Transformation of forest function

Transformation of Costa Rican forest functions from a focus on logging to one on ecotourism as backbone of the country's economy (mural in roadside restaurant)

Photo: World Agroforestry/Meine van Noordwijk

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CHAPTER NINETEEN

Policies for ecosystem services enhancement

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Highlights

- Policies and policy frameworks for ecosystem services (ES) are relatively weak and still emerging, interacting with sectoral policies for specific ES
- Individual and specific ES such as those related to biodiversity and water benefit from existing sector-driven policies, while less tangible and cross-sector ES such as pollination and climate have less policy support and instruments
- Climate regulation services which includes carbon sequestration and climate resilience have been catalysed by international policy instruments
- A few countries (e.g. Costa Rica and Vietnam) have developed specific policies for ES enhancement; however, there have been challenges with such attempts as a single policy falls short of addressing multiple ES and ecosystem functions
- Determining appropriate policy instruments and the right mix of instruments requires rigorous evidence-based analysis and understanding of the trade-offs and synergies between instruments, especially when decision-making requires balancing multiple ecosystem services

19.1 Introduction

Ecosystem services have increasingly been highlighted as central to human wellbeing[1,2,3]. Ecosystem services refer to the various benefits that humans gain from nature and functioning ecosystems. Four groups of ecosystem services are commonly recognized: provisioning (e.g. food, drinking water, fibre), regulating (e.g. climate, disease control, flood prevention, waste-water self-cleaning), supporting (e.g. nutrient cycling, crop pollination, maintenance of genetic diversity), and cultural (e.g. recreation, spiritual)[4] services. These together play a key role in determining overall economic, social and environmental development[5]. As a result, interest in various aspects related to maintaining and enhancing ecosystem services, with research on characterization and valuation taking centre stage[6,7]. Several recent publications have highlighted the paucity and need for research on policies and policy frameworks for maintaining and enhancing ecosystem services[8,9]. Such policies may need to support four processes of linking knowledge with action[10]:

1) Awareness, diagnosis of issues and (international) agreements on monitoring progress,

2) Political will and commitment to deal with them ('willingness to act'),

3) Synergy with the totality of existing policy instruments ('ability to act'), and

4) Support for continuous innovation in the search for fair and efficient solutions.

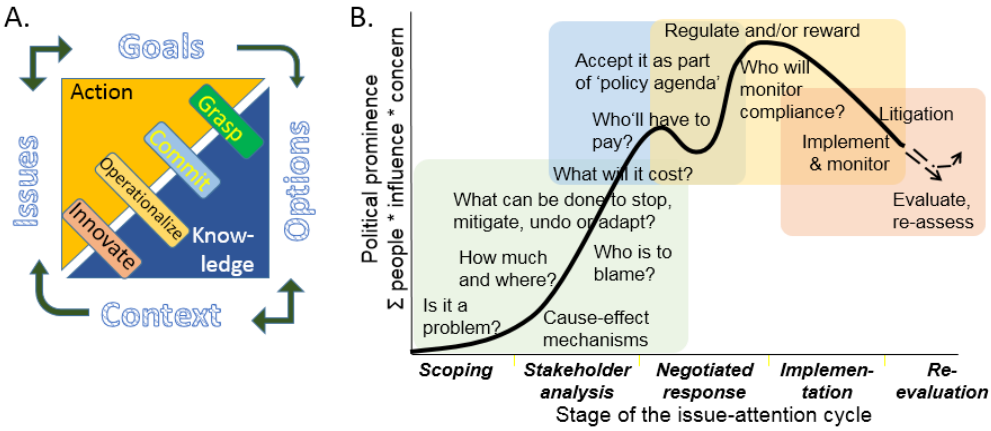

Figure 19.1 A. Four aspects of linking knowledge with action[10] in relation to B. the policy attention or issue cycle[11,12] (with colour coding of the four aspects)

As a consequence of a wide range of 'issues' that went through the stages of awareness, denial, diagnosis and acceptance of their importance by a sufficiently large part of the public discourse, political commitment has been expressed to deal with them. Given the sequence in which this happened in various countries, a patchwork exists for dealing with issues with a specific area focus and generically (within the jurisdiction of the institutions that have emerged), as shown in Table 19.1.

Table 19.1 Different models used to study interactions in mixed tree–crop systems and their main characteristics

Type of decisions	Specific area focus	Generic (within jurisdiction)
Avoiding negative effects on nature	Dams and other water infrastructure Mining and other resource extraction Regulated hunting/ fishing/ logging/ grazing Environmental Impact Assessments (EIA) for all 'projects'	Pesticide admission Water pollution control Air pollution control Soil pollution control Greenhouse gas emission control (climate mitigation) Invasive species control Land use zoning & planning Strategic Environmental Assessment (SEA) Adjusting perverse subsidies & taxation rules Boycotting destructive 'value chains'
Supporting positive	Protected area designation & management	Environmental education Environmental accounting

effects on nature	Ecological corridors Restoration of 'degraded lands'	Supporting 'certified' trade Developing clean technologies
Adjusting benefit distribution from well-functioning ecosystems	Respecting & recognizing indigenous territories PES and coinvestment in environmental stewardship Integrated Conservation and Development Programs Local conservation contracts Sloping land conversion actions	Benefit sharing rules for bioprospecting (incl. pharmaceuticals) Devolution of resource management governance Global Environmental Fund (and related) transfers

A study of the effectiveness of policies in sustaining and promoting ecosystem services in the Indian Himalayas[13] reviewed existing policy instruments in the forest, wildlife and environment sectors from 1927 – 2008. The narration showed an evolution from the production-focused instruments that dominated between 1927 and 1972, followed by a focus on protection-oriented instruments between 1972 and 1988, community-participation dominated instruments between 1988 and 2006 and a climate and globalization dominated approach from 2006 onwards. The study concluded that a mix of complementary instruments that ensure and incentivize stakeholder participation across sectors would be most effective and potentially efficient in sustaining ecosystem services. The way targeted policy instruments interact with all existing rules, incentives and norms shapes the citizen's response.

Measurement of 'policy relevant' ES issues, such as the rate of peat subsidence in smallholder oil palm landscapes. Photo: World Agroforestry/Ni'matul Khasanah

Policy literature and ES policy literature in particular suggests three major groups of policy instruments- regulatory, market-based instruments and information and knowledge-based instruments[14],[15],[16]. Regulatory instruments seek to regulate the use of natural resources. This could include rules for planning, management, granting of permits, controls etc. Market-based instruments seek to change behaviour by influencing prices directly and indirectly. Subsidies, taxes, payments, penalties, fees, and auctions represent examples of market-based instruments. Information and knowledge-based instruments seek to change behaviour through raising awareness and provision of knowledge. Education, training, extension, research and communication on matters related to human actions and environment are among the main instruments in this category. The above categorizations are not mutually exclusive in practice but rather used to highlight the possible distinctions to guide the discussion. The bulk of the instruments in this chapter fall in at least one of the above-mentioned categories. Tradeoffs need to be recognized at multiple levels[17], as key to effective policy designs and reforms. Often the last category (benefit distribution) is combined with either or both of the others, in forms of 'coinvestment', enhancing the local benefits from well-functioning ecosystems (rather than paying for the services provided as such).

This chapter explains ES policies and policy frameworks with a view to providing guidance on effective, efficient and equitable policy options for pro-poor payment for ecosystem services (PES). It examines sector-based policies to enhance targeted ES as a dominant paradigm of ES policies, and a more generic national ES support policy as an emerging paradigm. Backed by examples, the chapter discusses challenges for both paradigms and suggests innovative and flexible policy instruments for enhancing ecosystem services.

19.2 Sector-based ecosystem services policies

Given that ES is a relatively new concept, few countries have so far addressed ES specifically. Most countries have had very sector-specific policies often tied to a given ES. We briefly show a set of policies that target ES from different sectors and sub-sectors in the literature, typical of the global landscape namely, water, forests, carbon and pollination. The first two are largely established, while the last two have been growing. Table 19.2 below summarizes the set of instruments largely used in each of the sectors.

Table 19.2 Examples of policy instruments for ecosystem services enhancement

Instrument Category	Water	Forests	Carbon	Pollination
Regulatory restrictions on land use and resource exploitation	• Water Funds • Watershed Management Boards (local) • River Basin Commissions (Trans-national) • Integrated Basin and watershed management plans	• Protected Areas • Forest Zoning Plans • Spatial Land Use Plans • Forest Management Plans • Trade rules (*Forest Law Enforcement, Governance and Trade*, Lacey Act)	• REDD+ (Reducing Deforestation and (forest) Degradation) • Nationally Determined Contributions (NDCs)	• Pesticide regulatory standards • Crop risk assessment rules • Pollination and pollinator monitoring regulations

Market-Based Incentives	• User fees • PES • Utility taxes (water, electricity/hydro)	• PES • Fines (illegal harvesting, etc.) • Certification schemes • Penalties • Fees • Taxes • Duties	• PES • Certification	• Insurance schemes • Recognition and valuation of pollination as agricultural input
Information, Norms of behaviour	• Water Users Associations	• UNFCCC Subsidiary Body for Implementation (SBI), • Subsidiary Body for Scientific and Technological Advice (SBSTA) events, • Conferences of Parties (COPs)	• REDD Readiness[18] • Global Climate Fund readiness support • Climate Technology Centre and Network	• Pollination Strategy Documents • Integrated pest management • Agro-ecology (ecological intensification and diversification)

Generally, policies for water management are domestically and locally initiated rules for access to, and avoidance of pollution (as a 'disservice') of surface water given its centrality as a 'utility' to daily activities and development. Water policies tend to focus around four main areas, namely- planning and management rules, privatization and public management, water rights, and market policies including pricing. Various national and subnational levels often have to make choices along the lines of the four areas listed in the preceding sentence. Rules for less visible resources such as groundwater have been slower to develop, and the differential water use by different types of land cover (including forest plantations) is only regulated in a few, water-scarce countries[19]. In almost all countries complex laws govern water services management at multiple levels, broadened from an initial focus on agriculture (irrigation), engineering (flow regulation and storage), urban and industrial water supply, and/or waste-water treatment[20]. In transboundary river basin management, basin-level multi-country agreements constitute another layer of coordination in policies. No policies and institutions exist yet to coordinate atmospheric moisture transfers as key element of global climate systems[21,22,23].

Forest policies have also remained largely domestic. And have evolved tremendously overtime. Prior to the 1970s forests were meant to generate revenue for development. As a result, forest policy was centralized and heavily sectoral in nature, with forests designated as sources of revenue, land for agriculture and or forest reserves largely. Since the early 1970s, with rising awareness of dependence of local communities on forests as sources of livelihoods and the growing importance of small-scale forest enterprise in local economies, forest policies have sought to integrate forests in rural development. This ushered in participatory, collaborative and community approaches to forest management.

With growing competition between forests and larger economic interests such as a plantation agriculture, international interests in shaping forest policies has grown exponentially. Hence,

forest policies have been centre stage in the sustainable development discourse in the last three decades. The Convention on Biodiversity (CBD), the Aichi Targets, Forest Law Enforcement Governance and Trade- FLEGT, Reducing Emissions from Deforestation and forest Degradation (REDD+) within the UNFCCC are examples of international instruments that shaped forest policies at global and national levels. Payments for ecosystem services and certification are among mechanisms that have grown and continue to grow in the forest policy arena.

The influence of global climate policy is even greater since the UNFCCC[24] and the Kyoto Protocol in 1997 moved towards climate instruments, first only for 'reforestation' and 'afforestation', but subsequently also incorporating forest carbon stock protection. Efforts to learn lessons from 'integrated conservation development projects' informed the design of carbon emission control[25], but the capacity to understand and effectively deal with all aspects of effective policy design and its subsequent implementation varied substantially between countries[26]. As evidenced in India[13], climate concerns became a new 'discourse' for redressing existing policies, rather than a start from a clean slate.

Pollination policy or policy action on the other hand is at infancy. A few European countries have developed policy papers and strategies, with the EU attempting actions towards enhancing pollination services. Ten types of policies have been identified[27] that governments can take to safeguard pollination services. These include, raising pesticide regulatory standards; promoting integrated pest management; including indirect and sub-lethal effects in genetically modified crop risk assessments; regulating movement of managed pollinators; developing incentives such as insurance schemes to help farmers benefit from ecosystem services instead of agrochemicals; recognizing pollination as an input into extension services; supporting diversified farming systems, conserving and restoring 'green infrastructure' (a network of habitats that pollinators can move between) in agricultural and urban landscapes; developing long-term monitoring for pollinators and pollination; and funding participatory research on improving yield, diversified and ecologically intensified farming.

A major disadvantage of sectoral policies is that they sometimes displace degradation activities to other sectors with weak or no regulation. In the climate change literature such displacement is described as 'leakage'. Often times they are spatially targeted and land cover / land use type specific and therefore unlikely to be effective if not designed and implemented as part of a larger land use plan. Another challenge is that specific ES sector policies often suffer poor financing, especially when the base sector is weak in revenue generation. In forested countries, forests and agriculture tend to have more resources, while water, carbon and others are very weak. A national level policy can overcome this through cross-subsidization.

19.3 National ecosystems services policies

In the last 2-3 decades, national level ES policies have emerged as an option for enhancing ES. These policies largely target multiple ecosystem services and are modelled around payments for ecosystem services. We briefly introduce two case studies here in after – i.e. Costa Rica (Box 19.1) and Vietnam (Box 19.2). It is hoped that this will highlight the key features of national level ES as currently practiced.

Visitors to Costa Rican rainforest as inspiration for forest policy reform. Photo: World Agroforestry/Meine van Noordwijk

Box 19.1 Costa Rica

Costa Rica has a history of deploying incentives in forestry going back to 1979. This including soft credits and forest payment certificates of various forms. However, PES was only enshrined in forestry law in 1996. The new national forestry law recognized biodiversity, watershed functions, scenic beauty and GHG mitigation through carbon storage and sequestration as ecosystem services[28,29]. These could be achieved through a number of land use modalities (i) reforestation through plantation, (ii) protection through existing forest, (iii) natural forest regeneration, and (iv) agroforestry systems.

By 2008 over 668, 369 ha had been protected under this scheme. Payments ranged from USD 41/ha -for natural forest regeneration, to USD 800/ha for 10-years reforestation plantation contract. For agroforestry, payments were about USD1.3 per tree. Budgetary provisions for PES in Costa Rica averaged around USD 13 Million or about 0.43% of the country's budget in 2006[28].

Box 19.2 Vietnam

Vietnam instituted a nationwide Payments for Forest Ecosystem Services-PFES in 2010 with the aim of improving forest quality and quantity, increasing the forest sectors contribution to the national economy, reduce the state's financial burden in forest protection and management, and improving social wellbeing. PFES requires users of forest ecosystem services to make payments to suppliers of these services. Users include water supply companies, hydropower plants, tourism companies, and suppliers are forest owners including individuals, households, communities and organizations holding forest land titles. Services outlined in the Decree 99 include, water protection; natural landscape beauty protection and biodiversity conservation for tourism; forest carbon sequestration and the reduction of GHG through prevention of deforestation and forest degradation; and the provision of forest hydrological services for spawning in coastal fisheries and aquaculture.

Following a series of over 20 legal instruments, Forest Protection and Development Funds –FPDFs have been set-up at national and provincial levels for the purposes of implanting PFES. Provincial level FPDFs sign contracts with buyers and collect payments, prepare

payment plans, release payments to service suppliers, monitor performance and report to the national FPDF.

Since creation, PFES has guaranteed[30] USD 162 Million with record disbursements to ES suppliers of above 75%. For most families PFES payments often surpassed financial support of around VND 200000 / ha / year provided to forest owners for protection and development through state budget[29]. A variant of PFES specifically for watershed functions that was tested in Son La province received USD 35 Million (at a USD 1 per cubic meter as a nationwide price). Based on a formula known as the K-Factor, payments ranged between USD 5-10 per ha for forest conservation activities[31]. In this case 10% of funds was allocated to management at every level of government.

While national policies offer opportunities for cross-sectoral actions, cross-subsidization and coordination, the two case studies in Box 32.1 and 32.2 demonstrate that transactions costs might be quite high. Involving several sectors, different levels of government and monitoring for multiple types of services and actors (producers and beneficiaries) can be expensive. Capacity requirements for national level planning, implementation and monitoring can be difficult in poor, data-scarce environments in developing countries. This challenge was reported in both Vietnam and Costa Rica cases[27,29]. Both Costa Rica and Vietnam national policies were based on PES as the key instrument and there is emerging evidence that they may not be effective in instances where opportunity costs are higher than what government PES is offering rendering the scheme inefficient and ineffective[16,28]. It is thus imperative to find flexible, innovative and cost-effective policy options going forward. The preceding chapter discussed this for water-related policies in East Africa[32].

Towards flexible and innovative policy mixes

Sectoral policies have their limitations. Attempts at developing ES policies at national level in Costa Rica, Vietnam and elsewhere have also had challenges in attracting non-public financial resources[33] and interacting with global commodity trade through certification[34].

In order to be effective, efficient and equitable in the management of natural resources a more integrated approach has been recommended[16,35,36,37]. Such an approach must be flexible, innovative and allows for mixing of policy instruments in an adaptive way with room to retool, adopt and aggregate across sectors and local, meso and macro levels.

Several key dimensions/ features are necessary for the development and implementation of a successful integrated ES policy. (i) A flexible mix of instruments to choose from, (ii) choosing the right set of instruments, (iii) equity, participation and political feasibility of the instruments, and (iv) The role of technology and innovation policies. We briefly examine each of these below.

One of the beneficiaries of Costa Rican PES policies: a brightly coloured, highly toxic "Blue jeans" frog or known as Strawberry Poison-dart frog that has habitat loss and human use of its toxic skin for poisonous darts as threats. Photo: World Agroforestry Centre/Meine van Noordwijk

Instrument Choice

Choosing the right set of instruments that are compatible and complement each other is critical for delivering ecosystem services[16]. A number of factors deemed important in the choice of instruments have been cited in literature including, effectiveness, economic efficiency, equity (distribution of costs and benefits across groups) and political feasibility[38,39,40].

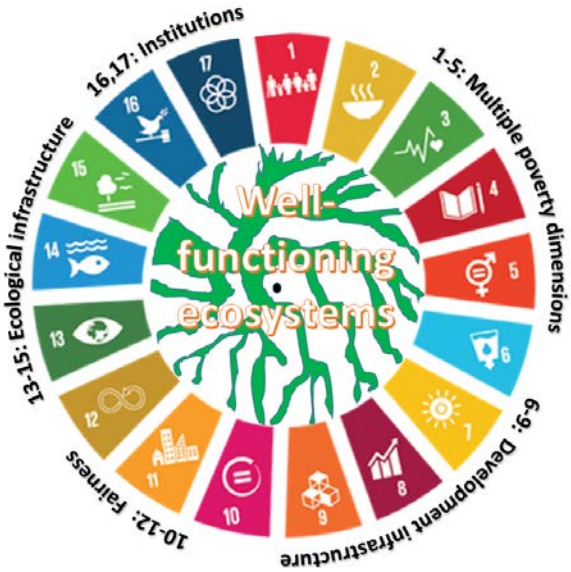

Figure 19.2 The 17 Sustainable Development Goals provide an overarching policy framework within which the case needs to be made that well-functioning ecosystems are essential for achieving any of the goals[41]

It is important to have some data and understanding of the impacts of the above-mentioned factors and their implications, before making decisions on what instruments to apply. Often, a clear view of the uncertainties involved is also necessary in the decision-making process. This can be a challenge in data-scarce and resourced challenged environments in developing countries. However, attempts at understanding these to the best extent possible is advisable. It is also important to understand the externalities of various instruments as we consider their deployment. The Sustainable Development Goal framework has emerged as a way to address synergies and tradeoffs at the level of national commitments to balance 'development' and 'sustainability', with its ecological, social and economic dimensions (Fig. 19.2).

Equity, Participation and Political Feasibility

Who gains and who losses in the implementation of any policy instruments is often a determinant of (especially political) feasibility. Often interests of various stakeholder groups and the way they would absorb benefits or costs of any instrument would vary. Poor vulnerable groups and minorities are often losers. It is therefore useful to ensure that their benefits and costs are well understood and taken care of through appropriate safeguards[42]. Participation and inclusion of all stakeholders in policy development and implementation at all stages has been evidenced as an effective way of ensuring that potential losers and winners are understood and that the political feasibility is guaranteed[43].

The Role of Technology, Research and Innovation

Some of the greatest opportunities for enhancing ecosystem services are linked to technology /technical innovations and practices. Climate smart agriculture practices, smart watershed management practices and innovations in forestry can help improve ecosystems productivity[3]. In Pro-Poor PES, this is particularly important because developing country environments face tremendous challenges in terms of technological developments. Technological innovation is often fuelled by research, therefore policies that promote investments in 'boundary work' research[10, 44] relevant for ecosystems services is important for the mix of policies and instruments needed.

19.4 Conclusion

This chapter set out to explore policies and policy frameworks for ES enhancement. It pays particular attention to PES as an instrument in the ES policy arena. Two ES policy paradigms are distinguished. Single sector ES policies and national PES policies. While sector specific policies are well established in the water, biodiversity and forest sectors, carbon and pollination are still in development. Hence, PES is established in water and in the biodiversity sub-sector to some extent but is yet experimental in the carbon sector and almost non-existent on the pollination arena. These sectoral policies are limited, poorly funded and often displace degradation related activities outside the sector.

While national PES presents opportunities for cross-sectoral actions and for cross-subsidization of sectors, it also lies at the interface of multiple sectors, with accompanying challenges of generating interest and agreement and meeting high transactions costs of multiple sectors. Like all PES, funding and financing must enable payments beyond what competing options offer, else it would become ineffective. This suggests that for PES to be effective, efficient and equitable, it has to be part of a wider policy mix that is flexible and innovative for application at all scales.

Four recommendations for developing flexible and innovative frameworks for ES enhancement are suggested. These are,

(i) Build up experience with diverse instruments so that there is a flexible mix to choose from, depending on context; be aware that working across existing sectors takes time and special efforts;

(ii) Choose appropriate instruments once the various, possibly partly conflicting, public goals have been articulated;

(iii) Throughout the 'issue cycles', ensure equity, participation and political feasibility of the emerging instruments and their implementation; and

(iv) Foster the role of technology and innovation policies so that emerging issues can refer to basic understanding of cause-effect mechanisms and monitoring of long-term changes.

Coherence between the four aspects of linking and action, as described in Figure 32.1, in effective boundary work can help enhance pro-poor PES in the future, beyond current 'recipes'.

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