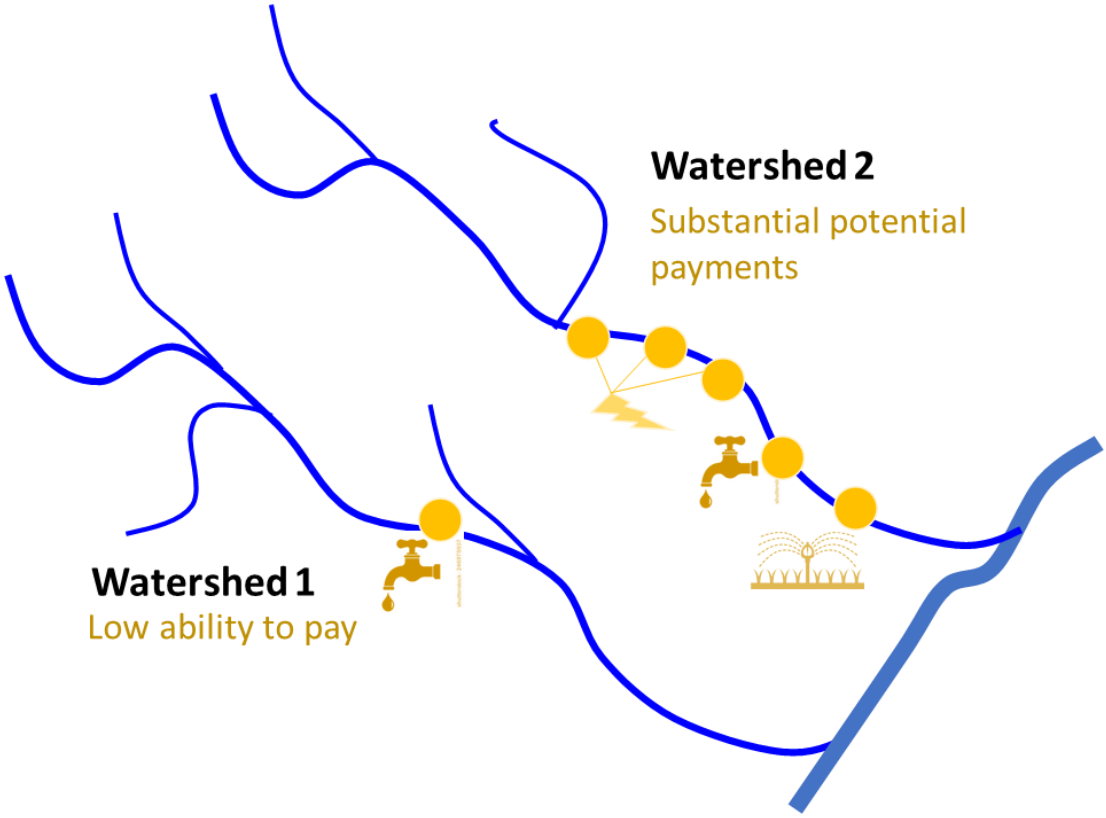
Direct negotiations with ecosystem service users

The underlying principle of financing PES is linked to externalities and beneficiaries, as shown by Figure 3 in MODULE 1, and more specifically in Figure 5 (adapted from Pagiola and Platais, 2007) which illustrates a theoretical watershed conservation deal. The amount of financial resources is critical on the scale of the intervention upstream, and this in turn will ultimately affect the ability of the intervention to have a discernible impact on the levels of the ecosystem services.

Finance from downstream water users

The figure shows two watersheds identical in all biophysical characteristics. But the water flowing from Watershed 2 has much higher economic value, since it feeds several hydroelectric projects, and provides water for irrigation and human settlements. On the other hand, Watershed 1 only feeds one small settlement, with low ability to pay for water. While the water flowing from both watersheds is the same, the potential of capturing revenues from Watershed 2 is high, and from Watershed 1 is low.

Figure 5. The value of ecosystem services is linked to beneficiaries



Source: adapted from Pagiola and Platais (2007)

Experience highlights three important aspects linked to financing in watershed deals:

- **Who:** Who are the beneficiaries and what is their potential ability to pay? Are downstream beneficiaries organised (for example as a water utility or a municipality), is there a charge for water already?
- **How:** what is the instrument to capture revenue? For example, taxes, charges, fees, price premium, ear-marked taxed, etc. What is the political will in ear-marking and devolving existing resources, for example from hydroelectric projects?
- **Management:** how will the financial resources be captured, managed and disbursed? For example, through trust funds, local banks, government offices, cash or direct bank transfers?

South America shows the potential of these initiatives to succeed. The Watershared programme in Bolivia shows strategies to effectively engage with these downstream users to fund upstream

conservation, that link downstream municipalities and water utilities supporting specific actions for upstream watershed conservation.

Ecuador has several similar initiatives. The Fund for the Conservation of Water (FONAG) in Quito, Ecuador, links NGOs, government and water users (Quito water utility, a private brewery, hydropower producers, and assorted other small private businesses) and donors contribute to a fund, from which returns are invested in upstream watershed management. The public water utility fixed by law a 2 per cent contribution of revenues to the Fund in 2007. By 2009, FONAG was making financial contributions of almost one million US$ per year and leveraging counterpart funding to fund programmes and projects with total expenditure of nearly four times this amount. The success of these water funds has promoted the creation of many similar funds in Latin America, as well as similar initiatives along the Himalayas region.

Initiatives at municipal and local level will become more important as cities grow and their surrounding ecosystems gain important, for example in terms of water protection, food production, access to recreation spaces, increasing urban resilience and improving resilience and quality of life for city dwellers (Gómez-Baggethun *et al*., 2013; Marshall, 2017). CTs/PES can complement planning strategies to promote land management in peri-urban areas.

Voluntary carbon offsets

Initial high expectations of financial flows from carbon markets have gradually ebbed away, as international policy makers fail to take decisive action. However, there are voluntary carbon markets going back to the late 1990s and early 2000s, which have been generating significant financial resources for community projects.

In these deals certified offsets from land-based activities are sold directly in international markets by resellers. About US$191.3 million were transacted on the (overall) voluntary carbon market in 2016. Community-focused projects were able to achieve better prices than other type of projects. However, demand remains variable (Hamrick and Gallant, 2017). A study by IIED-HIVOS found that PES can indeed provide a viable financing strategy for smallholder agriculture, but it depends on how well it integrates within the smallholder enterprise, as well as the level of payoffs from the carbon markets (Porras *et al.*, 2015)

The Trees for Global Benefits (TGB) project in Uganda is an example of how a project manager uses carbon offset revenues to promote sustainable resource management with rural famers. The funding for their programme includes sales from carbon offsets from voluntary markets – certified by Plan Vivo Standard, donations and the provision of technical support to other projects in the area. In 2015 they launched the Ecotrust Endowment Fund, which aims at providing the means to generate and manage funding in a way that provides financial stability and independence to achieve the organisation missions. To date, TGB has mobilised close to US$4.5 million in foreign direct investment for over 3,000 farmers putting more than 4,000ha under improved land management.

Public-private partnerships for conservation

Despite providing good examples with potential for local impacts, most watershed and carbon deals are small in scale, as funding from carbon and water remains relatively limited. Projects like Trees for Global Benefits in Uganda -mentioned above – are beginning to seek public-private partnerships in an effort to increase funding and redistribute risk.

Bolsa Floresta in the Amazonas, Brazil provides a good example of public-private partnerships to promote sustainable development reserves in the Amazonas. The programme is mostly funded by Bradesco Bank and the Amazon Fund (The Brazilian National Development Bank BNDES/Government of Norway). Almost 80 per cent of FAS funding is from private sources, including Coca-Cola, Samsung, Abril Media Group and Marriott International, among others. In addition, the Juma REDD+ initiative has been co-funded by Marriott International and Abril Media Group. REDD+ is certified in one reserve and it's in readiness stage for the other. The project targets Voluntary Over-the-Counter carbon market (OTC).

Government budgets

Direct deals like those from watershed conservation deals are common in early stages of large programmes, such as the Costa Rican PES. They provide evidence of willingness to pay from beneficiaries and are a testing ground for implementation. However, these deals can be time consuming, have high transaction costs and may not be able to achieve the scales required to impact ecosystems.

Most often, governments step in as the main drivers for scaling-up CTs and PES. These actions are linked to various agendas such as climate change adaptation and mitigation, green economy, rural development, sustainable development goals and natural capital. Public funds are often used to leverage private and international funds, increasing profitability in favour of sustainable, long-term projects.

Public finance for environmental investments, including CT/PES, comes from a variety of sources which are presented in this Module. They include general budget, ear-marked sectoral taxes (such as water, tourism or fuel), and public debt (for example through bond emissions or loans). We also present tools that allow Ministries of Finance track the government's environmental and climate expenditures, as a step towards identifying finance gaps and potential environmental tax reform.

Ear-marking environmental taxes

Earmarking is a provision included into a discretionary government spending for a particular purpose, usually circumventing other allocation processes. Earkmarking environmental taxes is favoured by some groups, as evidence of the degree of commitment from the government towards a particular cause and to prevent financial withdrawals when power changes. On the other hand, earmarking can be inefficient with regards to good practice in taxing and spending and some governments strongly opposed it (Brett and Keen, 2000; Kallbekken and Aasen, 2010; Marsiliani and Renstrom, 2000).

Module 2 presents examples of environmental taxes used to finance investments in conservation and ecosystem management. For example:

- Revenues from hydropower in several countries along the Hindu Kush Himalayas. Usually, a percentage of total hydropower revenues is handed back to the local government who then authorises how this is spent. Ongoing efforts in Nepal and Bhutan are aiming to channel some of these resources back towards CT/PES.
- Water taxes, either through reallocation of existing collection or by passing the cost to final users. The Mexican Payments for Hydrological Services (PSAH), for example, was funded by an increase to an existing fee charged to water users. The initial allocation of funding to the PSAH programme was set at 2.5 per cent of water fee revenues, totalling approximately US $18.2 million per year. The funding structure was later modified to be a set amount each year (about US $27.3 million annually).
- Fuel taxes have been used in Costa Rica as a main source of finance for the PES programme. A third of revenues from tax collections was set by law when the programme was created (Forestry Law 7575, article 69), although the actual amount transferred to PES has varied throughout the years (Porras *et al*., 2013).
- Hunting licences. Approximately 80 per cent of total hunting revenues of the Markhor (*Siberian ibex*) go back to local communities in Pakistan. This community-sharing principle has been applied in Africa, much of it inspired by Zimbabwe's Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) project during the 1980s (Frost and Bond, 2008).
- Tourist charges can be important sources of financial resources. While not a CT/PES programme, Belize uses a mix of general budget and earmarking strategies to fund protected areas. The country's Protected Areas Conservation Trust is financed by a US$3.75 `conservation fee' charged to everyone leaving the country (total exit fee is US$40 for non-residents), and a 20 per cent commission from the cruise ship passenger tax of US $7 per person.

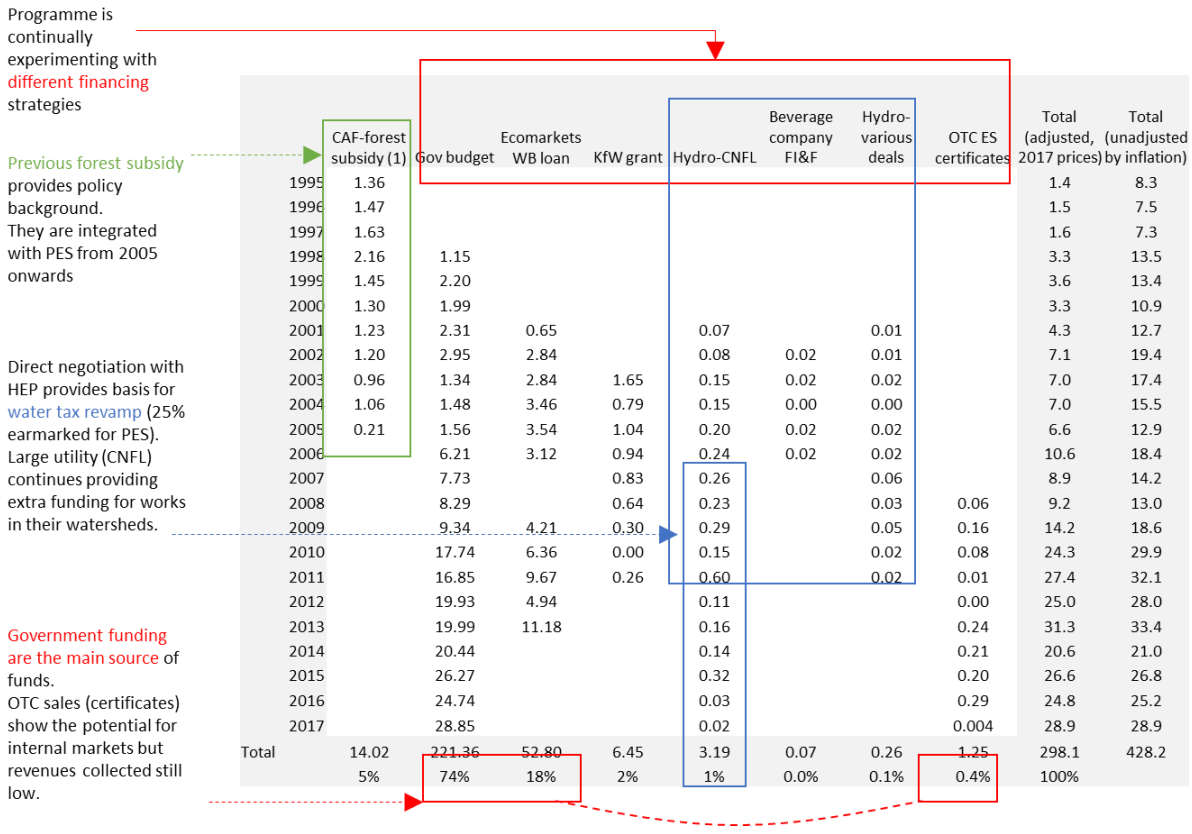
Environmental taxes linked to tourism, water, or hydropower are used in almost all countries, but only a few of them earmark and reallocate these funds back towards conservation. Some countries, like Costa Rica, have evolved to using a form of "soft" earmarking, which allows contributions to be politically-pegged to collections but provides a margin for negotiation from government general budgets, as discussed below.

General budget allocations

Governments often relocate general public funds to promote greener alternatives and sustainable use and conservation of ecosystems. The largest PES programme in the world, China's Eco-Compensation programme is primarily funded from general budget. Other important examples include the MGNREGA programme in India, a social protection programme with a strong focus on environmental investments and the ICMS-Ecológico in Brazil:

- China's Eco-Compensation Programme is financed by the Ministry of Finance, from the national budget of the Central Government. The budget is guaranteed by the regulations issued in 2002 by the State Council of the PRC. Between 2002 and 2012, total investment for the Sloping Land Conversion Programme alone was about US$69 billion, including the grain subsidy, seed fund, maintenance fees, and various special funds. Of this, about US$52 billion were direct payments to 32 million households in 25 provinces (Liu and Lan, 2015).
- MGNREGA's social protection programme in India is primarily funded by the national budget with a certain percentage funded through state budgets. The funds are allocated under an Act which came into force in 2006 and therefore has a strong legal backing. Central government covers the full cost of the unskilled wages, and 75 per cent of the costs for materials and skilled/semi-skilled workers and administrative expenses. State governments cover the remaining 25 per cent of the costs and share some of the administrative costs. Between 2016 and 2017, the government allocated about US$5.67 billion for MGNREGA activities. The Ministry has stressed the creation of State Employment Guarantee Funds (SEGFs), to ensure long-term funding for the programme.
- Federal fiscal environmental transfers, for example the ICMS-Ecologico in Brazil, are fiscal transfer mechanisms that allow participating states to transfer part of their value added tax revenue to cities based on the creation of protected conservation areas. In Paraná state, some US$200 million was redistributed under the scheme from 1992- 2001, and protected areas grew by more than 165 per cent. Fiscal federal transfers also fund the Bolsa Familia social programme, one of the basic components of the Bolsa Floresta programme in the Amazon.
- Sociobosque PES programme in Ecuador builds on previous water funds success. The primary source of funding is the government but looking to incorporate other forms of funds including new green taxes, industry payments as compensation for licences for extractions and high environmental impact activities – expected to contribute up to 40 per cent of Socio-Bosque budget, voluntary contributions from national and international sources, international cooperation and REDD+.
- The Costa Rican PES programme represents an interesting combination of general budget as leverage to promote multiple sources of funding (see Figure 6). Key lessons from this programme are experimentation and adaptation. An important point is that the PES programme does not have the monopoly for ecosystem services negotiations. This means that local schemes can co-exist with the national-funded programme. Several iconic local water deals (such as ESPH water utility scheme, the Florida Ice&Farm water bottling deal and a few direct deals with hydroelectric companies) generated interest and paved the way for the political will to increase water fees at national level (25% of which now go to fund PES). Over-the-counter sales of ES certificates (CSA) remain small but promising as ways to raise resources to invest at local level. One of the reasons for the lack of take-off is their relative high transaction cost in relation to money raised, compared to the allocations from general budget.

Figure 6. Exploring different sources of finance in Costa Rica PES



	CAF-forest subsidy (1)	Gov budget	Ecomarkets WB loan	KfW grant	Hydro-CNFL	Beverage company FI&F	Hydro-various deals	OTC ES certificates	Total (adjusted, 2017 prices)	Total (unadjusted by inflation)
1995	1.36								1.4	8.3
1996	1.47								1.5	7.5
1997	1.63								1.6	7.3
1998	2.16	1.15							3.3	13.5
1999	1.45	2.20							3.6	13.4
2000	1.30	1.99							3.3	10.9
2001	1.23	2.31	0.65		0.07		0.01		4.3	12.7
2002	1.20	2.95	2.84		0.08	0.02	0.01		7.1	19.4
2003	0.96	1.34	2.84	1.65	0.15	0.02	0.02		7.0	17.4
2004	1.06	1.48	3.46	0.79	0.15	0.00	0.00		7.0	15.5
2005	0.21	1.56	3.54	1.04	0.20	0.02	0.02		6.6	12.9
2006		6.21	3.12	0.94	0.24	0.02	0.02		10.6	18.4
2007		7.73		0.83	0.26		0.06		8.9	14.2
2008		8.29		0.64	0.23		0.03	0.06	9.2	13.0
2009		9.34	4.21	0.30	0.29		0.05	0.16	14.2	18.6
2010		17.74	6.36	0.00	0.15		0.02	0.08	24.3	29.9
2011		16.85	9.67	0.26	0.60		0.02	0.01	27.4	32.1
2012		19.93	4.94		0.11			0.00	25.0	28.0
2013		19.99	11.18		0.16			0.24	31.3	33.4
2014		20.44			0.14			0.21	20.6	21.0
2015		26.27			0.32			0.20	26.6	26.8
2016		24.74			0.03			0.29	24.8	25.2
2017		28.85			0.02			0.004	28.9	28.9
Total	14.02	221.36	52.80	6.45	3.19	0.07	0.26	1.25	298.1	428.2
	5%	74%	18%	2%	1%	0.0%	0.1%	0.4%	100%	

*Note: (1) *Certificado de abono forestal* (CAF) pre-dates PES and was a subsidy for reforestation. It overlapped with PES between 1998-2005 and phased out since 2006. Note (2). Totals appear as adjusted by inflation (in 2017 values), with an extra column with reported values not adjusted by inflation. Source: author's own, with data from FONAFIFO statistics. Source: Porras and Chacon-Cascante, in Module 2.

Public debt

Governments often use public debt as ways to finance environmental investments in an effort to improve quality of life.

Studies such as Fodha and Seegmuller (2014) suggest that governments should decrease debt and use market signals -such as pollution abatement, to promote environmental quality in the long-run. However, there is growing evidence (see for example Clootens, 2017) that show how public debt can be used to achieve environmental goals. This argument is behind "debt for nature swaps" deals, including the recent Seychelles marine park (Carrington, 2018). The Fiji government recently announced the issuance of sovereign green bonds for US$50 million (4 per cent for 5-year bonds, 6.3 per cent for 13-year bonds). Other countries are following, with support from international bodies such as multilateral development banks and the International Finance Corporation (IFC). The Climate Bonds Initiative, for example, is currently working with UNEP in the design of a guide for governments on the options to mobilise finance from bonds towards sustainable development (see www.climatebonds.net). Bringing forward economic arguments of the benefits of ecosystem actions, such as Ecosystem-based Adaptation, can help direct part of these investments beyond infrastructure and towards wider environmental management. Instruments such as CT/PES can provide the means to deliver resources towards people and communities.

Identifying potential new sources of finance by:

a) Improving expenditure tracking

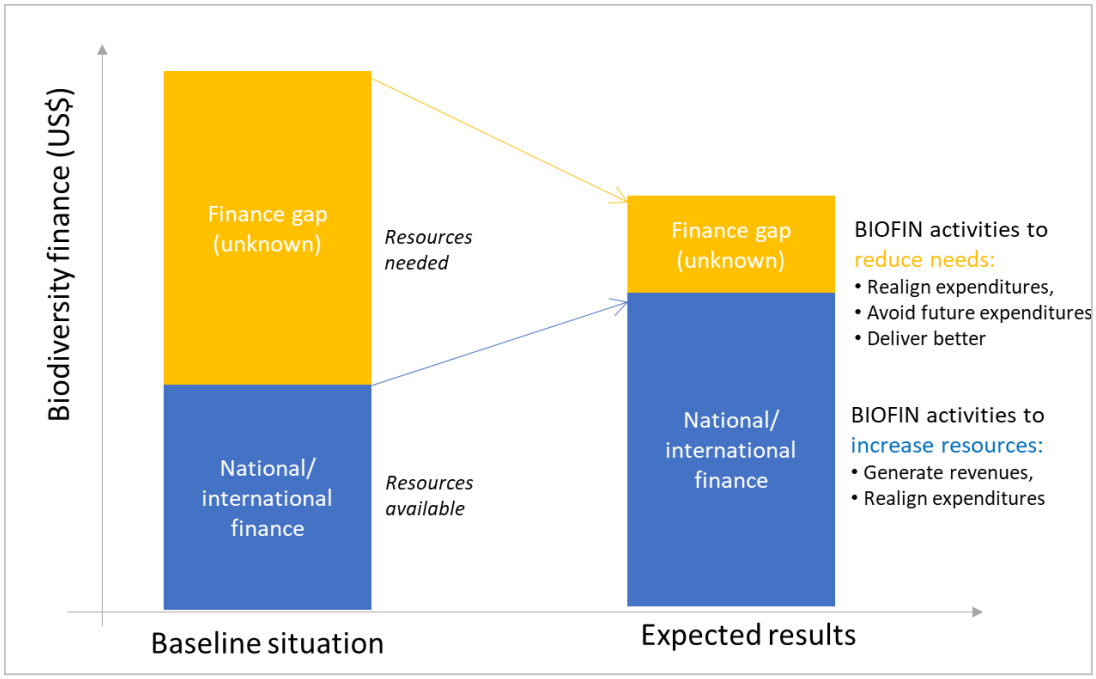
While most governments agree on the importance to protect the environment, they often struggle to engage the political will to secure financial resources. Prompted by the need to improve domestic climate finance, governments are urged to look carefully at their current environmental expenditures, as

a step towards identifying existing contributions, finance gaps and strategies for more efficient allocation of resources -including fiscal reform (see section below). Two useful tools to understand financial investments are the Climate Public Expenditure and Institutional Review (CPEIR), and the Biodiversity Finance Initiative (BIOFIN).

The Climate Public Expenditure and Institutional Review (CPEIR), for example, helps countries track existing budget climate expenditures across different sectors. The framework looks at six dimensions of public expenditure: fiscal sustainability, strategic resource allocation, the role of the government, efficiency and effectiveness of spending, incidence of spending and capability of institutions and alignment of incentives (International Bank for Reconstruction and Development and World Bank, 2014). This type of review is useful to help understand the potential impact of new measures -such as a carbon tax – on growth. Information on this tool can be found in: www.climatefinance-developmenteffectiveness.org/.

The Biodiversity Finance Initiative (BIOFIN) provides a framework to understand the process to mobilise resources for biodiversity and sustainable development – see Figure 7. Similar to the CPEIR, it measures current biodiversity expenditures but provides additional steps to identify financial needs, suitable financial solutions and guidance on how to implement actions. For example, establishing biodiversity business challenge funds, merging conservation funds, or establishing central procurement units or staff incentives to increase delivery of resources (UNDP, 2016).

Figure 7. BIOFIN framework towards finance mobilisation



Source: UNDP (2016)

b) Reforming environmental taxes and subsidies

Environmental taxes play an important role in funding CT/PES, as presented in the previous sections. But governments can go a step forward redesigning market signals, addressing price distortions and potentially reducing free-riding on natural resources and ecosystem services traditionally considered `free'. This is particularly important to understand how to mainstream environmental investments, including CT/PES, in the wider economic context.

Environmental fiscal reform (EFR) aims at restructuring the tax system, with a shift from traditional taxes to new areas. These taxes use “polluters pay” and “beneficiary pay” principle to generate revenues and promote more efficient use of resources. Environmental taxes are considered less

harmful to growth than other taxes to traditional areas of taxation, such as income, savings and capital grains, labour or corporate taxes. They are also important fiscal tools to target activities with a harmful impact on the economy, and promote green growth economic recovery (DG TAXUD, 2015; United Nations, 2012).

This fiscal reform goes towards 'tax neutrality': adding some taxes, eliminating others, and redirecting subsidies from environmental harmful activities, which act as 'perverse incentives', towards activities that promote green growth and poverty reduction. This includes the reduction and phasing out of these subsidies, and redirection of public spending towards socially and environmental beneficial activities, in line with the Aichi target three, which calls for this elimination by 2020 (Secretariat of the Convention on Biological Diversity, 2011). For example:

- Raising additional revenues and promote efficiencies: A study for the European Union shows that EU28 could raise €208 billion in additional revenue by 2030 through suggested environmental reforms, equivalent to a 1.05 per cent increase in GDP (Hogg *et al.*, 2016). The environmental benefits from the reforms amount to €14 billion. The scenario for 2030 revenue generation under good practice includes:
    - Energy €49billion from transport fuels, C&I/heating and electricity.
    - Transport €117B from vehicle taxes, passenger aviation tax and freight aviation tax.
    - Pollution and resource taxes €42billion from water abstraction tax, aggregates tax, packaging tax, and other taxes for pesticides, air pollution, landfill, waste water, incineration/ MBT, single use bag tax, and fertilizer tax.

  There are examples of environmental tax reform and environmental fiscal reform in China and South-East Asia (United Nations, 2012). Kreiser *et al.* (2011) present an analysis of the area, focusing on wastewater environmental taxes in DRC, carbon tax policies, green energy taxes in Hong Kong and examples of resource rent taxation regimes in Australia (see for example Kreiser *et al.*, 2011). China issues a draft environmental tax law with levies on air, water, noise and waste polluters in 2015, and fiscal reforms are at the core of China's Eco-Compensation programme.

- Reducing perverse incentives and free up resources. Some of the perverse incentives and subsidies that harm ecosystems and environmentally-friendly activities include:
    - Subsidies to already under-priced resources, like provision of water and energy at low prices, can lead to excessive consumption and often waste.
    - Subsidies to inputs of production are expected to increase production, often can lead to over use, for example over fishing, or subsidies to fertilizers or pesticides in agriculture. For example subsidies to bottom trawl fleets can have a major impact on the habitat of fish species.
    - Subsidies to environmentally-friendly activities need to ensure these are targeted and cost-effective.
    - There are other forms of perverse incentives beyond subsidies. For example, requirements to remove forests as precondition to receive land tenure or titles, or laws that threaten "idle" lands with higher taxes.

  The elimination of these harmful subsidies can increase efficiency –in the same way that the environmental tax reform does, and free up considerable funds which could be used for more pressing environmental needs. Environmental fiscal reform is proposed as a way to close the "time gap", by providing public funding for green investments and address long-term price signals to the private sector.

Experience of using environmental taxes and fiscal reform in Member States of the European Union suggest that they are an effective and efficient way of helping to achieve environmental policy objectives. Important issues to address in fiscal reform are linked to challenges to implementation. For example, their perception as additional taxes that add burden to people, issues of equity and need to ensure they remain income progressive (not regressive), and the perception that it damages the

competitiveness of companies and the economy as a whole – see for example Slunge and Sterner (2012).

b) Linking to climate agenda and INDCs

The success of the climate change agenda opens the space to bring environmental solutions back to the policy table. This is particularly clear when looking at the design of Intended Nationally Determined Contributions (INDCs). As large sections of the population become vulnerable to climate change, politicians may be more likely to take conservation action. The implementation of the Paris Agreement alone requires a massive deployment of resources, which countries have committed to raise through a mix of sources. This includes revamping existing fees for environmental goods and services such as water or timber, creating new taxes to collect revenues such as waste and carbon taxes, re-thinking existing subsidies, and explicitly linking the rural development agenda to the environment. The activities proposed by PES and REDD+ are clear examples of land-based measures towards adaptation and mitigation to climate change, which links them to the country's INDC. India and Costa Rica, for example, make a clear link between their INDC and CT/PES:

- India declared a voluntary goal to reduce the emissions intensity of its GDP by 33 to 35 per cent by 2030 from the 2005 level, by using a mix of actions towards mitigation and adaptation. Land-based activities feature strongly in mitigation (afforestation, sustainable forest management) and adaptation (expansion of agroforestry, watershed management, mangrove protection, protection of biodiversity and Himalayan ecosystems. The MGNREGA programme is one of the main programmes proposed to ensure rural livelihoods security linked to land, soil and water (Government of India, 2015). The sources of funding identified in India's INDC include a coal tax (which translates into a carbon tax equivalent of about US$2/tonne); the National Adaptation fund (with an initial government allocation of US$55.6 million for sectors such as agriculture, water, forestry), reduction in subsidies and increased taxes on fossil fuels (petrol and diesel), tax free infrastructure bonds for funding renewable energy, and `forest cover' 7.5 per cent weight included in the devolution of funds to states from federal pool (Finance Commission Incentive for creation of carbon sink). This is similar to the `ecological fiscal transfers' used in Brazil and Germany.
- Costa Rica intends to become carbon neutral by 2021, and the AFOLU (agriculture, forestry and other land uses) sector plays a large role by removing or offsetting carbon emissions and action pilots such as Nationally Appropriate Mitigation Actions (NAMA), low carbon sector strategies and national REDD+, as well as measures to decarbonise energy and transport supply chains. As part of the strategy the country will expand its PES programme to include ecosystem-based adaptation actions. The country is taking steps towards a Green Climate Fund (GCF) to establish the means to ensure sustainable financing and allocate resources (Government of Costa Rica, 2015).

Like India and Costa Rica, over 160 countries have submitted their proposals for INDCs and there are many domestic initiatives for climate funds where investments in natural capital feature strongly. The government of Bangladesh allocates US$100 million per year to the Bangladesh Climate Change Trust Fund, and a similar fund in Rwanda receives significant public domestic resources (Rai *et al.*, 2015). There is increasing support in helping countries develop their strategies and understand their financing options, which can help bring up the profile of CT/PES as potential instruments to help deliver climate commitments and help deliver money to local communities and actors, where it matters most.

International sources of funding

There are several international funds that have been designed to help leverage other sources of finance, especially government funding but in some cases contributing to unlock private contributions vy sharing risk.

These international resources use a mix of financial intermediaries to manage, disburse and monitor climate finance. It includes directly financing core national ministries, working with national development

banks, supporting national climate funds pool further resources, engage with multilateral entities and subnational agencies (including local government entities) -see Rai *et al.* (2015). The specific nature of the funds varies, and some of these funds put emphasis on local or community-relevant interventions, potential of small projects to reach scales; used as leverage for local public finance (ie municipalities) they can be used to finance community projects.

- The Global Environment Facility's (GEF) Small Grants Programme.
- The Forest Investment Programme's (FIP) Dedicated Grants Mechanism.
- DFID financed Decentralised Climate Funds in Kenya – County Climate Change Funds.
- The Local Disaster Risk Reduction Fund in Bangladesh.
- The UN Capital Development Fund (UNCDF).
- The World Bank's Community-Driven Development (CDD) initiatives.
- The Forest Carbon Partnership Facility Readiness Fund and Carbon Fund, which focuses on REDD+ initiatives.

The ability of this type of Funds to reach the local level and deliver real change varies depending on the structure of the funds, which affects the way funds flow and are allocated. A recent review of different funds by Soanes *et al.* (2017) present different strategies that enable resources to reach local level (eg local relevance, grants for de-risking, participatory approaches and simplified access) , discusses barriers (which includes intermediations, risk, capacities, management) and ways forward that will enable international funds and ODA act as leverage to unlock domestic public and private resources. Many of these programmes have been strategic in promoting the development of CT/PES programmes, financing pilot initiatives that improve the knowledge and understanding of the design of viable incentive programmes.

Private sector in conservation finance

Although the bulk of finance for CT/PES programmes (and wider conservation and sustainable development projects) comes from the government and the philanthropic sector, there is evidence that the private sector participation is increasing.

Key actors include development finance institutions, fund managers, corporations, private foundation, non-profit organisations and civil society (including HNWIs: High-Net-Worth-Individuals; and UHNWIs: Ultra-High-Net-Worth-Individuals). According to a study by NatureVest and EKO (2014), private investments in integrated ecosystem management more than doubled between the periods of 2004-2008 (US$893 million) and 2009-2013 (US$1923 million).

The private sector plays a key role by engaging in activities such as technology, capacity building, and various types of impact investment, such as sustainable investing, ethical investing, and mission investing (Credit Suisse AG and McKinsey Center for Business and Environment, 2016).

Impact investment -designed to make a positive measurable impact on social or environmental issues, are mainly promoted in middle-income developing countries where donors are phasing out their participation through non-conditional grants. Impact investments also foster the emergence of a larger capital pool, which might improve financial scalability of programmes and complement climate change mitigation and adaptation strategies by promoting the adoption of sustainable practices. The early-stages of impact investment are characterised by high risk compared to similar investments in other sectors, which will reduce as the local regulation and market structures are developed to be more compatible with a sustainable model. Investment instruments initially rely on venture philanthropy, ground-making equity, grants and donations and seed funding – to eventually move towards market instruments such as equity, bonds and options and securitised cash flows (Huwler *et al*, 2014).

Conservation impact investments are viable in sectors such as forestry, agriculture and sustainable land-use, carbon offsets, fisheries and marine conservation, aquaculture, wetlands, and freshwater. The forestry and ecosystem services asset class are particularly of interest, as they show a low correlation with the debt and equity markets and responses to macroeconomic conditions –an important consideration in the continuing low-interest rate environment, volatile equity and debt market.

Technological transfer towards greener activities has remained the focus of the private sector, as well as participation in research and development in conjunction with publicly funded research, etc. Most research and development in green technologies is relatively low in Asia Pacific and remains an opportunity for engagement (United Nations, 2012). Capacity building requires bilateral, regional and international cooperation, and should focus policies and programmes to build up required capacities at different levels.

The Athelia Climate Fund is an example of European environmental impact investment fund created in 2011, aiming to finance global sustainable land use and ecosystem service projects in developing countries in Latin America, Africa, and Southeast Asia. Together with Credit Suisse, the Fund created the Nature Conservation Notes, directed at HNWIs and quasi-public institutions that want to invest in conservation projects while receiving target market-rate returns. These investors come mainly from European and Asian countries and were selected by Credit Suisse, being qualified by the bank as wealthy investors. The Fund's projects seek to generate conservation impact, as well as, environmental assets, such as carbon credits and certified commodities, which can be sold at premium prices and, thus, produce financial returns for the investors. Currently, the Althelia Climate Fund has raised over US$105 million and is targeting a total fund size of US$204 million. Its first project started in 2014 in the Taita Hills, in south-eastern Kenya. Income is expected to be generated through REDD+ credits certified by VCS. In Peru, the Nature Conservation Notes have committed US$7 1 million to protect 570,000 hectares of natural forest and 4,000 hectares of degraded land around parks.

Module 4: Systems and tools for effective implementation

There is no easy, one-size fits all solution to implementing CT/PES. Instruments must respond to context, and to the pre-existing institutions, rules and conditions that affect people's behavior. In some situations, it will be impossible to ignore the poverty alleviation agenda: for example, poor people live in targeted ecosystems and could be affected or displaced. This is neither simple nor cheap, and should be actively approached with clear objectives, instruments and ways to monitor and adjust.

In this Section we look at emerging systems and tools to improve the way programmes are implemented, and specially how they can be brought to achieve meaningful scales. Much of the lessons have been provided directly by practitioners engaged in the case studies presented in Module 2, through focus groups, policy workshops and literature review.

Recently published support materials for implementing CT/PES include:

- Engel (2015) "The Devil in the Detail: A practical guide on designing payments for environmental service", with lessons across a wide selection of countries;
- World Agroforestry Center (Namirembe *et al.*, 2017) Co-investment in ecosystem services: Global lessons from payment and incentive schemes".
- FAS (2017) PES guidelines for the Amazon region. PES toolkit: designing innovative schemes for environmental services.
- ICIMOD's guidelines for the Himalaya region "Incentives for Ecosystem Services (IES) in the Himalayas: a 'cookbook' for emerging IES practitioners in the region".

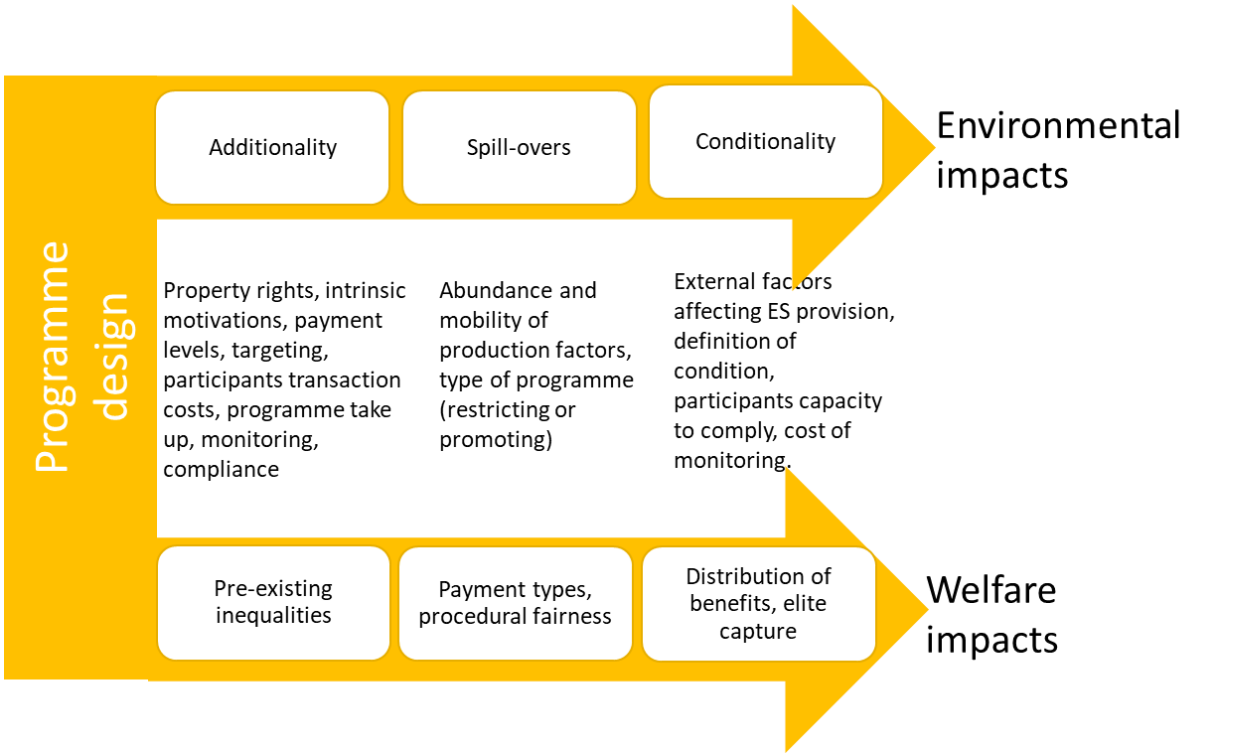
What is effective implementation?

Effectiveness is the change in the provision of services induced by the programme, compared to a counterfactual without CT/PES (Börner *et al*., 2017). Effectiveness in the field is determined by four main factors:

- Programme costs – transaction and implementation costs net of PES transfers – which determine the number of contracts that can be offered for a given programme budget and payment level.
- Direct changes in land/resource use among participants inducted onto the programme, compared to a baseline of `no PES' (additionality).
- Indirect effects (positive or negative) of the programme on land/resource use and environmental service (ES) provision outside of contracted land (spillovers).
- Effects that these changes in land/resource use among participants and non-participants have on the actual provision of environmental services. For example the biophysical link between induced behavioural changes in practices and the targeted ES). Scale is ultimately linked to this, for example looking at the number of project participants within the overall scale of the ecosystem.

Each of these factors is, in turn, shaped by the interplay of features related to the context, design, and implementation of the programme (Figure 8, also see Engel *et al.*, 2015; Persson and Alpizar, 2013). The cost-effectiveness of a small-scale conservation intervention, such as *Watershared* for example, increases if there are only a few, motivated stakeholders, and such actors can play a critical role in monitoring. Most importantly, the geographical proximity of service users and providers can promote strong 'conditionality'. If a landowner removes her trees it will quickly be obvious to their downstream counterparts. Downstream authorities have a clear (and often fiduciary) responsibility to check whether the compensation mechanisms (i.e. the development projects) have been implemented, and if watershed conservation has occurred (Asquith, 2016) and so have a specific direct interest in all parts of the programme's theory of change.

Figure 8. Factors affecting environmental and welfare impacts



Source: authors' own, based on Börner *et al.* (2017) and Engel (2015)

Programme governance and institutional set-up

Programmes need an efficient institutional set-up to operate at large scales, which includes clear operational rules. Channels are required to coordinate across different government sectors, for example between social affairs and environmental departments. The institutional set-up can be a challenge in national programmes. For China's Sloping Lands Conversion Programme, the challenge was to link a focus at scale – targeting 25 provinces that cover about 82 per cent of the country – with an innovative, 'cascading' institutional design (Jin *et al.*, 2017).

Many programmes have designed their activities in line with local needs and capacities, in order to ensure that participants are able to comply with conditions. Small-scale projects like *Watershared*, community carbon models and Bolsa Floresta also often provide technical assistance, which is important to increase local participation and support.

Government-led initiatives rely on more generic models for activities and often struggle to meet local needs. The hybrid CT/PES programme in Bangladesh promoted alternative income generation training, but achieved extremely low enrolment (Islam *et al.*, 2016). Some, especially those with a focus on social protection, often lack the technical capacity to implement environmental activities at ground level.

Payment delay is one of the most common complaints of programme beneficiaries – and this hits the poorest participants hardest. Innovations that lead to faster payments include the use of systems managed by recognised financial institutions, with project managers separated from fund disbursements. In Costa Rica, the PES programme switched from providing cheques to direct deposits. Direct payment to bank accounts has succeeded in Brazil and also in India, where it has reduced leakages and supports financial inclusion (Government of India, 2014). Mohammed and Uraguchi (2018) summarise useful experiences for financial products which can enable poor and disadvantaged women and men to access micro-credit. Experiences like this can help shape the way PES resources are allocated and can have a maximum benefit for poor people.

Security of land tenure is an intrinsic predictor of the capacity of CT managers to enforce conditionality. However, in many parts of the world, land tenure arrangements are often ill-defined. Formal PES schemes, especially government programmes such as those in Costa Rica and Ecuador, require land

title for registration, meaning that the poorest landowners are sometimes unable to participate. Grassroots schemes are more able to manoeuvre around land tenure issues, for example *Watershared* uses locally accepted definitions of who owns and controls, or grants access to, watershed forests (Asquith, 2016). Some schemes, such as the Ugandan and Kenyan carbon projects, are more open to other types of land tenure, for instance customary land and ancestral land rights (Plan Vivo Foundation, 2008). This bespoke approach works well at the local level but struggles to function at larger scales. Public works schemes in India and South Africa bypass the land tenure issue by providing jobs to vulnerable people, irrespective of land ownership.

Another major challenge to programme implementation is the lack of local technical capacity. In the India MGREGNA, low capacity has led to delays in payments and project completion, as well as low quality of work (Shah, 2016). This is due to there being an inadequate number of engineers, while the technical experts deployed are not sufficiently trained. In addition, elite capture has affected planning at the village level. In response to these issues, the government has taken a number of initiatives, for example social audits and training workshops to strengthen technical capacity at the local level.

Implementation costs

Successful programmes are often concerned with reducing implementation (or `transaction') costs. These costs can be linked to technical or governance issues:

- Technical: identifying ecosystem services, targeting eligible land uses/providers, and design of payment type (uniform, differentiated, continuous, one-off, cash, in-kind), which require understanding opportunity costs and asymmetries of information (leading to information rents), designing monitoring strategies and feedback channels, and adjusting strategies. Needs technical and GIS experts.
- Implementation costs: Up-front costs to create mechanisms (setting up institutions, background studies, etc); payments/compensations/rewards to participants; transaction costs for project managers (promotion, administration, supervision, technical support, contracting) and for participants (investments, time, paperwork, technologies); monitoring and evaluation (M&E).
- Governance: property rights regimes, negotiation, solving disputes, legal issues.

Table 6 presents strategies to deal with implementation costs, emerging from the review of ongoing programmes in Module 2.

Table 6. Potential ways to reduce implementation costs

Issue	Strategies
Information asymmetries	Use differentiated payments rather than uniform payments to reduce information rents through: proxies for opportunity costs (biophysical land characteristics, land values when available), screening contracts to understand heterogeneity of participants, procurement auctions.
Permanence	Time-bound payments to adopt new practices show signs of permanence after payments finish in various locations when technical support is provided to facilitate the change (Pagiola *et al.*, 2016; Wells *et al.*, 2017). Payments for strict protection (eg in Costa Rica) are associated with continuous, renewable contracts.
Reducing adverse selection (enrolling those who do not need, and failing to enroll those that do)	Understand the potential for adverse participant selection (which would decrease additionality); payments/reward in line with compliance and/or opportunity costs; understand other limitations (eg access to technical support, credit, cultural attitudes); target payments using combination of proxies for threat, benefit, opportunity costs. Consider the impact of spillovers by looking at impacts on employment opportunities and considering cross-boundary leakage: eg resource-extractive activities.
Increasing compliance	Combinations of satellite monitoring with field visits; IT systems can help substantially reduce transaction costs for monitoring; use self-monitoring with audits; avoid crowding-out: excessive monitoring and sanctioning can reduce motivation for cooperation; promote crowding-in by showing that PES can be supportive, ie securing land rights, etc.
Conditionality	Design conditions based on realistic expectations of outcomes or actions. Focus on actions: easier to design and monitor. Environmental impact depends on models used to design activities. Lack of monitoring and follow-up increases risk of non-delivery of ecosystem services. They are however easier to understand in terms of practical action from ecosystem providers, and easier to follow if participants are able to satisfy conditions (eg access to technical support, financial capacity, ability to ensure investment). Outcome-based: focus on ecosystem services that are often more difficult and expensive to design and implement, but have a higher potential for impacts on the ecosystem services. Relatively easier to use for carbon. High level of uncertainty in water-related services which are affected by global patterns. Outcome-based schemes place risks of investment and non-delivery on service providers.

Targeting

Programmes have different strategies to allocate funds, and various criteria have been used to try to improve effectiveness (Table 7). It is not unusual to see targeting strategies evolving, either to respond to better information or political pressure. In Costa Rica the self-targeting approach of the first stages of the PES programme led to very low additionality. The prohibition to deforest effectively raised the competitiveness of the PES, which was then mostly appropriated by wealthier landowners who had land titles in place and ready access to technical support (Porras *et al.*, 2013b). Most programmes have therefore evolved a different approach. National PES programmes in Mexico and Costa Rica announce geographic (eg biological corridors, type of forest) or social (areas with low social development index) priorities each year. Applications are scored against criteria and those with the highest marks receive payments with additional funds allocated to non-priority areas.

South Africa has developed spatial frameworks for evaluating future investments through the *Land User Incentive (LUI*) programme with a stepwise approach to identification. Checklists are also important tools for targeting and can offer practical guidance in projects such as *Watershared*. In its latest phase (phase IV), the Chinese SLCP is targeting only those who are poor, willing to convert and whose croplands are on a steep slope. Using models as a starting point can be very effective in increasing the efficiency of programmes, and can help identify the best ways to 'bundle' different objectives such as carbon, water and poverty (Wendland *et al.*, 2010) .

Table 7. Examples of targeting criteria

Strategy	Description
Self-targeting/ no targeting	By using low-level payments, the programmes try to target only those with the lowest opportunity costs – in theory the poorest. Some early generation CT programmes, such as *Watershared*, used a 'first-come, first-served' approach, in which the programme publishes requisites, and those who comply can apply. Although easier to manage and politically 'neutral', it can lead to financial resources allocated to areas with low risk of change and result in low additionality.
Economic targeting: benefit/cost targeting	Targeting resources that provide the highest environmental benefits per resource unit. Cost-targeting focuses on those least productive resources. Benefit-maximising targeting looks at those areas that provide the largest environmental benefits for a given budget, which can be identified using models like InVEST, WaterWorld and Co$tingNature. Resources are then distributed through open bidding or auctions. This is most common in developed countries such as the USA but has less traction in developing countries (Wünscher and Wunder, 2017)
Spatial targeting through models	Commonly used in national and subnational programmes such as REDD+ (Lin *et al.*, 2014). Combinations of GIS-based models and multi-criteria decision analysis to identify potential areas of projects with the highest potential for impact ('hotspots'). Often applies a stepwise approach, aiming first for **efficiency** (areas with high forest carbon content, high deforestation risk and low opportunity cost), and then for **co-benefits** (high biodiversity and high poverty rate). While this approach is useful as an initial step for geographic targeting, the heterogeneity of people on site will require further strategies to enable poorer people to participate or risk limiting their participation.
Stepwise approaches	Use some form of the previous strategies, usually: 1) identifying ecological focus areas; 2) different application systems (eg bidding, auctions, fixed payments); 3) identify pre-selected criteria to allocate applications.

Source: Authors' own

Establishing incentive types and levels

Meaningful incentives to change behaviour both cash and in-kind, are at the core of PES and CT programmes (see Table 8 for more detail). The types of incentives vary greatly, from cash payments by direct transfer to individuals to cover their opportunity cost of land conversion (Costa Rica), to delivery of community sanitation projects in Mikoko Pamoja, Kenya. Incentives can be allocated individually or at community level, reflecting the fact that delivering ecosystem services requires group action, and that wellbeing goes beyond individual household income.

A common theme is that, to be effective in promoting changes in behaviour, incentives need to be 'meaningful'. However, what constitutes 'meaningful' varies, and will change over time. For example, incentives provided by the Philippines' Greening the Nation Programme appear sufficient for tree planting, but may be insufficient to ensure tree survival after ten years (Lachica, 2014). The programme is studying the potential to use parallel incentives, such as harvesting rights, interim livelihood support (eg, marketing and product development support, capacity building and organisation development support), and mechanisms for long-term financing, such as PES schemes, as well as addressing tenure issues in community forests.

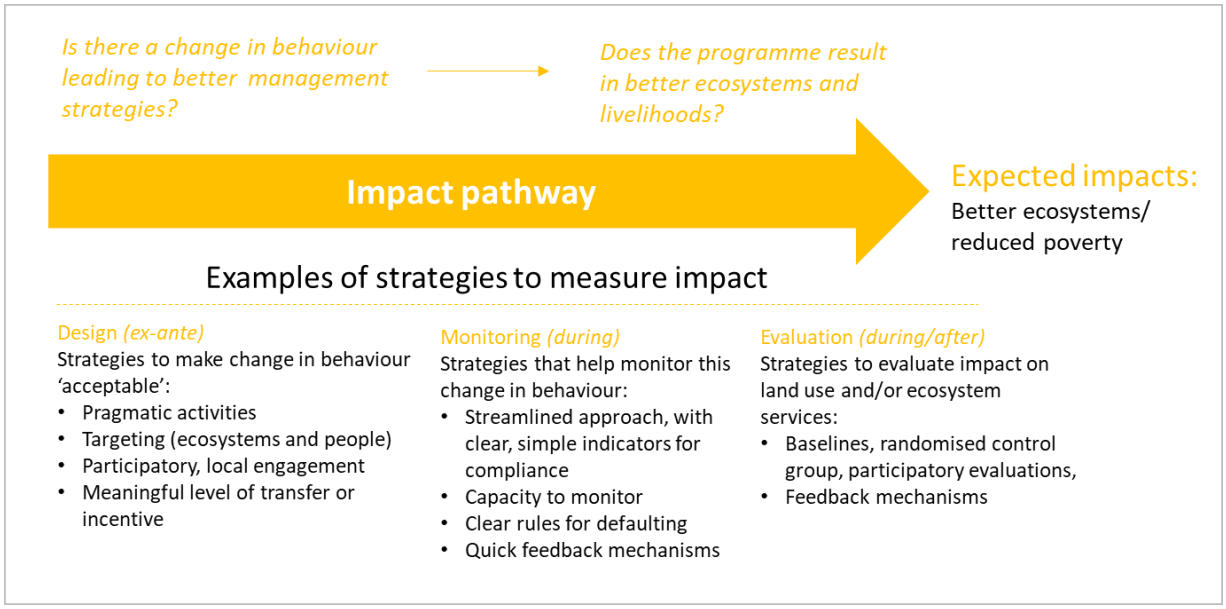
Table 8. Examples of incentives under PES and CT programmes

Incentive	Description
Cash (as PES and as wages from work schemes)	Costa Rica and Mexico national PES make direct cash payments for activities. South Africa makes cash payments in the form of a minimum wage equivalent in proportion to the infrastructure work required to people doing environmental works. Community carbon projects in Uganda and Mexico transfer part of the carbon revenues as individual payments, and a part is kept in a group fund. These payments are often deposited directly into bank accounts.
In-kind	Often used for community projects, where individual payments would be diluted if subdivided. Mikoko Pamoja carbon project in Kenya spends 32 per cent of its revenues to support community projects (chosen by the community); eg water and sanitation projects, improving local education, and restoring mangroves. *Watershared* in-kind 'compensations' – bee hives, barbed wire, and fruit tree seedlings – are seen as tokens of appreciation or a behaviour change 'nudge', rather than economic transactions, and comprise much lower amounts than opportunity cost calculations would predict. In Bangladesh, incentives (40 kg rice/family) are given to hilsa fishing households during ban periods. However, these incentives often do not compensate for the lost protein consumption during the ban, and few fishers engage with support for alternative income-generating activities. There are also concerns regarding equity and political interference in the distribution of compensation, elite capture. and high levels of inclusion and exclusion error (Haldar and Ali, 2014; Matin and Hulme, 2003; Rahman *et al.*, 2012).
Mix	*Bolsa Floresta* uses a mix of incentives that include: • *Bolsa Floresta Renda*: community investments of about US$70k/year/reserve to support income-generating activities in line with the protected area's management plan. Examples include value-adding on-farm processing activities, ecotourism and aquaculture. • *Bolsa Floresta Social*: an additional allocation of about US$30k/year/reserve for improvements in education and community infrastructure. • *Bolsa Floresta Associação*: about US$10k/year supporting associations of reserve dwellers. • *Bolsa Floresta Familiar*: approx. US$90k/year/reserve distributed as monthly cash transfers of an average value of US$170 to the female spouse of the household.

Demonstrating impact

Robust information that clearly demonstrates impact, in terms of healthier ecosystems and less poverty, was a major gap in almost all the programmes we analysed (Figure 9). Few programmes had clear social or environmental baselines. There are few examples of rigorous project evaluations (eg Mexico and Costa Rica), but they tend to be site specific rather than at country level. Because of their long-term implementation, the community carbon programmes in Mexico and Uganda have also been the subject of multiple studies (eg Wells *et al.* (2017). The Bolivian *Watershared* programme has been evaluated through an ESPA-funded randomised control trial (Grillos, 2017; Jack and Recalde, 2015).

Figure 9. Clarity on the impact pathway helps to demonstrate programme impacts



Ex-post payments for work completed, like those in South Africa, increase adherence to conditionality (`wages upon satisfactory work done'). But understanding what constitutes 'satisfactory' for the environment can be a problem when technical capacity on the ground is limited. In Bangladesh, the Department of Fisheries lacks capacity at the sub-district level to implement the Jatka programme: the 'mobile court' used to enforce fishery regulations is hard to coordinate and the Bangladesh Fisheries Research Institute lacks resources to carry out its role as implementation partner.

Political engagement with CT/PES programmes is critical for initiation, and such engagement is usually gained when the programme has a tight link to a poverty reduction agenda. However, such attention can be a problem when it comes to enforcing conditionality. Politicians do not want to see poor people losing programme benefits, even if they have not complied with the programme's environmental goals. Sanctions should be 'stiff' to ensure that programmes have an environmental impact, but it is sometimes not clear how this can be done in a politically acceptable way.

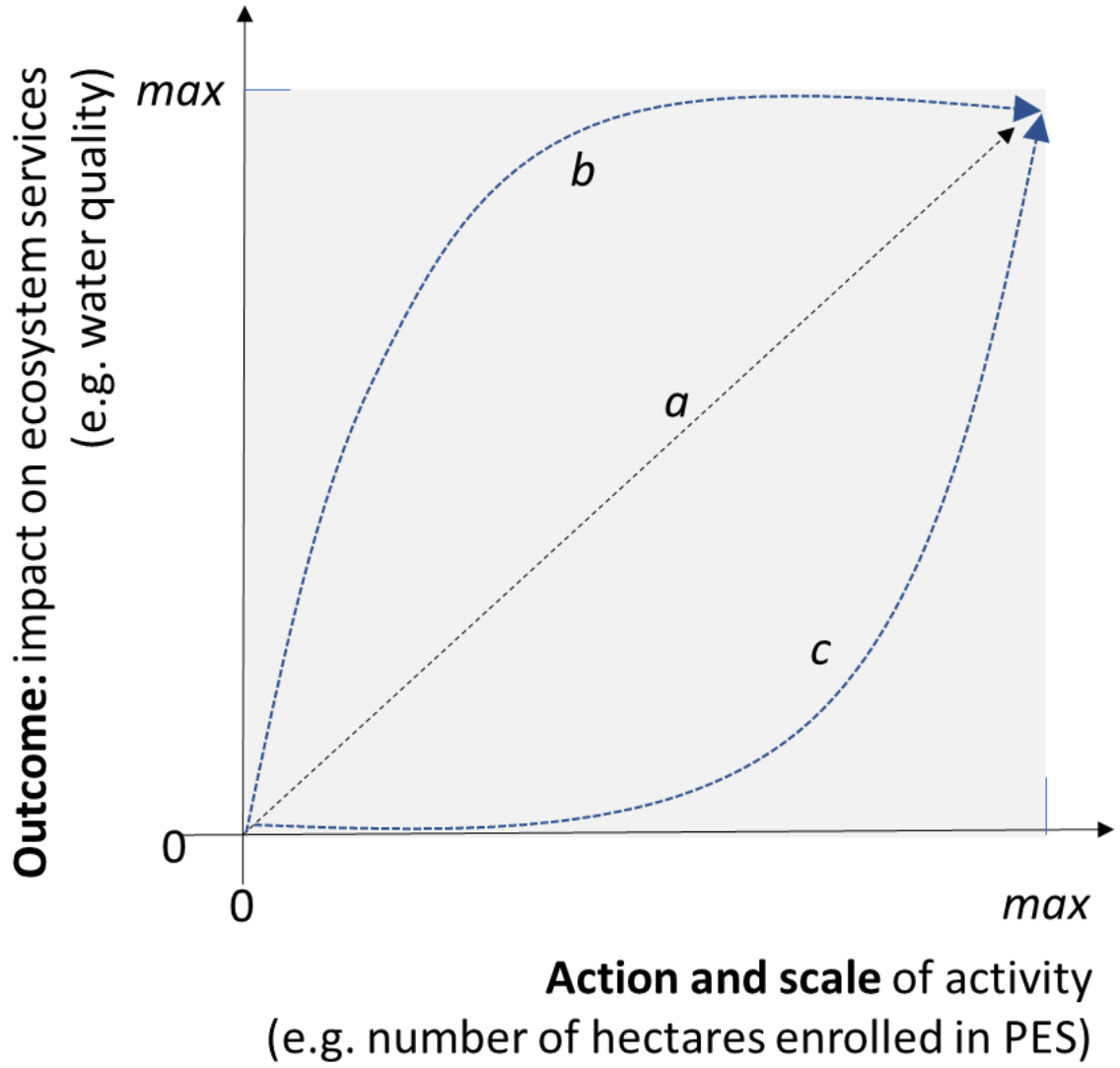
At a smaller scale, monitoring is an important condition for community carbon projects for private offset markets, and the systems must be clearly outlined before the projects are approved and certified. The project developer monitors communities and farmers in visits that often double as capacity building. Third parties conduct independent audits regularly to ensure transparency. While effective monitoring provides important reassurance on the impacts of the projects for offset buyers, these systems can be very expensive and difficult to scale up. A recent study of the Mexican and Ugandan carbon community projects shows how combining models with a limited number of field visits can be important to provide robust carbon estimates, provide reassurance and inclusion to communities, and keep costs down (Wells *et al.*, 2017).

Demonstrating impact can also be difficult when projects remain small due to potential non-linearity in the relationship between actions and outcomes. Pynegar (2018) recently conducted an impact evaluation study of the Watershared programme in Bolivia, as part of his PhD with Bangor University. In his thesis he discusses how non-linearity can affect not only outcomes but the messages emerging from impact evaluation (Figure 10). 'Type a' projects show a linear kind of action-outcome relationship.

'Type b' projects are those where relatively small-scale implementation can quickly impact ecosystem services (or other outcomes of interest), but which then peak and remain at that level irrespective of additional enrolment. This could be for example projects that are very finely-tuned and targeted. 'Type c' projects show slower impact on ecosystem services initially, for example because properties are small and scattered, or not in target areas, but their impact would increase once it reaches the scales (and time) needed, for example through reaching all stakeholders within target areas.

Impact evaluation will show very different results for the three projects. Conducting impact evaluation during the early stages of a Type C project will not only be expensive but could potentially show negative or insignificant results, which could be harmful if misinterpreted. It is important to be aware of the different kinds of action-outcome relationship when designing projects and evaluating impacts. Academic institutions are important partners in advancing tools for the design of CT/PES programmes and in identifying indicators and methodologies for tracking impacts.

Figure 10. Conceptual framework of conservation actions-expected outcomes in CT/PES



Source: based on Pynegar (2018)

Conclusions

There is significant potential for cross learning from social and environment CTs. Moreover, this can be a valid argument to promote greater integration across traditionally separate government departments (social and environment). New tools developed by academic research can help policy makers improve the efficiency and effectiveness of these programmes, as well as provide strategies to deal with the inevitable trade-offs that will emerge.

International support has often been catalytic in the emergence of local projects, supporting studies that provide the evidence of pathways of impact, and supporting dialogue inside countries, South-South collaborative learning, and technological transfer for improved programme design, monitoring and evaluation. There is high potential for mutual benefit from CT/PES programmes and the academic sector, with universities and research organisations providing support for technological transfer and impact evaluation, while project provide the learning hubs for practical teaching.

Several points emerge from the case studies and the potential of linking environmental and social objectives, and how to bring these to larger scales.

Emerging lessons from ongoing programmes

Module 2 looked at types of conditional transfers: a) programmes that seek to change behaviour using incentives like PES in Mexico and eco-compensations in China, and b) programmes that implement direct interventions to improve or restore ecosystems by employing poor and vulnerable people –as in South Africa and India.

Direct interventions can be effective in reaching poor people, for example through jobs for landless and vulnerable people, and by providing discrete environmental 'fixes'. However, they are often less effective in the quality of the environmental intervention or regarding long-term environmental management. Incentives such as PES, on the other hand, try to change the long-term behaviour but can be less effective in the short-term, and often struggle to include the very poor and/or landless.

While the interventions described have distinct characteristics with respect to their scope and design features, they provide some emerging lessons on opportunities and challenges across the group (Table 9).

Table 9. Main lessons from ongoing CT/PES programmes

Opportunities	Challenges
Encouraging evidence on positive social and ecological impacts in all cases	Most of the schemes suffer from targeting errors which can broadly be defined as inclusion and exclusion errors; and subsequently elite capture
Use of information, communication and technologies (ICTs) to reduce cost of monitoring and evaluation	A divergence between preferred and actual compensation packages undermines effectiveness
Private sector engagement to ensure financial sustainability	Rampant freeriding and limited capacities for effective policing and compliance.
Observed behavioural change and enhanced resilience	Lack of clear exit strategy or ability to graduate from the programmes.

Combining social and environmental objectives

It is widely recognised that PES and CT programmes often (if not always) focus on ecological or social outcomes respectively.

Cross-learning from CTs and PES

CTs and PES have the same starting point: the assumption that direct, conditional incentives are the most effective way to change behaviour.

However, although many PES schemes have rural development as an objective, they have struggled to implement mechanisms to engage the poor and alleviate poverty. In contrast, CTs have made great strides in promoting social protection and income stability, but their environmental impact has been limited. Table 10 highlights the differences between CTs and PES, but also suggests that there is significant scope for developing hybrid programmes that take advantage of model complementarities. Indeed, such hybrids are already being tested in the Bolsa Floresta, *Watershared* and Jatka conservation programmes.

Table 10. Differences between conditional transfers and PES

Conditional Social Transfers tend to:	**PES tend to:**
Have a clear social objective and are able to focus on the poor and ultra-poor	Have rural development as a secondary objective, but often as an afterthought
Support direct, one-off interventions with short-term impacts, which may not change long-term behaviour	Provide continuous low-level support that can change social norms and behaviour over the long term
Provide tangible benefits to the ultra-poor, including people without land	Support landowners and land managers, and so cannot effectively alleviate extreme poverty
Undertake environmental projects at large scale, but struggle to do so efficiently.	Have environmental objectives as their primary goal

Fulfilling commitments like the NDCs, Sustainable Development Goals and the Aichi Targets will require a combination of the environmental protection and poverty alleviation agendas. There is a need to develop PES programmes that learn from the social protection programmes with environmental components, such as South Africa's Expanded Public Works Programme. For example, public funding might provide short-term investments, for example watershed works, removing invasive species, or supporting changes to cleaner technologies, while revenues from PES from earmarked taxes could encourage the long-term change in behaviour to prevent future ecosystem degradation.

PES practitioners need to recognise that focusing on poverty alleviation can catalyse important political support and new budget lines. However, the potential challenges of such an approach, such as high transaction costs and the risk of targeting sites with low environmental value, must be built into programmes to both protect the environment and enable transformative and sustainable livelihood improvements. An acknowledgement of the benefits and the trade-offs is a first step towards designing response actions. Some of the pros and cons of designing hybrid social and environmental programmes are presented in Table 11:

Table 11. Combining social and ecological objectives: advantages and disadvantages

Advantages of combining environmental and social objectives	**Disadvantages of combining environmental and social objectives**
Poverty and environment are strongly interlinked. Poor communities are disproportionately more reliant on ecosystem services	Poor communities are not necessarily located where there are critical environmental issues (or vice versa).
Social protection programmes have more political buy in (relative to PES)	Adding ecological component could potentially lead to rent-seeking behaviours or "green-grabs" in the name of conservation to the exclusion of local communities.
Adding ecological component to existing social programmes could mean more cost-effectiveness and efficiency in achieving both ecological and social outcomes.	Adding ecological component to CSTs will certainly involve some trade off – which could be resented by the target population and endanger the legitimacy of the scheme.

Sustainable financing from multiple sources

The principles of externalities from PES can provide new forms of financing by unlocking revenues from ecosystem services – for example carbon taxes, water repricing.

Political support is important, but ultimately sustainable finance will determine whether a programme emerges and reaches sufficient scale. Making financing sustainable is critical if projects are to take the step from a one-off, usually donor-funded pilot, to a programme with financial stability that allows for replication and scaling-up. Grants and other forms of donor funding have helped to kick-start projects like *Watershared*, and to partially cover entry costs to international carbon markets (technical studies, registration fees, etc.). But it is important to have a clear strategy to generate ongoing revenues. Local governments and water users in Bolivia now provide 80 per cent of *Watershared* payments (Asquith, 2016), and sales from carbon offsets generate important revenues in our Mexico, Uganda and Kenya cases.

For national programmes, pegging contributions to tax allocations can be a softer (and often more politically viable) form of earmarking. For example, in Costa Rica and Mexico, allocations are roughly linked to fuel and water tax collection and are written into national law. Large countries like China, Mexico, India and Brazil use match contributions from national government with those from provincial/local budgets. This can help leverage funding from the private sector – almost 80 per cent of Bolsa Floresta in Brazil is funded from private sources, including Coca-Cola, Samsung, Abril Media Group and Marriott International, through a REDD+ project selling carbon credits on the voluntary market (Viana, *et al.*, 2014). Costa Rica has also successfully combined revenues from taxes, voluntary contributions and donor funding.

Experience shows it is possible to choose or develop pro-poor financial instruments for ecosystem management, but this needs to be done carefully and with adequate resources. The link to social protection can significantly increase the resources available for environmental management, as is the case in South Africa's Working for Water programme.

Useful innovations to manage these financial flows include developing secure finance management systems, such as independent trust funds, and diversifying the portfolio of economic instruments for capitalisation. Programmes like MGNREGA and Bolsa Floresta in Brazil work as catalysers of large integration of the financial sector and the poorer parts of society.

Policy enablers for scaling up CT/PES

Successful CT/PES schemes exhibit a series of enabling conditions: high level political support, sustainable financing streams, lean institutional set ups, tools and systems for effective implementation and a clear ability to demonstrate impact. Cross learning from our cases has proved to be an effective way to build capacity, and to improve CT/PES programmes from the ground up. Capacity building, bringing in scientific advances in modelling, monitoring, and understanding behaviour should include mid-level technical government staff and not only universities. Research into the gaps and potential of including poor and vulnerable people into environmental policy needs to reach a wider audience that includes not just Environmental Ministries and conservation professionals, but also mainstreaming into the agendas of Ministries of Finance, Ministries of Employment and the private sector.

New advances from academic research can help understand these trade-offs, as well as design informed policy responses (see for example Mace *et al.* 2018, which summarises eight years of research on ecosystems and poverty alleviation).

Glossary of terms

Additionality	In the context of carbon offsets, a project activity is 'additional' if anthropogenic greenhouse gas (GHG) emissions are lower than those that would have occurred in the absence of the project activity. In the context of other ecosystem services, additionality refers to incremental services being delivered by the project.
Carbon dioxide equivalent (CO_2e)	The universal unit of measurement used to indicate the global warming potential of each of the six GHGs regulated under the Kyoto Protocol. Carbon dioxide – a naturally occurring gas that is a by-product of burning fossil fuels and biomass, land-use changes and other industrial processes – is the reference gas against which the other GHGs are measured, using their global-warming potential (Kossoy *et al*. 2014).
Certification	Certification is a market-based mechanism, guaranteed by a third party, designed to encourage environmentally sustainable and socially responsible practices. Certification can also offer 'chain of custody' information.
Clean Development Mechanism (CDM)	This is a mechanism provided by Article 12 of the Kyoto Protocol, designed to assist developing countries in achieving sustainable development by allowing entities from Annex 1 Parties to participate in low-carbon projects and obtain CERs in return (Kossoy *et al*. 2014).
Co-benefits	In carbon projects, this refers to well-managed and sustainable projects associated with a variety of benefits beyond reduction of GHG emissions, such as increased local employment and income generation, protection of biodiversity and conservation of watersheds.
Certified Emission Reduction (CER)	A unit of GHG-emission reductions issued pursuant to the Clean Development Mechanism of the Kyoto Protocol and measured in metric tons (tonnes) of carbon dioxide equivalent (tCO_2e). One CER represents a reduction in GHG emissions of one metric ton of carbon dioxide equivalent (Kossoy *et al*. 2014).
Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).	An instrument proposed by the International Civil Aviation Organisation (ICAO) to help airlines reduce their emissions to meet an industry-wide target. It is not clear yet which standards or project types will be allowed in this new market (Hamrick and Gallant, 2017b)
Ecosystem services/environmental services	Ecosystems services are the benefits that people obtain from ecosystems, and include provisioning services (such as food or timber); regulating services (such as climate regulation, flood management, water purification and disease control); cultural services (eg recreation or spiritual); and supporting services that contribute to soil productivity through nutrient cycling, soil formation and primary production (MEA, 2005).
Ex-ante offsets	Ex-ante offsets are determined by the future carbon fixation of an activity (often forest based). Accredited projects are then able to sell credits on the agreement of future activities within a set timeframe.
Greenhouse gas (GHG)	Both natural and anthropogenic, GHGs trap heat in the Earth's atmosphere, causing the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary GHGs. The emission of GHG through human activities (such as fossil-fuel combustion or deforestation) and their accumulation in the atmosphere is responsible for an additional forcing, contributing to climate change (Kossoy *et al*. 2014).

Inclusive business models	A profitable core business activity that also tangibly expands opportunities for the poor and disadvantaged in developing countries. They engage the poor as employees, suppliers, distributors or consumers and expand their economic opportunities in a wide variety of ways (BIF 2011).
Inclusive trading relationships	Inclusive trading relationships are the result of business models that do not leave behind smallholder farmers and in which the voices and needs of those actors in rural areas in developing countries are recognised.
Intermediary	An intermediary is a mediator or negotiator who acts as a link between different parties, usually providing some added value to a transaction that may not be achieved through direct trading.
IPCC (Intergovernmental Panel on Climate Change)	The IPCC is the international body for assessing the science related to climate change. It was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation. See: www.ipcc.ch
Offset	An offset designates the emission reductions from project-based activities that can be used to meet compliance or corporate citizenship objectives vis-à-vis GHG mitigation (Kossoy *et al*. 2014).
Outgrower schemes	Partnerships between growers or landholders and a company for the production of commercial (usually forest or agricultural) products. The extent to which inputs, costs, risks and benefits are shared between growers/landholders and companies varies, as does the duration of the partnership. Growers may act individually or as a group in partnership with a company, and use private or communal land.
Paris Climate Agreement and negotiations	An agreement within the UNFCCC that begins to set up plans for greenhouse gas emissions mitigation, adaptation and finance, starting in 2020. Under the agreement, each country determines, plans and regularly report on their own contributions (*Nationally Determined Contributions).* (Abeysinghe and Prolo, 2016; Sharma *et al.*, 2016)
Payments for ecosystems services (PES)	In this paper we understand PES as follows, based on Porras *et al*. (2008) and Ferraro (2009): An instrument that addresses an environmental externality through variable payments made in cash or kind, with a land user, provider or seller of environmental services responding to an offer of payment by a private company, non-governmental organisation (NGO) or local or central government agency. A user of ecosystems services, who is distinguishable from the seller, makes payments to enhance or protect these services through pre-agreed activities (including sustainable land management and energy-based activities like cooking stoves or biodigesters). The ecosystems service provider enters into the transaction voluntarily. Payment is conditional upon previously agreed activities (eg land use, biodigesters) that are expected to provide the service in question. They can be in cash or in-kind (or a mix of both), continuous or one-off, depending on each individual arrangement. PES is anchored in the use of payments to correct an economic externality (Coase, 1960; Pigou, 1920). Coase argues that socially sub-optimal situations, in this case poor provision of ecological services, can be corrected through voluntary market-like transactions provided transaction costs are low and property rights are clearly defined and enforced

	(Pattanayak *et al.*, 2010).
Poverty	While there can be many definitions of poverty, we understand it as the lack of, or inability to achieve, a socially acceptable standard of living, or the possession of insufficient resources to meet basic needs. Multi dimensions of poverty imply going beyond the economic components to wider contributory elements of well-being. Poverty dynamics are the factors that affect whether people move out of poverty, stay poor or become poor (Suich, 2012).
REDD+	All activities that reduce emissions from deforestation and forest degradation and contribute to conservation, sustainable management of forests, and enhancement of forest carbon stocks.
Small producers/small farms	Although no common definition exists we follow Nagayets' (2005) approach, defining small farms on the basis of the size of landholding. This has limitations as it does not reflect efficiency. Size is also relative. Individual agricultural plots of <2 hectares are common in Africa and Asia but are generally larger in Latin America. Community forest land can include considerably larger patches.
Supply chain	'Formal' = 'modern' = 'coordinated' supply chains: coordinated supply chains are durable arrangements between producers, traders, processors and buyers about what and how much to produce, time of delivery, quality and safety conditions, and price. They often involve exchanges of information, and sometimes also help with technology and finance. They are usually initiated by investments of private traders and food companies, who act as chain leaders. They have characteristics of partnerships and joint interest (van der Meer 2006).
Transaction costs	Pagiola and Bosquet (2009) define transaction costs in reducing emissions from deforestation and forest degradation (REDD+)/PES as those necessary for the parties to reach an agreement that results in the reduction of emissions. The costs are associated with identification of the programme, creating enabling conditions for reducing emissions, and monitoring, verifying and certifying emissions reductions. Costs fall on different actors, including buyers and sellers (or donors and recipients), market regulators or institutions responsible for administration of the payment systems, project implementers, verifiers, certifiers, lawyers and other parties. The costs can be monetary and non-monetary, ex-ante (initial costs of achieving an agreement) and ex-post (implementing an agreement once it is in place).
Validation and verification	Validation is the process of independent evaluation of a project activity by a designated operational entity (DOE) against the requirements of the CDM. Verification is the review and ex-post determination by an independent third party of the monitored reductions in emissions generated by a registered project approved under CDM or another standard during the verification period (Kossoy *et al*., 2014).
Verified Emission Reduction (VER)	A unit of GHG emission reductions that has been verified by an independent auditor. Most often, this designates emission reductions units that are traded on the voluntary market (Kossoy *et al*., 2014).
Voluntary carbon market	The voluntary carbon market caters to the needs of those entities that voluntarily decide to reduce their carbon footprint using offsets. The regulatory vacuum in some countries and the anticipation of imminent legislation on GHG emissions also motivates some pre-compliance activity (Kossoy *et al*., 2014).

References

Abdoulayi, S, Angeles, G, Barrington, C, Brugh, K, Handa, S, Kilburn, K, Otchere, F, Zietz, S, Tsoka, M, Mvula, P, de Hoop, J, Palermo, T and Peterman, A (2017) Evaluating the effectiveness of an unconditional social cash transfer programme for the ultra poor in Malawi Grantee Final Report 3ie: International Initiative for Impact Evaluation, New Delhi.

Abeysinghe, A and Prolo, C (2016) Entry into force of the Paris Agreement. The legal process, *Issue Paper*, March 2016. International Institute for Environment and Development, London.

Aemi, P, Neves, B and Jost, S (2013) Forest Conservation in Mexico: Ten years of Payments for Ecosystem Services, Case studies on Remuneration of Positive Externalities (RPE)/ Payments for Environmental Services (PES). FAO, Rome.

Ahmed, AU, Quisumbing, AR, Nasreen, M, Hoddinott, JF and Bryan, E (2009) Comparing food and cash transfers to the ultra poor in Bangladesh, Research Monograph 163. International Food Policy Research Institute, Washington, DC.

Alatorre-Troncoso, A (2014) Mexico's national payments for ecosystem services programme: in the wrong place at the right time: Gap analysis and assessment of conservation success. Imperial College London.

Alix-Garcia, J, Aronson, G, Radeloff, V, Ramirez-Reyes, C, Shapiro, E, Sims, K and Yañez-Pagans, P (2014) Environmental and Socioeconomic Impacts of Mexico's Payments for Ecosystem Services Program, Grantee Final Report. International Initiative for Impact Evaluation (3ie), New Delhi.

Alix-Garcia, JM, Sims, KRE and Yañez-Pagansa, P (2013) Only One Tree From Each Seed? Environmental Effectiveness and Poverty Alleviation in Programs of Payments for Ecosystem Services, RFF Academic Seminar Resources for the Future, Washington DC.

Asquith, N (2016) Watershared: Adaptation, mitigation, watershed protection and economic development in Latin America, Inside Stories on climate compatible development. Climate and Development Knowledge Network (CDKN).

Asquith, N, Vargas, MT and Wunder, S (2008) Selling two environmental services: In-kind payments for bird habitat and watershed protection in Los Negros, Bolivia Ecological Economics 65, 675-684.

Asquith, N and Wunder, S (2008) Payments for watershed services: the Bellagio Conversations. IIED, Blue Moon Fund, CGIAR, DFID, EcoFund Foundation.

Asquith, NM (2011) Reciprocal Agreements for Water: An Environmental Management Revolution in the Santa Cruz Valleys. Harvard Review of Latin America 3: 58-60.

Barton, D, Harrison, P, Sander, J, Kelemen, E and Martin López, B (2017a) Integrated assessment and valuation of ecosystem services. Guidelines and experiences, OpenNess: operationalisation of natural capital and ecosystem services.

Barton, DN, Benavides, K, Chacon-Cascante, A, Le Coq, J-F, Quiros, MM, Porras, I, Primmer, E and Ring, I (2017b) Payments for Ecosystem Services as a Policy Mix: Demonstrating the institutional analysis and development framework on conservation policy instruments. *Environmental Policy and Governance* 27, 404-421.

Barton, DN, Primmer, E, Ring, I, Adamowicz, V, Robalindo, J, Blumentrath, S and Rusch, G (2011) Empirical analysis of policy mixes in biodiversity conservation – spatially explicit 'policyscape' approaches., 9th International Conference of the European Society for Ecological Economics, Istanbul.

Bhatta, L, Khadgi, A, Rai, R, Tamang, B, Timalsina, K and Wahid, S (2017) Designing community-based payment scheme for ecosystem services: a case from Koshi Hills. Environment, Development and Sustainability. Nepal.

Bhatta, L and Kotru, R (2012) Paper 10: Learning perspectives and analytical framework for framing PES in Nepal. In: Acharya, K et al. (eds). Leveraging and landscapes; conservation beyond boundaries. Nepal Foresters Association, Kathmandu.

Bertke, E and Marggraf, R (2005) An incentive-based tool for ecologically and economically efficient provision of agrobiodiversity. Department of Agricultural Economics, Environmental and Resource Economics, University of Göttingen, Germany.

Börner, J, Wunder, S, Reimer, F, Bakkegaard, RK, Viana, V, Tezza, J, Pinto, T, Lima, L, and Marostica, S (2013) Promoting Forest Stewardship in the Bolsa Floresta Programme: Local Livelihood Strategies and Preliminary Impacts. CIFOR, Rio de Janeiro.

Börner, J, Baylis, K, Corbera, E, Ezzine-de-Blas, D, Honey-Rosés, J, Persson, UM and Wunder, S (2017) The effectiveness of payments for environmental services. *World Development* 96, 359-374.

Brett, C., Keen, M., 2000. Political uncertainty and the earmarking of environmental taxes. Journal of Public Economics 75, 315-340.

Brown, K, Adger, NW, Boyd, E, Corbera-Elizalde, E and Shackley, S (2004) How do CDM projects contribute to sustainable development? Technical Report. Tyndall Centre for Climate Change Research.

Carrington, D., 2018. Debt for dolphins: Seychelles creates huge marine parks in world-first finance schemeskyp, Environment. The Guardian, London.

Cavelier, J and Gray, IM (2014) GEF investments on payments for ecosystem services schemes. Global Environmental Facility.

Clootens, N., 2017. Public Debt, Life Expectancy, and the Environment. Environmental Modeling & Assessment 22, 267-278.

Coase, RH (1960) The Problem of Social Cost. *Journal of Law and Economics 3*, 1-44.

Cohen, F, Hamilton, K, Hepburn, C, Sperling, F and Teytelboym, A (2017) The wealth of nature: increasing national wealth and reducing risk by measuring and managing natural capital. Green Economy Coalition; Institute for New Economic Thinking, Smith School of Enterprise and the Environment.

Corbera, E, Estrada, M, May, P, Navarro, G and Pacheco, P (2011) Rights to land, forests and carbon in REDD+: Insights from Mexico, Brazil and Costa Rica. *Forests 2*, 301.

Credit Suisse, WWF and McKinsey (2014) Conservation Finance: Moving beyond donor funding toward an investor-driven approach. Credit Suisse AG, WWF, McKinsey & Company.

Devereux, S (2009) Social Protection Instruments: What's on the menu? In: IDS (*ed*.), UNICEF Social Protection Training Course, Brighton, UK.

DG TAXUD (2015) Tax Reforms in EU Member States 2015- Tax Policy Challenges for Economic Growth and Fiscal Sustainability, *European Economy Institutional Paper* 008.

Díaz, S, Demissew, S, Carabias, J, Joly, C, Lonsdale, M, Ash, N, Larigauderie, A, Adhikari, J.Ram; Arico, S, Báldi, A, Bartuska, A, Baste, IA, Bilgin, A, Brondizio, E, Chan, KMA, Figueroa, VE, Duraiappah, A, Fischer, M, Hill, R, Koetz, T, Leadley, P, Lyver, P, Mace, GM, Martin-Lopez, B, Okumura, M, Pacheco, D, Pascual, U, Pérez, ES, Reyers, B, Roth, E, Saito, O, Scholes, RJ, Sharma, N, Tallis, H, Thaman, R, Watson, R, Yahara, T, Hamid, ZA, Akosim, C, Al-Hafedh, Y, Allahverdiyev, R, Amankwah, E, Asah, S.T, Asfaw, Z, Bartus, G, Brooks, A, Caillaux, J, Dalle, G, Darnaedi, D, Driver, A, Erpul, G, Escobar-Eyzaguirre, P, Failler, P, Fouda, A.Moustafa M, Fu, B, Gundimeda, H, Hashimoto, S, Homer, F, Lavorel, S, Lichtenstein, G, Mala, WA, Mandivenyi, W, Matczak, P, Mbizvo, C, Mehrdadi, M, Metzger, JP, Mikissa, JB, Moller, H, Mooney, HA, Mumby, P, Nagendra, H, Nesshover, C, Oteng-Yeboah, AA, Pataki, G, Roué, M, Rubis, J, Schultz, M, Smith, P, Sumaila, R, Takeuchi, K, Thomas, S, Verma, M, Yeo-Chang, Y and Zlatanova, D (2015) The IPBES Conceptual Framework — connecting nature and people. *Current Opinion in Environmental Sustainability* 14, 1-16.

DoF (2012) National Fisheries Week 2012. Department of Fisheries, Government of Bangladesh, Dhaka.

Engel, S (2015) The Devil in the Detail: A practical guide on designing payments for environmental services. *International Review of Environmental and Resource Economics* 9, 131-177.

Engel, S., Pagiola, S., Wunder, S., 2008. Designing payments for environmental services in theory and practice: An overview of the issues. Ecological Economics 65, 663-674.

Farley, J and Costanza, R (2010) Payments for ecosystem services: From local to global. *Ecological Economics 69*, 2060-2068.

FAS (2017) Designing innovative schemes for payments for environmental services.

Fisher, JA (2013) Justice implications of conditionality in payments for ecosystem services: a case study from Uganda, in: Sikor, T. (*ed.*), The Justices and Injustices of Ecosystem Services. Routledge, Abingdon, Oxon, pp. 21-45.

Fisher, JA, Patenaude, G, Giri, K, Lewis, K, Meir, P, Pinho, P, Rounsevell, MDA and Williams, M (2014) Understanding the relationships between ecosystem services and poverty alleviation: A conceptual framework. *Ecosystem Services 7*, 34-45.

Fiszbein, A, Schady, N, Ferreira, F, Grosh, M, Keleher, N, Olinto, P and Skoufias, E (2009) Conditional cash transfers: reducing present and future poverty, *A World Bank Policy Research Report*.

Fodha, M., Seegmuller, T., 2014. Environmental Quality, Public Debt and Economic Development. Environmental and Resource Economics 57, 487-504.
Forbes, A, Iyer, D and Steele, P (2015) Mainstreaming Environment and Climate for Poverty Reduction and Sustainable Development: A Handbook to Strengthen Planning and Budgeting Processes. UNDP-UNEP Poverty-Environment Initiative, Nairobi, Kenya.
Frost, P.G.H., Bond, I., 2008. The CAMPFIRE programme in Zimbabwe: Payments for wildlife services. Ecological Economics 65, 776-787.
Gómez-Baggethun, E., Gren, Å., Barton, D.N., Langemeyer, J., McPhearson, T., O'Farrell, P., Andersson, E., Hamstead, Z., Kremer, P., 2013. Urban Ecosystem Services, in: Elmqvist, T., et al. (Eds.), Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities: A Global Assessment. Springer Netherlands, Dordrecht, pp. 175-251.
Government of Costa Rica (2015) Costa Rica's National Declared Contributions Plan, in: Energy, M.o.E.a. (*ed.*), INDCs as communicated by Parties. UNFCCC.
Government of India (2014) Report to the people: Mahatma Gandhi National Rural Employment Guarantee Act, 2005. Ministry of Rural Development, Department of Rural Development, New Delhi.
Government of India (2015) India's National Declared Contributions Plan: working towards climate justice, INDCs as communicated by Parties. UNFCCC.
Grieg-Gran, M, Porras, I and Wunder, S (2005) How can market mechanisms for forest environmental services help the poor? Preliminary lessons from Latin America. *World Development 33*, 1511-1527.
Grillos, T (2017) Economic vs non-material incentives for participation in an in-kind payments for ecosystem services program in Bolivia. *Ecological Economics 131*, 178-190.
Haldar, GC and Ali, L (2014) The cost of compensation: Transaction and administration costs of hilsa fish management in Bangladesh. *IIED Working Paper*. IIED, London.
Hamrick, K and Gallant, M (2017a) Fertile Ground: State of Forest Carbon Finance 2017. *Forest Trends*.
Hamrick, K and Gallant, M (2017b) Unlocking Potential: State of the Voluntary Carbon Markets 2017. Forest Trends, Ecosystem Marketplace, Washington DC.
Hejnowicz, AP, Raffaelli, DG, Rudd, MA and White, PCL (2014) Evaluating the outcomes of payments for ecosystem services programmes using a capital asset framework. *Ecosystem Services 9,* 83-97.
Huwyler, F., Käppeli, J., Serafimova, K., Swanson, E., Tobin, J., 2014. Conservation Finance: Moving beyond donor funding toward an investor-driven approach. Credit Suisse, WWF, McKinsey&Company.
Hogg, D, Elliott, T, Elliott, L, Ettlinger, S, Chowdhury, T, Bapasola, A, Norstein, H, Emery, L, Andersen, MS, Brink, Pt, Withana, S, Schweitzer, J-P, Illes, A, Paquel, K, Mutafoglu, K, Woollard, J, Ventosa, IP, Sastre, S and Campos, L (2016) Study on assessing the environmental fiscal reform potential for the EU28. European Commission; Eunomia; Institute for European Environmental Policy; Denkstatt; Ent; Aarhus University.
International Bank for Reconstruction and Development and World Bank (2014) Climate change, public expenditure and institutional review sourcebook. World Bank Group, Washington D.C.
Islam, MM, Mohammed, EY and Ali, L (2016) Economic incentives for sustainable hilsa fishing in Bangladesh: An analysis of the legal and institutional framework. *Marine Policy 68*, 8-22.
Jack, BK and Recalde, MP (2015) Leadership and the voluntary provision of public goods: Field evidence from Bolivia. *Journal of Public Economics* 122, 80-93.
Jin, L, Porras, I, Lopez, A and Kazis, P (2017). Sloping Lands Conversion Programme, People's Republic of China. In: Porras, I., Mohammed, E., Steele, P. (*eds*), Conditional transfers, poverty and ecosystems: National Programmes Highlights. IIED, London.
Kakwani, N, Veras Soares, F and Son, HH (2005) Conditional cash transfers in African countries, Working Paper. United Nations Development Programme, International Poverty Centre, Brazil.
Kallbekken, S., Aasen, M., 2010. The demand for earmarking: Results from a focus group study. Ecological Economics 69, 2183-2190.
Kaur, N, Steele, P and Barnwal, A (2017) The Mahatma Gandhi Rural Employment Guarantee Act (MGREGA), India -Country study summary. In: Porras, I, Mohammed, E, Steele, P (*eds*). Conditional transfers, poverty and ecosystems: National Programmes Highlights series. IIED, London.

Koohi-Kamali, F (2010) Public works and social protection, European report on development. European University Institute.
Kosoy, N and Corbera, E (2010) Payments for ecosystem services as commodity fetishism. *Ecological Economics* 69, 9.
Kossoy, A., Oppermann, K., Platanova-Oquab, A., Suphachalasai, S., 2014. State and trends of carbon pricing. World Bank Group, Climate Change, Washington DC.
Kreiser, L, Sirisom, J, Ashiabor, H and Milne, J (2011) Environmental Taxation in China and Asia-Pacific: Achieving Environmental Sustainability through Fiscal Policy, *Critical Issues in Environmental Taxation* Series.
Lachica, A (2014) Philippines: degraded forest rehabilitation and sustainable forest management in The Philippines. Workshop on Degraded Forest Rehabilitation and Sustainable Forest Management. DENR – Forest Management Bureau, Kunming China.
Landell-Mills, N and Porras, I (2002) Silver bullet or fools' gold: A global review of markets for forest environmental services and their impacts on the poor. IIED, London.
Lin, L, Sills, E and Cheshire, H (2014) Targeting areas for Reducing Emissions from Deforestation and forest Degradation (REDD+) projects in Tanzania. *Global Environmental Change* 24, 277-286.
Liu, Z and Lan, J (2015) The Sloping Land Conversion Program in China: Effect on the Livelihood Diversification of Rural Households. *World Development* 70, 147-161.
Ma, Z, Bauchet, J, Steele, D, Godoy, R, Radel, C and Zanotti, L (2017) Comparison of Direct Transfers for Human Capital Development and Environmental Conservation. *World Development* 99, 498-517.
Mace, G, Schreckenberg, K and Poudyal, M (2018) Ecosystem Services and Poverty Alleviation: Trade-offs and Governance. Routledge, London.
Marshall, F., 2017. Why peri-urban ecosystem services matter for urban policy, ESPA: ecosystem services for poverty alleviation briefing. University of Sussex, Sussex, UK.
Marsiliani, L., Renstrom, T.I., 2000. Time Inconsistency in Environmental Policy: Tax Earmarking as a Commitment Solution. The Economic Journal 110, 123-138.
Matin, I (2000) Targeted development programmes for the extreme poor : experiences from BRAC experiments, *CPRC Working Paper No. 20*. Chronic Poverty and Development Policy. Imran Matin Research and Evaluation Division , Bangladesh Rural Advancement Committee (BRAC).
Matin, I and Hulme, D (2003) Programs for the Poorest: Learning from the IGVGD Program in Bangladesh. *World Development* 31, 647-665.
McCord, A (2013) Public Works and Social Protection in sub-Saharan Africa. Do public works work for the poor? ODI, London.
MEA (2005) Ecosystems and human well-being: biodiversity synthesis, Washington D.C.
Menton, M and Bennet, A (2018) Payments for Ecosystem Services in Principle: 'true-PES' unicorns, 'PES-like' umbrellas and the call for locally driven, equitable approaches to PES. In: Mace, G, Schreckenberg, K and Poudyal, M (eds.) Ecosystem Services and Poverty Alleviation: Trade-offs and Governance. Routledge, London.
Milder, J, Scherr, S and Bracer, C (2010) Trends and Future Potential of Payment for Ecosystem Services to Alleviate Rural Poverty in Developing Countries, *Ecology and Society 15*.
Miljøverndepartementet (2010) The Government of Norway's International Climate and Forest Initiative. Norwegian Ministry of the Environment, Oslo.
Mohammed, EY (2015) Balancing carrots and sticks for fisheries management: Lessons from Bangladesh, 52nd Australian Marine Science Association (AMSA) Annual Conference, Geelong, Australia. July 5-9, 2015.
Mohammed, EY and Uraguchi, ZB (2018) Financial inclusion for poverty alleviation: Issues and case studies for sustainable development. Routledge.
Muñoz-Piña, C, Guevara, A, Torres, JM and Braña Varela, J (2008) Paying for the hydrological services of Mexico's forests: analysis, negotiations and results. *Ecological Economics 65*, 725-736.
Muradian, R, Corbera, E, Pascual, U, Kosoy, N and May, P (2010) Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services. *Ecological Economics 69*, 1202-1208.
Nagayets, O (2005) Small farms: current status and key trends. Background paper prepared for the Research Workshop on the Future of Small Farms. IFPRI, Imperial College and the Overseas Development Institute, Wye College, UK.

Namirembe, S, Leimona, B, van Noordwijk, M and Minang, P (2017) Co-investment in ecosystem services: global lessons from payment and incentive schemes. World Agroforestry Centre, Nairobi.
NatureVest and EKO (2014) Investing in conservation: A landscape assessment of an emerging market. The Nature Conservancy, Arlington, VA.
OECD (2010) Paying for Biodiversity: Enhancing the Cost-Effectiveness of Payments for Ecosystem Services OECD Publishing, Paris.
Pagiola, S (2008) Payments for environmental services in Costa Rica. *Ecological Economics 65*, 712-724.
Pagiola, S and Benoit, B (2009) Estimating the costs of REDD at the country level. Forest Carbon Partnership Facility, World Bank, Washington D.C.
Pagiola, S, Honey-Rosés, J and Freire-González, J (2016) Evaluation of the Permanence of Land Use Change Induced by Payments for Environmental Services in Quindío, Colombia. Plos One 11, e0147829.
Pagiola, S and Platais, G (2007) Payments for environmental services: From theory to practice. World Bank, Washington.
Pattanayak, SK, Wunder, S and Ferraro, P (2010) Show me the money: do payments supply environmental services in developing countries? *Review of Environmental Economics and Policy,* 1-21.
Patterson, T, Bhatta, L.D., Alfthan, B, Agrawal, N.K., Basnet, D, Sharma, E and van Oort, B (2017) Incentives for Ecosystem Services (IES) in the Himalayas: a 'cookbook' for emerging IES practitioners in the region. ICIMOD, CICERO, GRED. Arendal.
Peh, KS-H, Balmford, AP, Bradbury, RB, Brown, C, Butchart, SHM, Hughes, FMR, MacDonald, MA, Stattersfield, AJ, Thomas, DHL., Trevelyan, RJ, Walpole, M and Merriman, JC (2017) Toolkit for Ecosystem Service Site-based Assessment (TESSA). Version 2.0 Cambridge, UK.
Pigou, AC (1920) The Economics of Welfare. Macmillan and Co., London.
Plan Vivo Foundation (2008) The Plan Vivo Standards 2008. Plan Vivo Foundation.
Porras, I, Chacón-Cascante, A, Robalino, J and Oosterhuis, F (2011) PES and other economic beasts: assessing PES within a policy mix in conservation, 9th International Conference of the European Society for Ecological Economics, Istanbul.
Porras, I, Aylward, B and Dengel, J (2013) Monitoring payments for watershed services schemes in developing countries. International Institute for Environment and Development.
Porras, I, Barton, DN, Miranda, M and Chacón-Cascante, A (2013) Learning from 20 years of Payments for Ecosystem Services in Costa Rica. IIED, London.
Porras, I., Vorley, B., Amrein, A., Douma, W., Clemens, H., 2015. Payments for ecosystem services in smallholder agriculture: lessons from the Hivos-IIED learning trajectory, in: Blackmore, E. (Ed.), Shaping Sustainable Markets. IIED, Hivos, London.
Porras, I, Alterio, H, Vardon, M, Pagiola, S and Bastad, K (2016) Showing the worth: NCA and the design of payments for ecosystem services. The World Bank, Washington D.C.
Porras, I, Steele, P and Mohammed, EY (2016) Upscaling solutions: The role of conditional transfers for poverty reduction and ecosystem management, *Working Paper*. IIED, London.
Porras, I, Mohammed, EY and Steele, P (2017) Policy workshop: Conditional transfers for poverty reduction and ecosystem management, Cambridge, UK.
Pynegar, E.L., 2018. The use of Randomised Control Trials in evaluating conservation interventions: the case of Watershared in the Bolivian Andes, School of Environment, Natural Resources and Geography. Bangor University, Bangor.
PROFOR (2017) Poverty-forest linkages toolkit. PROFOR, CIFOR, IUCN, ODI, and Winrock International.
Rahman, MA, Alam, MA, Hasan, SJ and Jaher, M (2012) Hilsa fishery management in Bangladesh, Status of Fishery and Potential for Aquaculture Regional Workshop. The WorldFish, Bangladesh and South Asia Office, Dhaka.
Rai, N, Kaur, N, Greene, S, Wang, B and Steele, P (2015) Topic guide: A guide to national governance of climate finance. International Institute for Environment and Development (IIED), London.
Reed, MS, Allen, K, Attlee, A, Dougill, AJ, Evans, KL, Kenter, JO, Hoy, J, McNab, D, Stead, SM, Twyman, C, Scott, AS, Smyth, MA, Stringer, LC and Whittingham, MJ (2017) A place-based approach to payments for ecosystem services. *Global Environmental Change* 43, 92-106.

Rodríguez, LC, Pascual, U, Muradian, R, Pazmino, N and Whitten, S (2011) Towards a unified scheme for environmental and social protection: Learning from PES and CCT experiences in developing countries. *Ecological Economics* 70, 2163-2174.

Salafsky, N (2011) Integrating development with conservation: A means to a conservation end, or a mean end to conservation? *Biological Conservation* 144, 973-978.

Secretariat of the Convention on Biological Diversity (2011) Incentive measures for the conservation and sustainable use of biological diversity : Case studies and lessons learned. United Nations Environmental Programme, Montreal, Quebec, Canada.

Shah, M (2016) Should India do away with the MGNREGA? *The Indian Journal of Labour Economics* 59, 125-153.

Sharma, A, Schwarte, C, Müller, B, Abeysinghe, A and Barakat, S (2016) Pocket guide to the Paris Agreement. ECBI.

Sikor, T (2013) The Justices and Injustices of Ecosystem Services. Routledge, Abingdon, Oxon.

Slunge, D., Sterner, T., 2012. Environmental Fiscal Reform in East and Southern Africa and its Effects on Income Distribution, in: Castellucci, L., Markandya, A. (Eds.), Environmental Taxes and Fiscal Reform. Palgrave Macmillan UK, London, pp. 93-122.

Soanes, M, Rai, N, Steele, P, Shakya, C and MacGregor, J (2017) Delivering real change: getting international climate finance to the local level. IIED, London.

Stern, N., 2007. The Economics of Climate Change: The Stern Review Cambridge University Press, Cambridge.

Suich, H (2012) Conceptual framework: Poverty. ESPA, DFID, ESRC, NERC, London.

Talla Takoukam, P and Morita, S (2008) A Policy and Legal Framework Supporting Payments for Ecosystem Services. World Bank's Environment and International Law Unit.

TEEB (2011) The Economics of Ecosystems and Biodiversity The Ecological and Economic Foundation.

UNDP (2016) BIOFIN Workbook: Mobilizing Resources for Biodiversity and Sustainable Development. The Biodiversity Finance Initiative.

United Nations (2012) Low Carbon Green Growth Roadmap for Asia and the Pacific: turning resource constraints and the climate crisis into economic growth opportunities. United Nations ESCAP; Korea International Cooperation Agency, Bangkok.

United Nations (2015) System of Environmental-Economic Accounting 2012. Central Framework. United Nations, European Union, Food and Agriculture Organization of the United Nations, International Monetary Fund, Organisation for Economic Co-operation and Development , World Bank.

Uraguchi, ZB (2011) Social protection for redistributive justice: socio-economic and political drivers of vulnerability to food insecurity in Bangladesh and Ethiopia, International Conference on Social Protection for Social Justice. Institute of Development Studies and Centre for Social Protection, UK.

Vardon, M, Bass, S, Ahlroth, S and Ruijs, A (2017) Forum on Natural Capital Accounting for Better Policy Decisions: Taking Stock and Moving Forward. WAVES, World Bank Group, Washington DC.

Vardon, M, King, S, Juhn, D, Bass, S, Burnett, P and Johansson, S (2016) The Aichi Targets and Biodiversity Conservation – The Role of Natural Capital Accounting. *WAVES Policy Brief.*

Vatn, A (2010) An institutional analysis of payments for environmental services. *Ecological Economics* 69, 1245-1252.

Vatn, A, Barton, DN, Lindhjem, H, Movik, S, Ring, I and Ferreira dos Santos, R (2011) Can markets protect biodiversity? An evaluation of different financial mechanisms. Department of International Environment and Development Studies, Noragric Norwegian University of Life Sciences, UMB.

Viana, V (2008) Bolsa Floresta (Forest Conservation Allowance): An innovative mechanism to promote health in traditional communities in the Amazon. *Estudos Avançados* 22.

Wells, G, Fisher, JA, Porras, I, Staddon, S and Ryan, C (2017) Rethinking Monitoring in Smallholder Carbon Payments for Ecosystem Service Schemes: Devolve Monitoring, Understand Accuracy and Identify Co-benefits. *Ecological Economics* 139, 115-127.

Wendland, KJ, Honzák, M, Portela, R, Vitale, B, Rubinoff, S and Randrianarisoa, J (2010) Targeting and implementing payments for ecosystem services: Opportunities for bundling biodiversity conservation with carbon and water services in Madagascar. *Ecological Economics* 69, 2093-2107.

Whitten, S and Shelton, D (2005) Markets for ecosystem services in Australia: Practical design and case studies.

World Commission on Environment and Development (1987) Report of the World Commission on Environment and Development `Our Common Future'. United Nations.

Wunder, S (2005) Payments for environmental services: some nuts and bolts. *Occasional Paper No. 42*. Bogor, CIFOR.

Wunder, S (2015) Revisiting the concept of payments for environmental services. *Ecological Economics* 117, 234-243.

Wünscher, T and Wunder, S (2017) Conservation tenders in low-income countries: Opportunities and challenges. *Land Use Policy* 63, 672-678.

Zhang, Q, Bennett, MT, Kannan, K and Jin, L (2009) Payments for ecological services and eco-compensation: Practices and innovations in the People's Republic of China, Proceedings from the International Conference on Payments for Ecological Services. Asian Development Bank, National Development and Reform Commission, Mandaluyong City, Philippines.

Knowledge Products

Toolkit
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Social conditional transfers (CTs) and payments for ecosystem services (PES) have the same starting point: the assumption that direct, conditional incentives are the most effective way to change behaviour. However, contextual disadvantages affect the capacity for the very poor to comply. Recognising this is important in the design of inclusive, pro-poor instruments.

We draw lessons from experiences that have achieved scale by moving beyond pilots or projects into established programmes. Successful CT/PES schemes exhibit a series of enabling conditions: high level political support, sustainable financing streams, lean institutional set-ups, tools and systems for effective implementation, and a clear ability to demonstrate impact.

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