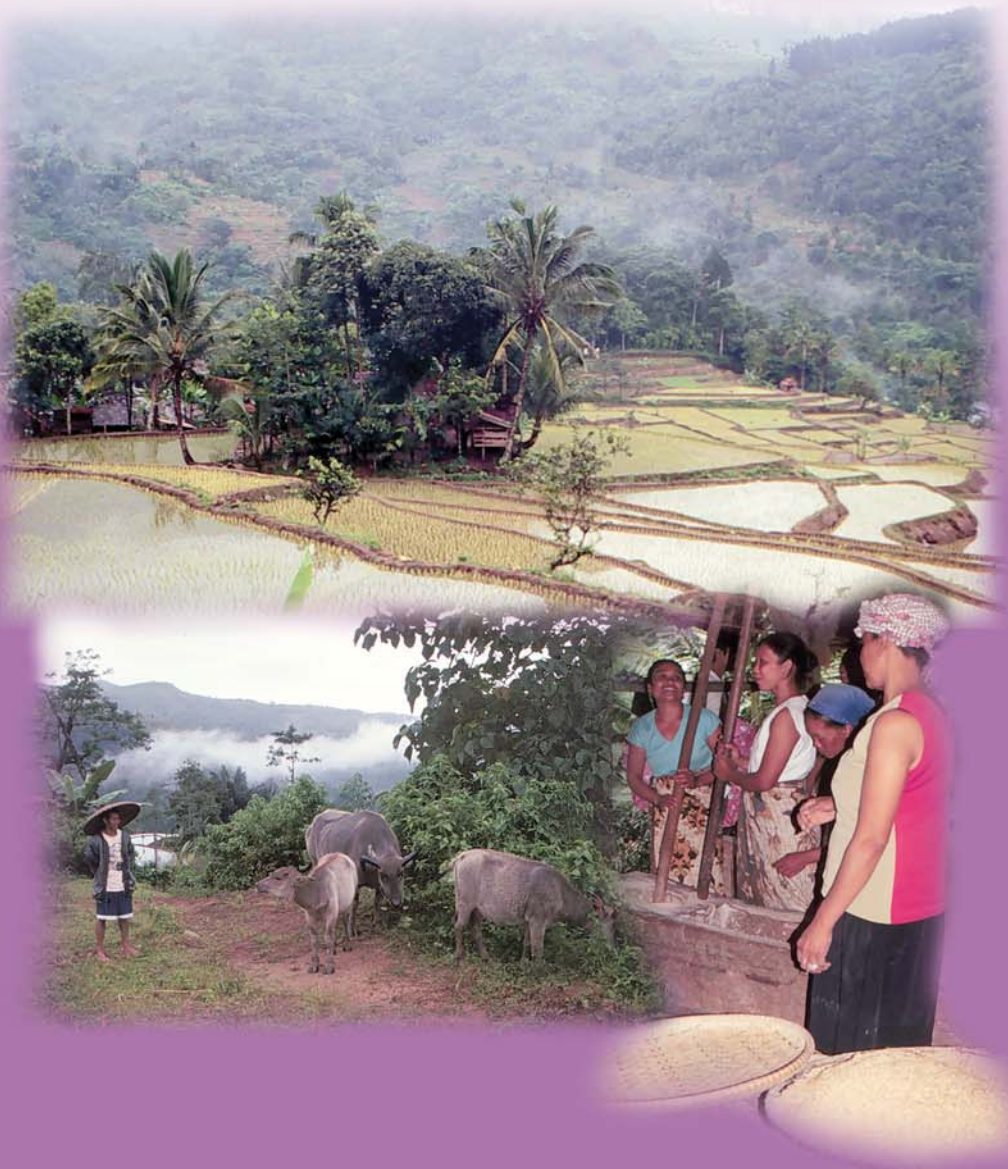


# An Introduction to the Conceptual Basis of **RUPES**

*Meine van Noordwijk, Fiona Chandler  
and Thomas P. Tomich*





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World Agroforestry Centre  
TRANSFORMING LIVES AND LANDSCAPES

Developing Mechanisms for  
Rewarding the Upland Poor in Asia for  
Environmental Services They Provide



***What services to whom and where?***

Watershed functions, Biodiversity,  
Landscape beauty, Carbon storage ~ as  
influenced by land use practices

***How do all stakeholders know?***

Bridging local, scientific and policy  
ecological knowledge, Negotiation support  
systems, Local monitoring

***Which reward mechanisms and how  
do they work?***

Land tenure, Trust funds, Infrastructure,  
Social capital support, Eco-label markets,  
Ecotourism – Equity, Efficiency,  
Effectiveness

***Which policies can support?***

Direct involvement of local governance,  
clear implementation of global conventions,  
integrated natural resource management,  
community-based forestry

M. van Noordwijk, F.J. Chandler and T.P. Tomich, 2004. An introduction to the conceptual basis of RUPES: rewarding upland poor for the environmental services they provide. ICRAF-Southeast Asia, Bogor. 46 pp

### **Disclaimer**

In the RUPES project a large number of international and national partners work together to test and improve the way rewards for environmental services are used in Asia to reduce poverty and enhance environmental quality. The investors in this project (including IFAD and the EU through its support for environmental policy research of ICRAF) are not responsible for any of the views expressed here.

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### **Acknowledgements**

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## Prologue

Payments for environmental services are normally discussed in terms of **'buyers'** and **'sellers'** – as if there are only two sides of a coin. Taking this analogy, we may see the **'brokers'** (those that act as a third party between the buyers and the sellers) as the third side of the coin. However, the chance that a coin will land on this side and reach a stable equilibrium is small – it normally falls to either of the two other sides.

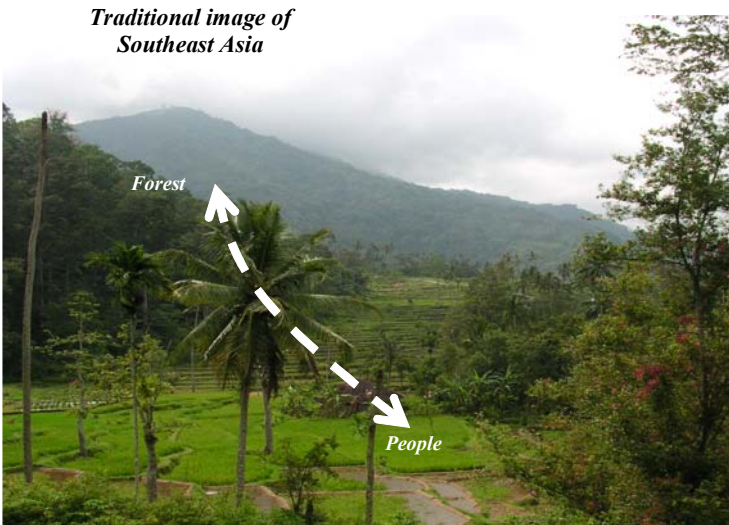
What is presented are twenty 'aspects' of Rewarding the Upland Poor in Asia for Environmental Services They Provide (RUPES), suggesting that rewarding upland poor for environmental services ES is a well-polished diamond, rather than a coin. All these aspects can co-exist and all reveal insights into what is at the core, yet none of them are the full and only truth.

We start with an **ecologists** view that not all environmental services are the same (or some are more so than others), and suggest that the different phases and stages in histories of land use change offer different opportunities for protection and rehabilitation. An **economics** perspective blends in with insights ranging from some firm 'micro' economical theory of how farmers may modify their decisions in the face of changing price incentives to the fully empirical 'macro' perspectives of how the concept of 'economic growth' can and should be corrected for non-sustainable resource exploitation. We then move to a **social** perspective and some of the ethical questions of whether access to environmental services is part of the 'human birth right' or whether they can be seen as subject to economic transactions. Looking at **'management'** aspects of multi-stakeholder Integrated National Resource Managed (INRM) we see that 'lack of trust' and conflict are dominant aspects of the current 'loose-loose' for both the rural poor and environmental services, and that stopping bad practice might initially be more effective than looking for new mechanisms. The distinction between **'bonding'** and **'bridging'** forms of social capital then leads us to a **'political ecology'** of trust as the basis for successful partnership between the poor providers of ES and the (slightly?) better off beneficiaries.

Overall we hope that this collection of aspects can stimulate the wider intellectual debate and practical exploration and testing that we need to achieve the double goals of poverty alleviation and environmental protection that the world community has set itself as Millennium Development Goals.

*Throughout the text we tried to formulate conclusions that might contribute to an overall synthesis. We invite the reader to help in formulating a coherent framework that encompasses all*

## Three questions as a start...



The traditional image of Southeast Asia is one of forest on the hill providing regular flows of clean water and other environmental services to agriculture in the lowlands...

**but...**

- The lowland agricultural lands have a lot of trees and agroforestry systems provide environmental services themselves
- Most of the uplands don't have forest cover any more – they have forms of 'agroforest' or are in various stages of 'degradation' – losing their services to both the local people as well as downstream.

In fact half of the people in Indonesia live in lowland rice/urban systems downstream of 'upland land use mosaics' and a quarter live in such upland land use mosaics. Critical environmental services to the lowland will have to be negotiated with their upland neighbours (on roughly a 2:1 ratio – that is on average the 'payments for environmental services' by only two lowland families will have to be enough for one upland family to modify its land use and livelihood choices...

This raises three questions

1. **Does the idea of 'environmental service payments' make sense?**
2. **Can they help alleviate rural poverty?**
3. **Can economic, ecological, institutional/social science theories help?**

## RUPES in a nutshell

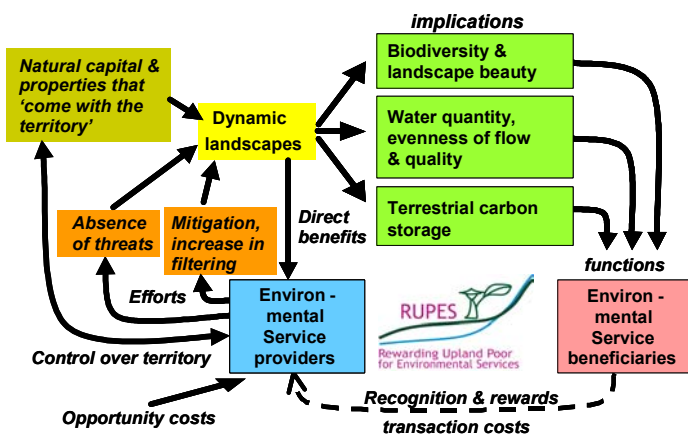
The RUPES partnership of the International Fund for Agricultural Development (IFAD), the World Agroforestry Centre (ICRAF) and a partnership of local, national and international partners aims to enhance the livelihoods and reduce the poverty of upland poor in Asia while supporting environmental conservation at the global and local levels.

The partnership is built on the **premise** that payment for environmental services

- Improves markets & prices by valuing ecosystem services according to real worth
- Is a mechanism for generating finance and incentives for service providers
- Can help to provide rewards and cover costs of ecosystem conservation
- Is a tool for livelihood enhancement and income generation

with the following indicators of success

- A participatory approach to learning
- Identified providers and beneficiaries
- Tangible services transparent to the buyers
- Providers have control over resource access and their land management is clearly linked to the provision of ES
- Rewards/incentives can offset opportunity costs
- Fair and equitable benefit sharing among the providers of ES
- Enabling institutional set up and policy framework
- Efficient monitoring and enforcement system
- Tangible contributions to Millennium Development Goals by enhancing sustainable development



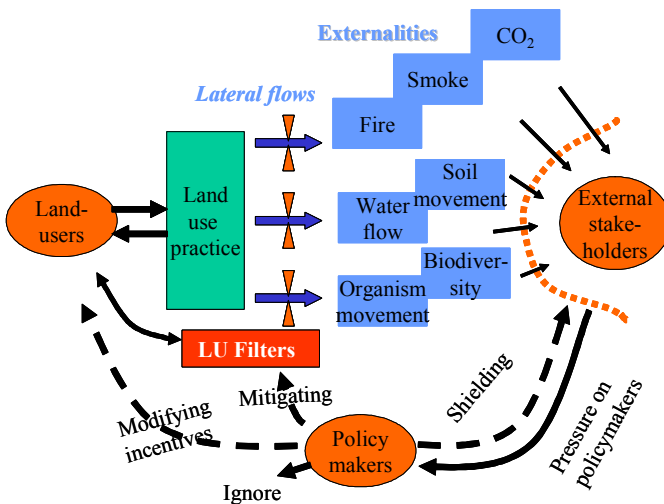
**Figure 1.** Schematic relationships between upland (potential) providers of environmental services and the (downstream – interpreted in a broad sense of the flow direction of the service) beneficiaries

## Section 1: An environmental science perspective

### 1. Environmental Service: issues follow the ‘issue cycle’

Environmental services are taken for granted until they’re no longer there, or at least until they are under clear threat. When a new ‘issue’ or ‘threat’ comes up regarding negative effects of land use practices (here interpreted in a broad sense) on environmental services (be it pollution of air, water, soil or oceans, climate change, extinctions of animals or plants, landslides or mudflows) authorities have at least four strategies to choose in responding to pressure from the various stakeholders:

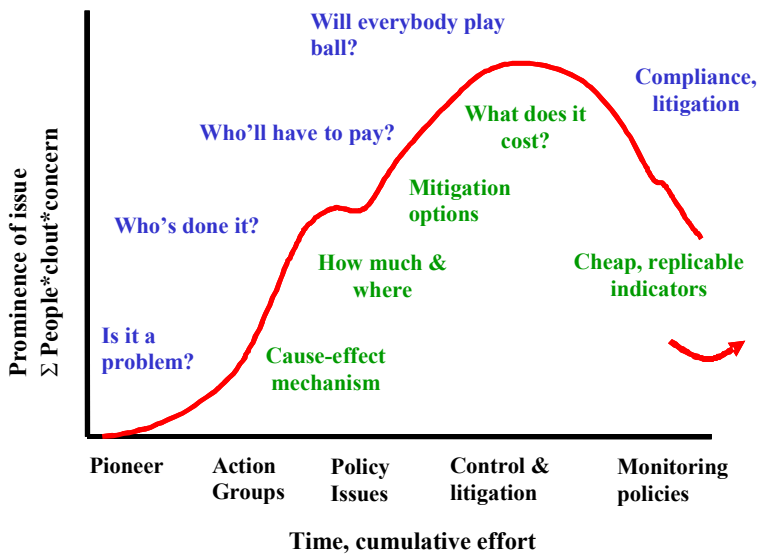
- do nothing (ignore or deny the relevance of the issue for as long as possible),
- compensate the suffering groups or try to ‘shield’ them from the negative impacts,
- mitigate degradation by, for example, increasing the filter functions intercepting lateral flows, as discussed by van Noordwijk et al. (2004) or
- modify the incentives for land users as a way to reduce (or stop...) degradation through regulations, market-based instruments (taxes and/or subsidies), other means of social control, such as negative publicity, or some combination of these approaches.



**Figure 2.** Cause-effect chains between land use, lateral flows and (negative) impacts on external stakeholders, with a number of ways that policymakers can respond to pressures from those affected (modified from van Noordwijk et al., 2004)

*‘Rewards for environmental services’ can improve life ‘downstream’ by incentives, either*

- to stop negative effects on lateral flows at their origin (‘root cause’),
- to strengthen ‘filter functions’ (rewarding the land users of filter elements for providing the service of intercepting negatively valued lateral flows).



**Figure 3.** Schematic 'issue cycle' of an environmental externality in a democracy showing how public perceptions evolve over time through social interaction and scientific enquiry (Tomich et al., 2004)

Tomich et al. (2004) discussed seven stages in the 'environmental policy issue life cycle' (Fig. 3, adapted from Winsemius, 1986):

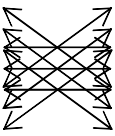
- Stage 1: Perception by 'pioneers' (if they are ultimately judged by society to be correct) or 'crackpots' (if they are shown to be wrong) of a particular environmental issue, but no broader awareness either by society at large or by the authorities.
- Stage 2: Lobbying by 'action groups', denial of effects by some groups of stakeholders, and incipient awareness but no action by authorities.
- Stage 3: Widening acceptance of existence of (potential or actual) environmental impacts, with mounting awareness and pressure for action by authorities.
- Stage 4: Debate on evidence of 'cause and effect' and attribution of 'blame'.
- Stage 5: Inventory and assessment of prevention and mitigation options and their environmental, economic, and administrative costs and benefits.
- Stage 6: Negotiations on prevention or mitigation of impacts.
- Stage 7: Implementation, monitoring, and enforcement of prevention or mitigation actions.

*Payments for environmental services and especially 'willingness to pay' as a contribution to solutions may require that the issue has reached stage 6 or 7 of this cycle...*

## 2. Two classification systems for ‘environmental services’

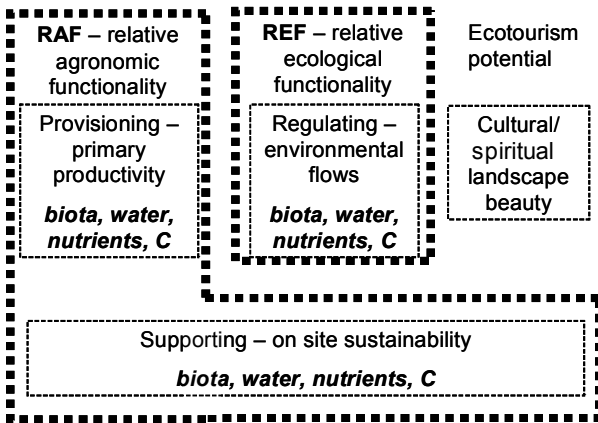
A major current effort to review the impacts of human land use on environmental services, with a broad interpretation of the latter, is the Millenium Ecosystem Assessment. Their classification system for ecosystem services starts from a different perspective (Table 1) than that used by Alternatives to Slash and Burn (ASB) and RUPES, but at the more detailed level the two classification systems are fully compatible (Tables 2 and 3).

**Table 1.** Main categories in the classification system for environmental services used by the ASB and RUPES consortia (Table 2) and the Millenium Ecosystem Assessment (Table 3)

<b>ASB/RUPES classification system</b>		<b>Millenium Ecosystem Assessment</b>
Watershed		Provisioning
Biodiversity		Regulating
Carbon stocks		Supporting
Productivity and direct profitability		Cultural and spiritual
Human health and landscape beauty		

**Table 2.** Ecosystem service classification used by ASB consortium and RUPES

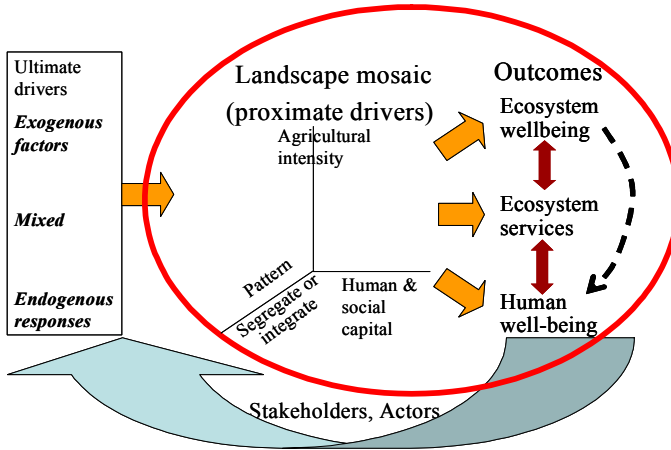
<p><b>Watershed functions (W)</b></p> <p>W1 Water transmission (total water yield per unit rainfall)</p> <p>W2 Buffering (above average river discharge per unit above average rainfall)</p> <p>W3 Gradual release of stored water supporting dry-season flows</p> <p>W4 Maintaining water quality (relative to that of rainfall)</p> <p>W5 Stability of slopes, absence of landslides</p> <p>W6 Tolerable intensities of net soil loss from slopes by erosion</p> <p>W7 Microclimate effects on air humidity and temperature</p> <p><b>Biodiversity functions (B)</b></p> <p>B1 Protecting the integrity of conservation areas by preventing loss of habitat and threats at population level in the areas directly around core protection areas,</p> <p>B2 Providing habitat for a sub-set of the original fauna and flora inside agriculturally used landscapes<sup>1</sup></p> <p>B3 Maintaining connectivity between protected areas via corridors,</p> <p>B4 Creating opportunities for local-level ‘restoration’, in landscapes where connectivity is still maintained.</p> <p>B5 Various forms of ex situ conservation.</p> <p><b>Carbon stocks (C)</b></p> <p>C1 Protecting natural forest area, peat soils and other carbon storage areas</p> <p>C2 Protecting above- and/or belowground carbon stocks in areas used for (agro)forestry and/or agriculture</p> <p>C3 Restoration, increase in tree cover (in a ‘sustainable harvest’ regime the time-averaged C stock of a land use system does not depend on the growth rate, but on maximum stock at time of harvest)</p> <p>C4 Accumulating wood and other products derived from recent plant production in, for example, the form of houses, furniture, paper, organic waste dumps.</p> <p><b>Productivity and direct profitability (P)</b></p> <p>P1 Allowing extraction of potentially renewable resource use</p> <p>P2 Non-renewable resource mining</p> <p>P3 Nutrient and water supply for agriculture</p> <p>P4 Biotic relationships: pollination, plant and animal, pests diseases and their control</p> <p><b>Human health &amp; landscape beauty (H)</b></p> <p>H1 Regulation of human pests and diseases</p> <p>H2 Detoxification of air, water, food</p> <p>H3 Spiritual, religious and aesthetic values</p> <p>H4 Opportunity for active recreation (ecotourism)</p> <p>H5 Ecological knowledge</p> <p>Notes</p> <p>1. This increases in relevance with the increasing loss of natural habitat; it will only allow the conservation of part of the original species pool – with losers among the organisms that few people want to have in their backyard (tigers, elephants) or as direct neighbours (e.g., pests), and those that can not tolerate people as neighbours.</p>
---



**Figure 4.** Tentative grouping of the four categories of environmental services as distinguished by the Millenium Ecosystem Assessment (Table 3) into ‘relative agronomic functionality’ or (RAF) and ‘relative ecological functionality’ (REF), with the cultural/ spiritual values and landscape beauty linked to ‘ecotourism potential’

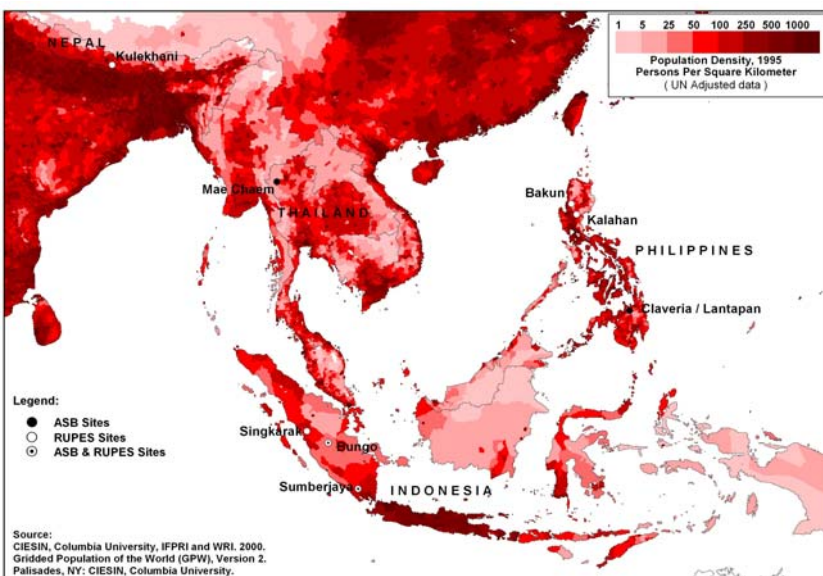
**Table 3.** Ecosystem service classification used for Millenium Ecosystem Assessment

	Equivalent in Table 2
<b>PROVISIONING SERVICES</b>	
Food: crops, wild fruit and vegetables, meat, fish	P1
Fiber:	P1
1. fuel wood and charcoal	
2. timber for construction and furniture	
3. for textiles and paper	
Feed: fodder	P1
Fresh water, water supply	W1
Biological products	B2 / P1
1. biochemical, medicines, pharmaceuticals	
2. ornamental resources	
Genetic resources	B1
Minerals, sand and non-living resources	P2
<b>REGULATING SERVICES</b>	
Air quality	W7, H2
Climate	
1. water flow	W2, W3
2. water purification	W4
3. carbon sequestration	C3
Erosion control	W5
Regulation of pests and diseases in:	
1. humans	H1
2. their domesticates	P2
Detoxification	H2
<b>SUPPORTING SERVICES</b>	
Soil formation	P3
Nutrient cycling	P3
Pollination	P4
Primary production	P1
<b>CULTURAL AND SPIRITUAL</b>	
Spiritual and religious values	H3
Recreation and ecotourism	H4
Inspiration and aesthetic values	L1
Sense of place and culture:	L1
1. cultural diversity and identity	
2. cultural heritage value	
Knowledge systems: ecological knowledge	H5
Other	



**Figure 5.** Interactions between ‘drivers’, the land use mosaic and its consequences for human and ecosystem well-being; RUPES is aimed at enhancing the feedback between the consequences of ‘ecosystem services for human wellbeing’ and the drivers of land use change

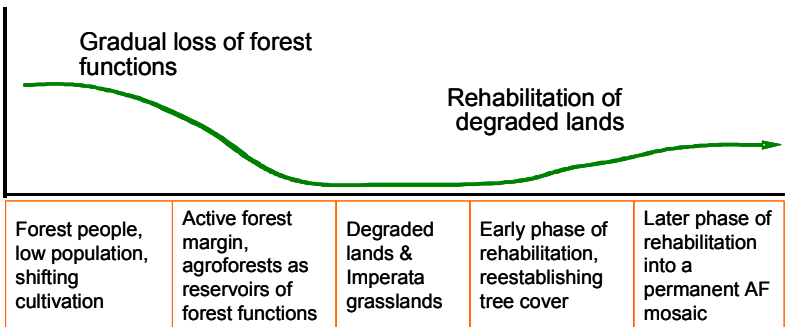
Conceptually the Millenium Ecosystem Assessment arrives at the need for modifying the incentives for land users in a way that supports a broad interpretation of RUPES interventions. The key actors in ‘agro-ecosystems’ respond to both *internal* (‘endogenous’) and *external* (‘exogenous’) signals. Their response will modify the spatial aspects of land use and/or the intensity with which agricultural inputs, human and social capital are used for productive purposes. This has consequences for human well-being through direct production and indirect effects on ecosystem services, as well as for ecosystem wellbeing. Our main interest in this stage is in the feedback loops that relate the overall performance of the agroecosystem as perceived by actors and stakeholders, back to ‘drivers of change’: internalizing impacts of farmer decisions that previously were considered to be ‘externalities’.



**Figure 6.** While climate, soil and natural vegetation in the (sub)humid tropics may provide a broadly similar level natural capital, the differences in population density (from <math><1</math> to >math>180</math> people

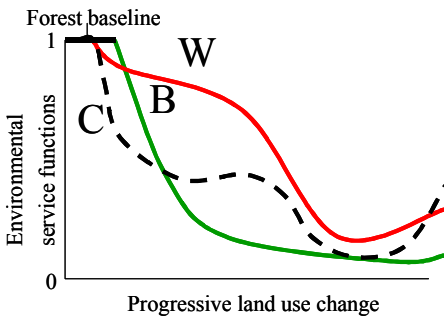


### 3. Degradation-rehabilitation histories differ between the various environmental services



**Figure 7.** The ‘inverse’ relationship or ‘inverted Kuznetz’ curve of environmental degradation followed by rehabilitation that appears to capture many of the land use change histories in settled parts of the world; the version with Imperata grasslands as the main degraded phase is a common form in the humid tropics of Southeast Asia

The main environmental services differ in their response to land use change (Fig. 8).

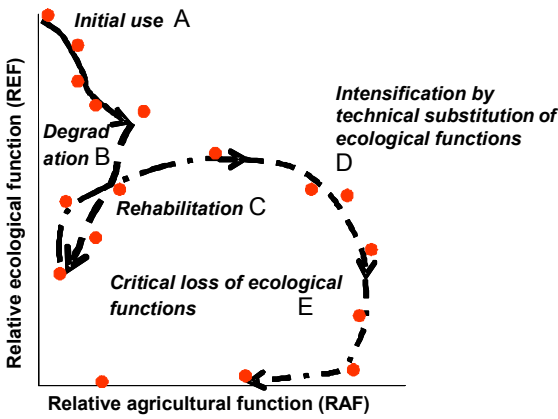


**Figure 8.** A semi-informed perception of the general trends in the three classes of environmental service functions B(biodiversity), C(carbon) and W(watershed functions) during progressive land use change, taken relative to a forest baseline

Degradation processes, however, differ in the degree to which they are reversible by normally available means. Physical soil degradation, for example, can have its primary effect via a compaction of the macropores that allow for rapid transport of water in forest soils, or via the reduction of the potential surface infiltration rate, through the formation of ‘crusts’ on the soil surface. In relatively dry climates this may even be the primary effect that leads to overland flow in conditions where the soil remains far from saturation. Where surface phenomena such as crusting rather than soil compaction dominate in the soil physical degradation process (as is often the case in drier climates), recovery may be faster: any type of cover (e.g. mulch) that protects the soil from the direct impact of rain and sunshine and stimulates soil biological activity may lead to recovery in a time frame of months.

It is important to correctly diagnose what type of degradation dominates in a given location, as it influences the time frames for potential recovery. Avoiding compaction on sites that are still in a ‘natural forest’ condition is probably more effective than ‘rehabilitation’ of degraded sites. Where surface processes dominate, however, rapid gains by mulch-based ‘restoration’ activities can be expected.

Many systems operate below the unavoidable trade-off between Relative Ecological Function (REF) and Relative Agricultural function (RAF) (van Noordwijk et al., 2004). Where forms of agriculture (again used in a broad sense here) have lead to degradation of the resource base for both agriculture and ecological function, e.g. by exhaustion of soil fertility, loss of topsoil, pollution of water resources or weed infestation, there may be opportunities for a ‘win’-‘win’ rehabilitation phase (Fig. 9). To get started on such a trajectory, however, usually needs investment and resources (labour, technical inputs or forms of collective action) that were not available previously. External help in such a phase may pay off for the beneficiaries of the environmental services – but not immediately. For some of the environmental effects, such as pollution of lakes and surface water, recovery takes time as non-linear responses are involved.



**Figure 9.** Schematic relationship between relative ecological and agricultural functions of land during phases of intensification – degradation-rehabilitation (based on van Noordwijk et al., 2004)

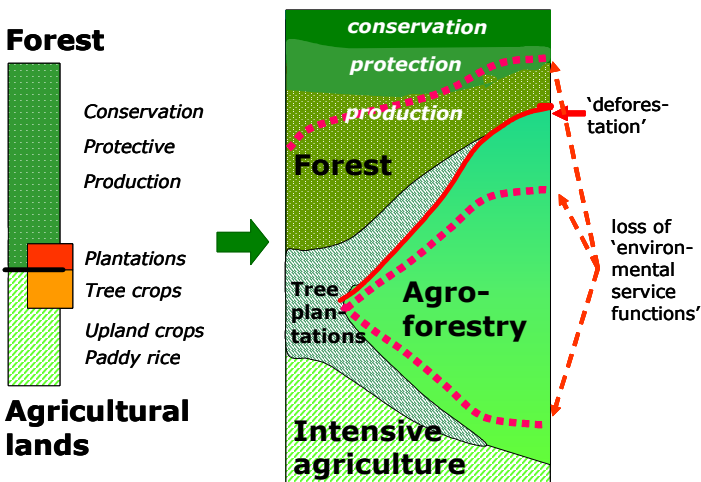
**Table 4.** Opportunities for rewards for environmental services in different phases of a land use change scenario (Fig. 9).

Phase	REF	RAF	Key issue	Can PES work?
Initial phase	Lose (C, B & W)	Win a bit	Protect sufficient areas from agricultural conversion	By ‘guardianship’ of protected areas, providing income alternatives
Degradation	Lose (C, B & W)	Lose	Lack of incentives for sustainable forms of RAF	Tenurial security, access to markets, knowledge & inputs
Rehabilitation	Win a bit (C, W)	Win	Investment in recovery of sustainable land use	Rewards for ‘stewardship’ labour in restoring REF
‘Best practice’ intensification REF-substitution	Lose a bit (W)	Win	REF substitution by inputs checked by input costs	Tax on REF substituting inputs, rewards for REF maintenance
Critical ecological functions lost	Lose	Lose	Recognize & avoid REF thresholds where ‘crash’ starts	Focus on damage control and stop of lateral flows causing downward spiral

*Local opportunities for a win-win option for enhancing environmental services as well as the productive use of land exist after a lose-lose phase of degradation; otherwise protecting environmental services involves opportunity costs for missed agricultural production.*

#### 4. Optimal choice among segregate and integrate options depends on trade-offs

Public policies and perceptions in many countries have been built on a dichotomy (segregation) between ‘forest’ and ‘agriculture’ – where the first is primarily associated with environmental services (as well as highly valued stocks of timber), and the second with production of food and provision of income. In reality a large part of the landscape is somewhere in between these two – it integrates across the environmental and productive functions. Depending on the operational definition of ‘forest’ we can say that the loss of ‘forest functions’ does not have to coincide with ‘deforestation’ (Fig. 10).



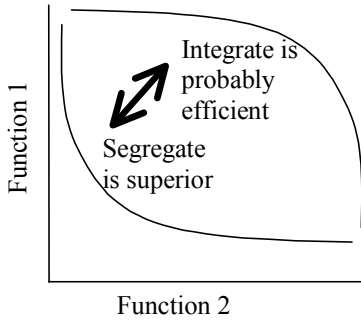
**Figure 10.** Discrepancy between the institutional and legal distinctions between ‘agriculture’ and ‘forestry’ and the reality in the landscape mosaic where many intermediate forms exist

Although much of the landscape may be in some intermediate form of multifunctionality, this may not be the most efficient way to achieve multifunctionality for society. Specifically for biodiversity, the apparent need for ‘segregation’ by the establishment of conservation areas has long been realized. While many countries may have now set aside some 10% of their land area for conservation purposes, the environmental services of the other 90% are not negligible. In fact, a focus on enhancing these functions in the landscape mosaic may be more relevant at this stage than efforts to increase from 10 to 12% of land set aside for pure conservation...

Proponents of a ‘segregate’ and those of an ‘integrate’ pathway tend to be strongly attached to their point of view. The issue, however, is open to a more formal analysis. If we do so, we see that the choice between ‘segregate’ and ‘integrate’ approaches to multifunctionality of land use critically depend on the shape of the REF/RAF trade-off curve.

There are trade-offs among environmental service functions as well as between ES and agricultural production. For example, maximizing carbon sequestration through fast growing trees tends to reduce water availability downstream. Ideally, farmer decisions would be informed by the external value of all ES and

get rewards for the degree to which each service is provided – through a form of **bundling** of ES. This would avoid the need to specialize (segregate) on a single ES. In practice, however, the transaction costs (see section 19) may be prohibitively high for multiple (partial) services and multiple external stakeholders (each with their own set of institutional mechanisms).



**Figure 11.** The shape of the trade-off curve between two functions determines whether they are likely to be integrated for mutual benefit, or can be better spatially integrated. A classical form of this 'segregate/integrate' issue is between the provision of environmental services and agricultural production. Is it better to have very intensive agriculture in a small space and keep the rest of the land for 'nature' or are we better with 'environmentally friendly' but less productive agriculture on much of the land available? Is it worthwhile to pay for environmental services in agriculturally used landscapes?

## 5. Tragedy of commons re-visited: regulations, property rights, rewards & collective action

'Commons' traditionally refers to land that can be used, e.g. for grazing of domestic animals and/or felling of trees for construction of houses or collection of firewood, by any one who belongs to the local 'community'. The rules for exclusion by those not belonging to the 'community' differ with local customs and can change with time. In a classical study, Hardin (1960) concluded that private marginal benefits of further resource use (e.g. one more animal added to the herd that is already overgrazing) exceed the private costs, as long as other in the community are sharing in the costs. The discrepancy between the scale at which benefits and costs accrue leads to overexploitation. The main way to overcome this problem, in the view of Hardin and many subsequent analysts, is to privatize the common lands – as in fact has happened in much of the European landscape where 'commons' used to exist.

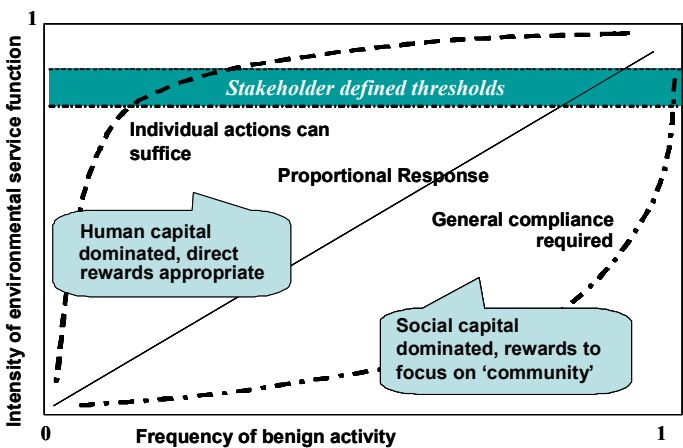
Fisheries in inland waters, coastal zones or open sea are another version of the 'commons', with traditional 'open access' rights for local, national or even international communities. Efforts to regulate the fishing effort are needed as the marginal private profitability leads to fish population decline below the maximum-harvest level. So, collective action and regulation is needed. Community-based forest management has become a popular concept – at least with some; others believe in privatization and deregulation as basis for sustainable development.

In a recent discussion of 'Tragedy Averted: The Promise of Collaboration', Bryan (2004) considers why environmentalists, for the most part, continue their skepticism of collaborative

approaches to environmental and natural resource decision making, particularly on public lands. “Such collaborative approaches, many have argued, are an abdication of government authority, circumvent environmental laws, lead to lowest common denominator solutions, are not accountable to public and scientific review processes, and are undemocratic. Environmentalists can point to flawed decision-making processes that contain these elements. Such processes, however, are generally not publicly and statutorily accountable collaborative processes. Moreover, thoughtful and accountable collaborative approaches, more than other kinds of decision-making processes, hold promise that other decision-making approaches lack—that of creating a sense of shared ownership of our larger and more complex problems. Achieving shared ownership, and ultimately averting the inevitable tragedies of the commons facing society today, requires a shift in how decision-making processes are structured and managed. His article explores paradoxical barriers to creating a culture of shared ownership and the role of collaboration in overcoming those barriers.”

In the context of ‘environmental service rewards’ we need to look at the ‘tragedy of the commons’ both at the level of potential beneficiaries/buyers and potential providers/sellers. To start with the latter, the relationship between the frequency of ‘benign’ land uses and the emerging level of environmental service differs essentially between the services (Fig. 12). A service like providing clean water only exists if every one complies, while carbon stocks can be increased on a piece-by-piece area basis.

*Some ES supply situations will strongly depend on collective action of the ‘sellers’ while for others clear property rights may be a sufficient condition.*



**Figure 12.** Dependence of the environmental service on the part of the landscape in which ‘benign’ land use practices exist

On the buyer side we have a similar question of ‘collective action’: for most of the environmental services we discussed so far the opportunities for an individual buyer to exclude non-buyers from the benefits is limited. Why bother to pay if others will benefit free of charge (‘free riders’)? Environmental economists use a two-dimensional classification of issues under ‘rivalry’ (does use of the services by one person reduce their

**Table 5.** Classification of public goods by the degree to which they are consumed and thus lead to rivalry (or competition) and the degree to which others ('non-buyers' or 'free-riders') can be excluded from the benefits; Landell-Mills and Porras, 2002.

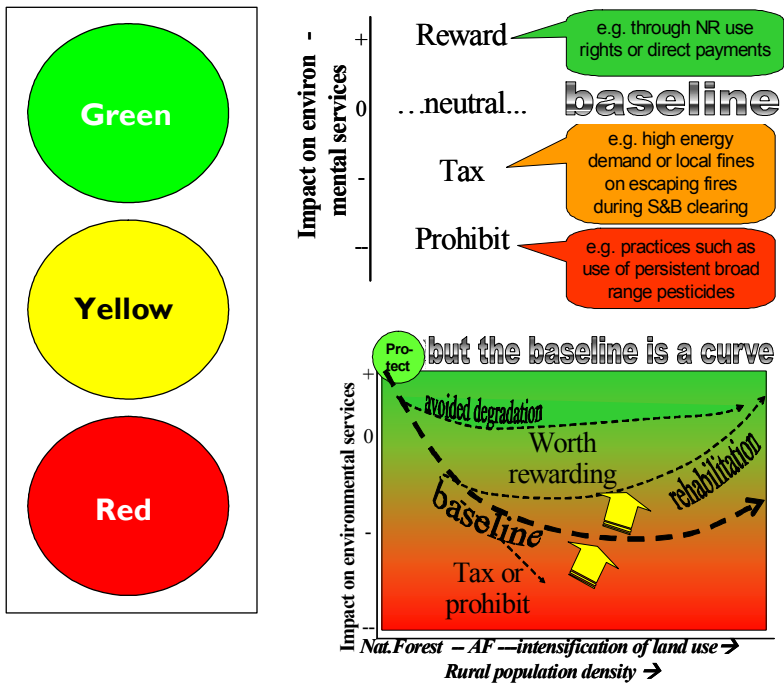
		Rivalry		
		Low	Middle	High
Excludability	Low	<b>Pure public goods</b> Carbon sequestration Biodiversity (existence)	<b>Open access resources</b> Landscape	
	Middle	<b>Local public goods</b> Flood control	<b>Common property resources</b> Water purification	
	High		<b>Club goods</b> Biodiversity (use) Wildlife habitat (use)	<b>Private goods</b> Recreation (e.g. tourism, hunting)

*Most if not all ES reward schemes will require 'collective action' (with exclusion of non-paying beneficiaries) at the buyer level; some require collective action by the sellers.*

availability to others?) and 'excludability' (is it feasible to exclude non-payers from the benefits?).

Every society needs (and usually has) norms of behaviour that cannot be tolerated if it harms others in a more-than-proportionate way. This involves the social and ethical domain of interaction as well as physical aspects of the environment. E.g. societies may have found that the use of broad-spectrum persistent pesticides, such as DDT, have too many side effects and that no individual should be allowed to use them for solving their immediate, private problems. Once there is a law, citizens are not awarded for not committing crimes – they are punished when they do. For less severe infringements on public goods and public space, most societies have found forms of imposing 'tax' – which is the opposite of a reward for positive behaviour that is 'better than expected'.

The point here is that the **baseline** of what is **expected** depends on society and its context. The situation is further complicated by the issue of limited 'legality of the law' in societies where multiple sets of institutions and rules are super- imposed to each other: "we will not respect the law, until the law respects us".



**Figure 13.** Reward, tax or prohibit as the three ways by which communities and societies achieve that farmers and other NR managers ‘internalize’ the externalities of impacts on common environmental services

*Reward cannot be used where rules are not followed (we don't pay criminals not to commit crimes); revising ineffective rules may be needed before rewards can play their role.*

## Section 2: An economics perspective

### 6. National economic policy needs to be based on 'genuine savings': growth data need to be corrected for changes in environmental services and natural capital

While macro-economic growth is essential for developing countries, the traditional measures need to be augmented. Investment in education and depletion of natural capital need to be considered in a 'genuine savings' approach (Arrow et al., 2004). Existing data of the World Bank at national level and for groups of low, middle and high income countries allow such

*On a per capita basis, low income countries have few 'environmental services' to offer – but help to reduce their high deforestation rates, increase effective biodiversity conservation and access to cleaner energy sources can assist both globally and locally.*

analysis (Table 6). Large differences in the relation between environment and development emerge if we look at the data at this level of aggregation.

**Table 6.** Selected indicators of development, natural capital and 'genuine savings' for countries classified as low, middle or high income, respectively (Source: 'Little Green Data Book' World Bank)

	Low	Middle	High
<b>Population (millions)</b>	2,494.60	2,737.90	966.2
Urban population (% of total)	30.6	52.6	<b>77.7</b>
Gross Domestic Production (GDP) (\$ billions)	1,124	5,139	26,053
Gross National Income (GNI) per capita, Atlas method (\$)	430	1,850	<b>26,490</b>
<b>Agriculture</b>			
Land area (1,000 sq km)	32,424	66,725	30,996
Agricultural land (% of land area)	43	38	36
Irrigated land (% of crop land)	<b>26.3</b>	19.3	12.2
Fertilizer consumption (100 grams/ha arable land)	710	1,020	<b>1,230</b>
Food production index (1989-91 = 100)	136	150	113
Population density, rural (people/sq km arable land)	<b>510</b>	<b>473</b>	205
<b>Forests</b>			
Forest area (1,000 sq km)	9,031	21,493	7,955
Forest area per capita (ha)	0.36	0.79	<b>0.82</b>
Forest area (% of total land area)	27.1	32.7	26.1
Annual deforestation (% change, 1990-2000)	<b>0.8</b>	0.1	-0.1
<b>Biodiversity</b>			
Nationally protected area (% of land area)	8.4	9.1	<b>19.5</b>
<b>Energy</b>			
GDP per unit of energy use (PPP\$/kg oil equiv)	3.6	3.7	4.7
Energy use per capita (kg oil equiv)	518	1,339	<b>5,423</b>
Energy imports net (% energy use)	-8	-36	26
Electric power consumption per capita (kWh)	317	1,447	<b>8,421</b>
Share of electricity generated by coal (%)	<b>49.2</b>	38.8	37.6

2.5 (rural) poor per (urban) rich who earns 50x as much

The rural poor rely on intensive land & water use, less fertilizer, little forest left

Poor countries loose their forests and don't protect as much as the rich can afford to do



	Low	Middle	High	
<b>Emissions and pollution</b>				
CO2 emissions per unit of GDP (kg/PPP\$ GDP)	0.5	0.7	0.5	
CO2 emissions per capita (mt)	0.9	3.4	<b>12.4</b>	Poor countries energy use is inefficient and polluting
Consumption of CFCs (ODP metric tons)	14,561	<b>57,484</b>	927	
Particulate matter (pop—weighted average—µg/m3)	<b>64</b>	38	33	
Passenger cars (per 1,000 people)	6	40	<b>436</b>	
<b>Water and sanitation</b>				
Freshwater resources per capita (m3)	6,416	9,938	..	
Freshwater withdrawal (% of total water resources)	6.5	5.3	9.3	Rich countries use water for urban & industrial use, rather than agriculture
Freshwater withdrawal agriculture (% of total)	<b>92</b>	73	42	
Access to an improved water source (% total pop)	76	82	..	
Access to sanitation (% total pop)	43	61	..	
Under-5 mortality rate (per 1,000 live births)	<b>121</b>	37	7	
<b>National accounting aggregates – 2002</b>				
Gross national savings (% GNI)	21.5	<b>27.7</b>	17.4	
Consumption of fixed capital (% GNI)	8.4	10.1	<b>13.1</b>	
Education expenditure (% GNI)	2.6	3.8	<b>5</b>	
Energy depletion (% GNI)	5.9	<b>7.7</b>	0.7	
Mineral depletion (% GNI)	<b>0.4</b>	0.3	0	Middle-income countries are the ones that are really growing healthily
Net forest depletion (% GNI)	<b>0.8</b>	0	..	
CO2 damage (% GNI)	1.3	<b>1.4</b>	0.3	
Particulate emission damage (% GNI)	0.6	<b>0.7</b>	0.3	
Adjusted net savings (% GNI)	6.7	<b>11.3</b>	8	

## 7. Private land use decisions do not fully consider the environmental costs to others: there are externalities that need to be internalized

The motivation of ‘buyers’ to make payments for environmental services often depends on the expectation that these payments will actually influence land use decisions towards more care for the environmental services.

Two situations can be distinguished: one relates to a choice between qualitatively different land use types, the other to quantitative changes in the intensity of land use (but staying within the same class of land use systems).

### Case 1. Choices between land use types

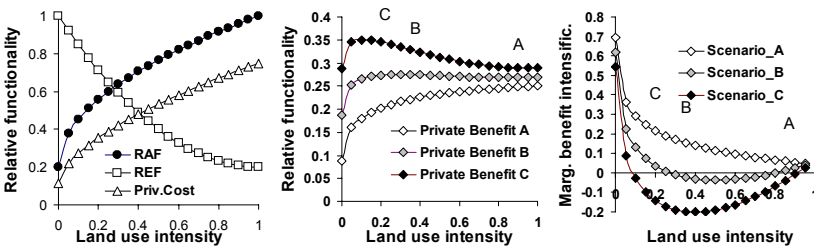
Land use types such as ‘agroforests’, ‘plantations’ or ‘open field food cropping’ can differ substantially in environmental impacts for similar private benefits – as shown by the example of the rubber agroforests of Sumatra in comparison to oil palm monocultures (Murdiyarto et al., 2002). A relatively small incentive that compensates rubber agroforest farmers for the ‘opportunity costs’ of not converting their lands to oil palm monoculture can make the more environmentally friendly land use systems the most attractive for farmers. This may lead to substantial gains in (or avoid substantial losses of) environmental services for a moderate cost. The problem, however, is that the opportunity for conversion will remain and recurrent rewards may be needed for the service to be continuously provided.

### Case 2. Intensification within a land use system

Making some bold assumptions (that seem to be justifiable for most situations) we can expect that farmers make decisions on ‘land use intensity’ as reflected in  $I_{LUI}^1$  by searching for a balance between four relationships:

1. The expected yields and ‘agronomic functionality’ (RAF = Relative Agricultural Functionality) that may have a low but non-zero value for ‘natural systems’ and tend to increase in a ‘diminishing returns’ fashion with  $I_{LUI}$ ,
2. The environmental services such as provision of clean water, maintenance of biodiversity and carbon storage (REF = Relative ecological functionality) that may have a low but non-zero value even for the most intensively used agricultural systems but tends to decrease monotonely with  $I_{LUI}$  from a maximum for completely ‘natural’ systems,
3. The costs of land use that include a ‘fixed cost’ component plus a variable cost that depends on the level of intensification (as there tends to be a partial substitution of human labour for chemical inputs and fossil energy, the overall relationship with  $I_{LUI}$  is likely to be non-linear, but still monotone rising),
4. Overall benefits for the farm household that derive from the difference between ‘costs’ and ‘benefits’ – with the benefits existing of some combination of food and income linked to RAF and clean water and other environmental services linked to REF.

Standard economic theory on maximizing the net benefits then suggests that the ‘optimum’ land use intensity depends on the relative ‘weight’ by which the impacts of land use on environmental services are internalized in their ‘welfare’ judgement (Fig. 14).



**Figure 14.** Relationship between land use intensity, agronomic functionality (linked to yield), costs and net benefits, for three scenarios that reflect increasing relative ‘weight’ of the environmental services in the net benefit function: 0.02, 0.1 and 0.2 for scenarios A, B and C, respectively.

For the example from Fig. 14 we can conclude<sup>2</sup> that a moderate degree of ‘internalization’ of the impacts of land use intensity on environmental services *may* lead to a drastic change in decisions on land use intensity. If ‘outsiders’ who assign more weight to the environmental impacts than the farmer can ‘transfer’ some of their benefits to the farmer both farmers and outside stakeholders may benefit at relatively low cost.

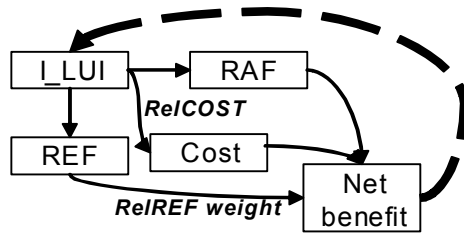
<sup>1</sup> As elaborated elsewhere, aspects such as length of fallow, frequency of cropping, use of labour for weeding, fertilizer, pest control measures can all be captured in a single ‘index of land use intensity’  $I_{LUI}$ , rescaled to 0-1.

<sup>2</sup> The example of Fig. 1 depends on a number of parameter choices, but is qualitatively generalizable.

Calculations like this assume that farmers can make free and well-informed decisions about the various determinants of overall land use intensity, weighing all short and long term costs and benefits with appropriate discount rates for future costs and benefits.

Of course, real-world farmers do not quite match these assumptions – and the difference between reality and theory can be expressed as various types of ‘failure’: failure of markets to provide appropriate incentives

and respond to future supply and demand expectations, failures of information flows, or failures of the theory to adequately capture the various types of benefit and costs that the farmer **de facto** weighs in the decision making process.



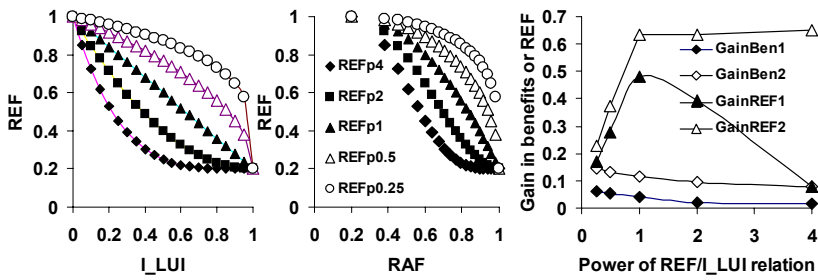
**Figure 15.** Conceptual scheme underlying the analysis of Fig. 14 and 16

In follow-up to the segregate/integrate analysis (paragraph 4) we can explore how the shape of the REF/RAF tradeoff curve influences the relationship between the costs of a PES (REF-reward) scheme and the resulting increase in environmental services that it leads to (under the assumption of fully ‘rational’ decisions by farmers). Fig. 16 illustrates that for near-linear tradeoffs between REF and RAF a smooth continuous relationship between costs and benefits is the result, but for more convex relationships we approach the ‘qualitative’ version of compensating for opportunity costs.

The effects on the optimum choice (from the farmers’ perspective) of land use intensity when the impacts on environmental services (or REF) are included in the overall benefit function for the farmer depend critically on the shape of the relationship between land use intensity and REF. For ‘convex’ forms (i.e. power of the relationship between REF and  $I_{LUI} > 1$ ) of the relationship (where most of the environmental service are affected at relatively low levels of land use intensity), internalization of the ES leads to a substantial gain in REF, but only a relatively small gain in farmer net benefit (as there is a strong ‘trade-off’ between REF and RAF).

Alternatively, for ‘concave’ forms (i.e. power of the relationship between REF and  $I_{LUI} < 1$ ), the farmer will benefit more from a recognition of ES in the overall benefit function, but the change in ES at ‘optimum’ land use intensity is less (as the trade-off is less pronounced).

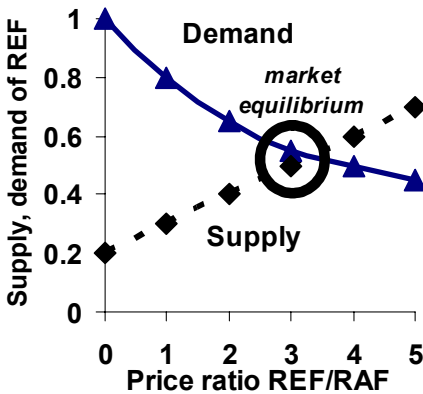
This simple analysis suggests that the net effect on farmers and external stakeholders of ‘payments for environmental services’ to the farmer will depend on the shape of the REF:  $I_{LUI}$  relationship: the more ‘ES benign’ the land use is, the more ‘internalization’ benefits the farmer. For the external stakeholders, however, the ES gain from payments is larger for less-benign land uses.



**Figure 16.** Alternative forms of the relationship between land use intensity ( $I_{LUI}$ ) and environmental services (REF), their effect of the REF/RAF trade-off and the gains in net farmer benefits and REF that can be made if the weight of the REF impacts in farmer net benefits and choice of optimum  $I_{LUI}$  increases from 0.02 to 1 (step 1) or from 0.02 to 0.2 (step 2).

## 8. Emerging markets for ES can in principle correct ‘market failure’ by reducing ‘externalities’

In the previous paragraph we saw that the relationship between the level of payments for environmental services and the likely response of farmers in adjusting their land use will depend on the nature of the REF/RAF trade-off. In the absence of detailed knowledge of this relationship for all farmers, it may be appropriate to take a ‘learning-by-doing’ approach in which markets for ES help to establish appropriate levels of rewards. A market-hypothesis for ES essentially assumes that the demand for ES will decline with increasing price (or increasing price ratio of REF and RAF), while the supply will increase (Fig. 17). If so, a market equilibrium can be found at which we can say the externalities of consequences for ES have been internalized.



**Figure 17.** The basic ‘market’ assumption: both ‘supply’ and ‘demand’ respond to price, and allow an equilibrium to be found.

Table 7 specifies a number of assumptions that (implicitly) underlie a market analogy for ES.

The market analogy implies a number of assumptions that may not be generally met. However, the problems can be partly overcome by active ‘brokers’ or ‘intermediaries’.

*Basic assumptions for a market paradigm for ES don’t hold.*

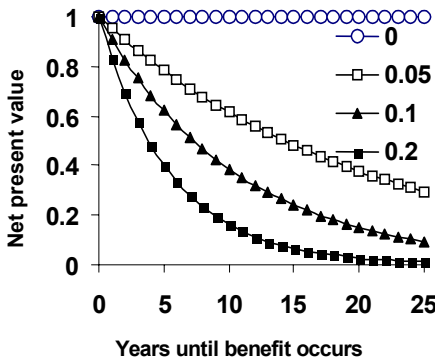
**Table 7.** Assumptions that (often implicitly) underlie the concept of market transactions and the way these assumptions apply to markets for ES from a buyers or sellers perspective, with opportunities for 'brokers' to smoothen the process

Market assumptions	Buyers perspective	Brokers' role	Sellers perspective
Freedom to engage in transactions	Where motivation for ES payments requires protection from 'free riders' the costs may be imposed in the form of a tax  Base levels of ES supply are supposed to be guaranteed by regulation (although not guaranteeing ' <b>freedom to live in a pollution free world</b> ')	Clarifying the scale and cause-effect relationships of ES production  Establishing and maintaining collective action among 'responsible' buyers as 'good citizens'  Improving regulation and compliance	Where supply of the ES requires collective action, freedom of individuals to engage may be restricted by 'social control'.  Respecting base levels of ES supply is often implied by regulation (restricting the ' <b>freedom to pollute</b> ')
Multiple choices of partners for transactions (providers/ consumers) rather than 'monopolies'	In watersheds one does not choose who lives 'upstream'; where protection of location-bound biodiversity is concerned, one doesn't have a choice of local provider; C storage may be the least 'monopolistic'	Moving from conflict to shared responsibility in watershed management  Increasing information flows and access to enhance choice	In watersheds one does not choose who lives 'downstream'; for biodiversity and carbon there may be a substantial range of potential 'buyers'
Without payments the goods won't be delivered (sellers conditionality)	Efforts to increase awareness of sellers that maintaining ES is in their own interest as well as being a moral obligation as 'world citizen' may be the best way to lower the price that has to be paid	Quality control and certification to increase transparency	Basic levels of ES are maintained primarily for local benefits they provide  Threatening to degrade the environment ('blackmailing') may be the most effective way to increase the market price
Without payments the goods cannot be consumed/obtained (buyers conditionality)	Most of the environmental services appear to come as 'public good' and exclusion does not work for reduction of global climate change or existence values of biodiversity	Social control of compliance to (global) conventions and agreements	Water pipes can lead clean water to specific consumers and access to ecotourists controlled, but most other ES are part of 'lateral flows' that can be stopped but not targeted
Price formation reflects both current and expected future scarcity	Technical substitution for ES (higher dykes, more treatment of drinking water, safari parks & zoo's, technical carbon sinks) may reduce future scarcity	Increased information flows and analysis of plausible scenarios	Production functions of ES are strongly non-linear and we often don't know the real 'thresholds', but can assume poor reversibility

## 9. Intergenerational equity and concerns about future environmental services

Care for environmental services is often expressed as aspect of intergenerational equity. Although it may seem economically rational to use the available resources for development in this generation and assume that new solutions and opportunities will be found in due time for future generations, the view that this generation 'borrows' the earth from the future ones, and is supposed to return it intact, has strong moral appeal.

One way to make future benefit flows of environmental services more prominent in today's decision making, is to use a different **discount rate**. A discount rate is commonly used to relate future benefits to today's 'net present value' by discounting them on the basis of the formal or informal rates that apply to lending. E.g. if the discount rate is 0.1 year<sup>-1</sup> a unit benefit to be derived in 5 years time only counts for about 0.5 now.



**Figure 18.** Net present value of a benefit flow of unit value that will occur at some time in the future (x-axis) and is discounted with 0, 0.05, 0.1 or 0.2 % year<sup>-1</sup>.

Economists have long used the concept of ‘shadow prices’ for weighing values that do not have an immediate market price. Where extrapolation into future values more than a decade away are concerned the choice of discount rate may be as important as the choice of the current shadow price. An alternative approach is to try to estimate the future evolution of prices. With increasing scarcity of environmental services being likely and increasing demand to be expected by a still-growing world population (and hopefully an increasing per capita income), it is quite likely that the future market value for ES will considerably exceed the current one (Arrow et al., 2004). This might even mean that negative discount rates apply: the expected gain from holding on to the resource may exceed the current use value. The problem with these approaches, however, is that these future values do not as yet translate to current income, as no bank will think that resource-protection of this nature is credit-worthy. Who controls the resources that are to be protected for future use? How can they guarantee that they will remain in control?

An easier example of the role of discount rates in ES protection is provided by the cases where high discount rates, linked to uncertainty of tenure, lead to land use with negative effects for ES. Rather than payments for environmental services now, we may achieve the same goal of having farmers switch to more long-term views on profitability and resource protection by effectively reducing the discount rate for future environmental benefits. In practice, security of tenurial control over land is directly linked to the effective discount rate. For example, Budidarsono et al. (2004) found that the overall profitability of mixed (multistrata) coffee production systems is higher than that of monoculture systems if the discount rate of farmers with secure tenure is used, while the higher apparent discount rate of farmers with insecure tenure favours going in for a quick profit through a monoculture approach, with negative consequences for environmental services.

## 10. Exchange rates among currencies of the ‘Five Capitals’ are variable

While economic theory is in essence about efficient decision-making in the face of scarce resources, most of economic theory is based on the (implicit) assumption that all ‘costs’ and ‘benefits’ can be ultimately expressed in a single currency, reflecting

‘financial capital’. In as far as this is true, a one-dimensional concept of ‘poverty’ can be used, for example expressed as the ‘1\$/day’ income criterion.

In the analysis of development problems, however, the concept of ‘five capitals’ has gained significant support: within the relevant time scales for development, the exchange between different forms of capital is so slow that it is useful to distinguish different forms of ‘capital’:

- Natural
- Social
- Human
- Infrastructure
- Financial

Substitution and conversion among these types of capital are incomplete and often irreversible. While natural capital can often be ‘cashed’ as financial capital (e.g. by mining or logging), reverse flows into natural capital take time or are virtually impossible. Financial capital gains from conversion of natural capital can support development if it is invested into human, social or infrastructural capital, but this requires ‘good governance’ (itself considered to be a form of social capital – alternative schemes see ‘political capital’ as a separate form).

Although at first sight environmental services may seem to be mostly associated with **natural capital**, the provision of these services in the landscape is directly linked to **human** and **social capital** as well. In a first approximation, we can distinguish a ‘**guardianship**’ role in **avoiding degradation** and protecting the existing natural capital (based on implementation of (local) rules and protection of common resources), and a ‘**stewardship**’ role of more immediate interventions in ‘**restoration**’.

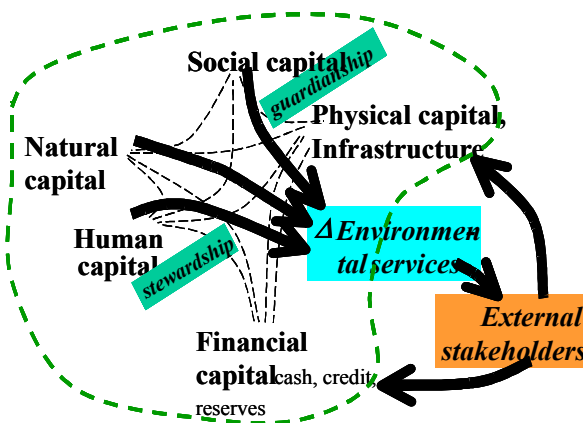


Figure 19. Five capital types, as distinguished in DFID’s livelihood analysis, and their relation to the change in environmental services perceived by external stakeholders and potentially the basis for ES rewards.

Recognizing the different types of capital, also implies that ‘rewards’ can be provided in various forms, e.g. as financial capital (cash, trust funds, tax breaks) or physical capital (health centres, schools, roads).

## Section 3: A social justice perspective

### 11. Environmental services are part of basic human rights and Millennium Development Goals (MDGs)

Clean water is a basic human right... much along the lines that finding a variety of wild fruits that contribute to child nutrition in your direct environment used to be a common ‘birth right’ (when the majority of people lived in landscapes with enough ‘left over’ places for nature).

It is expected that society (through commitment to the Millennium Development Goals) will provide a minimum level of environmental services free of charge – or at least at a charge that is affordable by even the most disadvantaged segments of the population.

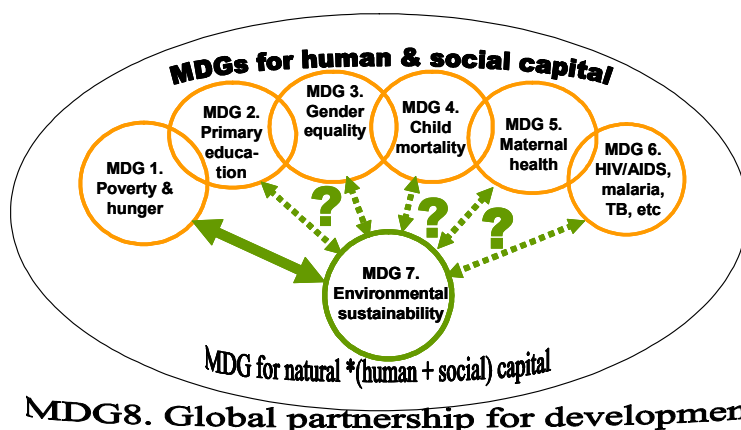


Figure 20. Millenium development goals (MDG's) and the relationships between them

Table 8. Millenium development goals and opportunities for RUPES to link to them (source: <http://www.un.org/millenniumgoals/>)

Millennium Development Goals	Target	RUPES-links
1. Eradicate extreme poverty and hunger	Reduce by half the proportion of people living on less than a dollar a day Reduce by half the proportion of people who suffer from hunger	Some new income opportunities for upland poor
2. Achieve universal primary education	Ensure that all boys and girls complete a full course of primary schooling	
3. Promote gender equality and empower women	Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015	
4. Reduce child mortality	Reduce by two thirds the mortality rate among children under five	Water quality...
5. Improve maternal health	Reduce by three quarters the maternal mortality ratio	
6. Combat HIV/AIDS, malaria and other diseases	Halt and begin to reverse the spread of HIV/AIDS Halt and begin to reverse the incidence of malaria and other major diseases	Nutritional links via fruits & medicinals
7. Ensure environmental sustainability	Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources Reduce by half the proportion of people without sustainable access to safe drinking water	Rewarding guardians and stewards of environmental services



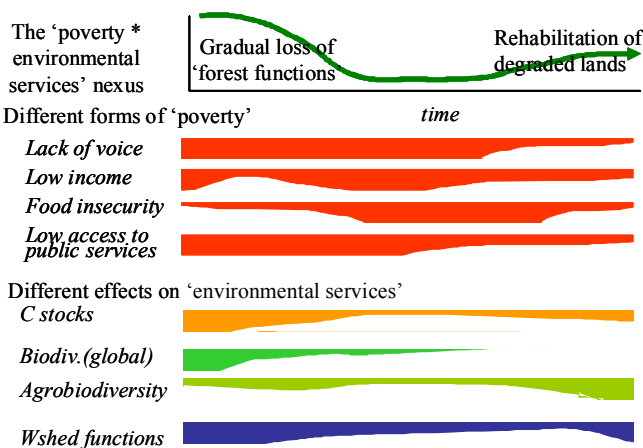
Millennium Development Goals	Target	RUPES-links
	Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020	
8. Develop a global partnership for development	<p>Develop further an open trading and financial system that is rule-based, predictable and non-discriminatory. Includes a commitment to good governance, development and poverty reduction—nationally and internationally</p> <p>Address the least developed countries' special needs.</p> <p>Address the special needs of landlocked and small island developing States</p> <p>Deal comprehensively with developing countries' debt problems through national and international measures to make debt sustainable in the long term</p> <p>In cooperation with the developing countries, develop decent and productive work for youth</p> <p>In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries</p> <p>In cooperation with the private sector, make available the benefits of new technologies—especially information and communications technologies</p>	ES rewards as part of international agreements require better implementation mechanisms

*Where basic public services are absent, the rural poor cannot be expected to provide ES to the rest of society free of charge.*

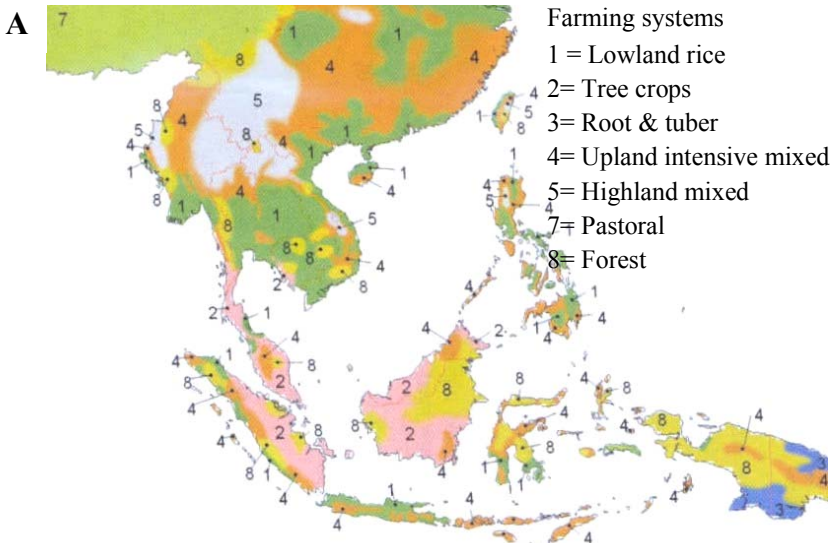
## 12. Dimensions of poverty vary along the intensification landscape, co-varying with ES impacts

Poverty has many faces. Depending on the situation one or more of the following elements may contribute to poverty:

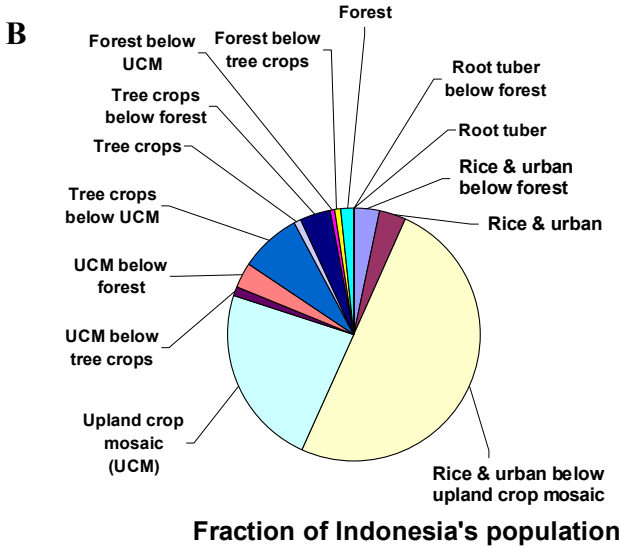
- Food insecurity (calories, protein, quality)
- Low income (the 1\$ day<sup>-1</sup> criterion)
- Low access to public services such as clean water, health care or education opportunities for children – compare the Millenium Development Goals)
- Lack of voice in determining the course of events



**Figure 21.** Hypotheses on the coincidence of poverty dimensions and environmental services across a degradation – rehabilitation transition of a landscape (compare figure 7)



:Source: 'Farming Systems and Poverty: improving farmers' livelihoods in a changing world' by John Dixon, Aidan Gulliver and David Gibbon, 2001; FAO and World Bank



**Figure 22.** Classification of farming systems as rough indication of the types of environmental services provided and the fraction of Indonesia's population that lives in various agroecosystems downstream of others (e.g. very few live in rice agroecosystems downstream of forest, while about 50% live in rice agroecosystems downstream of upland crop mosaics, while another quarter live in these upland crop mosaics)

If we expect that payments for environmental services can be made to have 'pro-poor' impacts, we first need to look at the way different types of poverty tend to coincide with environmental services.

Building on Figure 7, and hypotheses about the way poverty dimensions co-vary with degradation and rehabilitation phases of a landscape, we can expect that there are situations with:

- People living in remote forest environments rich in all aspects of environmental services, but poor because of lack of public services (health, education), lack of political voice and low income, but with enough to eat
- People who can increase their income by starting to sell off the forest and thus reduce the level of environmental services

- People who live in a rapidly degrading environment where food insecurity increases while income opportunities are becoming reduced
- People who live in a degraded environment but in places where access to public services starts to increase, as well as opportunities to obtain income, maybe through seasonal migration or remittances from relatives who take urban or overseas' jobs
- People who live in landscapes where rehabilitation starts to be successful and who have prospects of reducing all dimensions of poverty

The connotation of 'rewarding upland poor for the environmental services they provide' may differ essentially between these situations.

### 13. Rewards for ES enhancing labour are more likely to be 'pro-poor' than rewards for land-based actual ES levels

Environmental services such as the provision of clean water essentially depend on land area, as they derive from rainfall. If one does not 'own' or 'control' land, one cannot provide clean water to downstream beneficiaries. Similarly, biodiversity conservation depends on the availability of land where populations of organisms can 'go on with their lives'. Again, without ownership or control over land, one cannot 'provide the service' in this respect.

It is thus logical that rewards for environmental services may primarily accrue to the owners and 'controllers' of land. The idea that RUPES mechanisms might alleviate poverty seems naïve, to say the least... Or is it?

The human and social capital side of environmental service provision suggests that labour can be a basis for rewards as much as land – and this may open the door to more 'pro-poor' approaches that yet go a step further than making use of lowly paid labour for environmental infrastructure. The 'food for work' concept offers the prospects of providing immediate remuneration for investment in local infrastructure as well as ownership of the improved conditions that hopefully allow self-reliant economic activities in future.

A specific form of the debate emerged in discussions of the Bungo site in Jambi (Sumatra, Indonesia) where interest in biodiversity conservation through extensive forms of rubber agroforests drives concerns over the likely conversion to monoculture oil palm landscapes. Some of these agroforests are managed by owner-tappers, who can be categorized as poor. Other parts of the landscape, however, have relatively large landowners and a system of 'share tapping', that may involve relatives or (trusted) outsiders as operators in the field. These share-tappers share the yields of their labour with the owners of the land, in what may involve a classical patron-client relationship, with the patron acting as middleman and provider

of credit, as well as owner of the land. Will ‘payments for the environmental services’ provided by extensive rubber agroforests push out the share-tappers? Are their ways to make them benefit as well, or even primarily? The RUPES Bungo site hopes to find answers in the coming two years (Table 9).

**Table 9.** Initial evaluation of opportunities to provide affective rewards for conservation of biodiversity in extensively managed rubber agroforests in Bungo

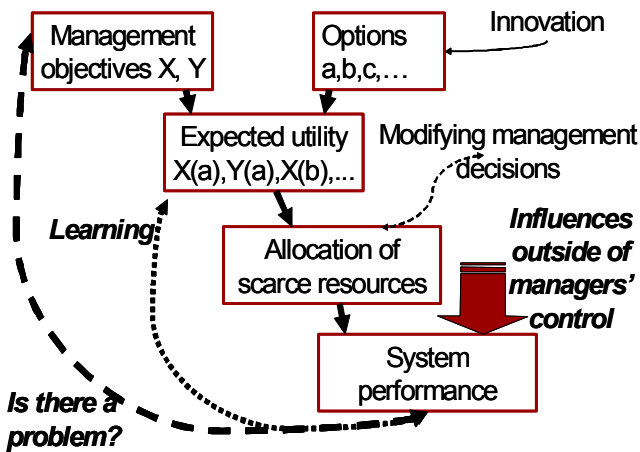
Mechanism	Variants for implementation	Buyers perspective: Real stimulus to maintain ES	Sellers perspective: Opportunity costs of land and labour	Poverty alleviation impacts expected <sup>1</sup>	Transaction costs at pilot level	Ease of scaling up	Main concern
1. Set up institution that buys land in biodiversity rich rubber AF, and allow for use by ‘share tappers’	<ul style="list-style-type: none"> <li>- Local trust fund to become ‘landlord’</li> <li>- Implement at community scale (~ 3)</li> </ul>	<ul style="list-style-type: none"> <li>- The trust fund can set &amp; negotiate the rules for how this land will be managed in future</li> </ul>	<ul style="list-style-type: none"> <li>- Land owners will get the going market price for land (or a bit more if the buyer isn’t well tuned in)</li> </ul>	<ul style="list-style-type: none"> <li>- By offering high ‘shares’, it may drive up the labour-limited share-tapper market</li> </ul>	<ul style="list-style-type: none"> <li>- Medium: establishing credible intermediary institution</li> </ul>	<ul style="list-style-type: none"> <li>- Costs proportional to total area</li> </ul>	<ul style="list-style-type: none"> <li>- Prioritization of land</li> </ul>
2a. Provide annual ‘bonus’ to land owners for rich rubber AF maintained	<ul style="list-style-type: none"> <li>- Implement via local tax</li> <li>- Implement at community scale (~ 3), based on total land area</li> <li>- Annually renegotiate (2b)</li> </ul>	<ul style="list-style-type: none"> <li>- Annual cycle too short: longer term commitment needed through ‘contract’</li> </ul>	<ul style="list-style-type: none"> <li>- Attractiveness varies with ups and downs of alternative LU benefits</li> </ul>	<ul style="list-style-type: none"> <li>- Not clear how benefit will transfer to ‘share tappers’</li> </ul>	<ul style="list-style-type: none"> <li>- Depends largely on payment mechanism</li> </ul>	<ul style="list-style-type: none"> <li>- Costs proportional to total area</li> </ul>	<ul style="list-style-type: none"> <li>- Criteria for allowable use</li> </ul>
2b. Provide a guarantee on the ‘returns to labour’ based on price dynamics in oil palm as main competitor	<ul style="list-style-type: none"> <li>- Use national statistics for update of prices</li> <li>- Implement at community scale (~ 3), based on # of ‘registered rubber tappers’</li> </ul>	<ul style="list-style-type: none"> <li>- Annual cycle too short: longer term commitment needed through ‘contract’</li> </ul>	<ul style="list-style-type: none"> <li>- Reducing risks due to market fluctuations</li> </ul>	<ul style="list-style-type: none"> <li>- Direct benefits to share-tappers &amp; owner/tappers</li> </ul>	<ul style="list-style-type: none"> <li>- Depends largely on payment mechanism</li> </ul>	<ul style="list-style-type: none"> <li>- Costs proportional to total area</li> </ul>	<ul style="list-style-type: none"> <li>- Criteria for allowable use</li> </ul>
3. Support for village-level land use planning based on ‘segregation’ of functions: conserve part of the rubber AF area and intensify elsewhere	<ul style="list-style-type: none"> <li>- Within modified adat mechanisms for setting &amp; maintaining rules</li> <li>- Linked to district land use plans</li> <li>- Support for development</li> </ul>	<ul style="list-style-type: none"> <li>- Doubts about the conservation commitment made, once the benefits have been passed on</li> </ul>	<ul style="list-style-type: none"> <li>- Concern about ‘loss of control’ over the conservation area</li> </ul>	<ul style="list-style-type: none"> <li>- Depends primarily on the ‘development’ quid-pro-quo chosen</li> </ul>	<ul style="list-style-type: none"> <li>- Capacity building for full involvement</li> </ul>	<ul style="list-style-type: none"> <li>- 0/+ (replicate process)</li> </ul>	<ul style="list-style-type: none"> <li>- Elite capture of planning process</li> </ul>
4. Ecolabelling of rubber from rich agroforests for premium price	<ul style="list-style-type: none"> <li>- Full chain of custody</li> <li>- Based on total volume that can be sold at + price</li> </ul>	<ul style="list-style-type: none"> <li>- Supervisory body needed for certification</li> </ul>	<ul style="list-style-type: none"> <li>- How will market differentiation be achieved?</li> </ul>	<ul style="list-style-type: none"> <li>- Benefit flows to all tappers</li> </ul>	<ul style="list-style-type: none"> <li>- High: low awareness in market yet</li> </ul>	<ul style="list-style-type: none"> <li>- ++(eco-nomies of scale)</li> </ul>	<ul style="list-style-type: none"> <li>- Criteria</li> </ul>

<sup>1</sup> . For all methods that conserve rubber AF: additional benefits to poor members of community via maintenance of access for fruits, medicinals, firewood

## Section 4: An INRManagement perspective:

### 14. Natural resource management can be understood at five levels

Farmers are ‘natural resource managers’. As a ‘manager’ they have to deal with multiple objectives, limited resources, incomplete knowledge of how the system they manage responds to external variables and uncertainty about the prospects of the various types of ‘innovations’ recommended to them. They learn from the results of their farms, as well as from discussions with others. Natural resource management can be understood at five levels starting from ‘criteria and indicators’, ‘activities’, ‘management decisions’ and ‘objectives’ through to ‘learning’.

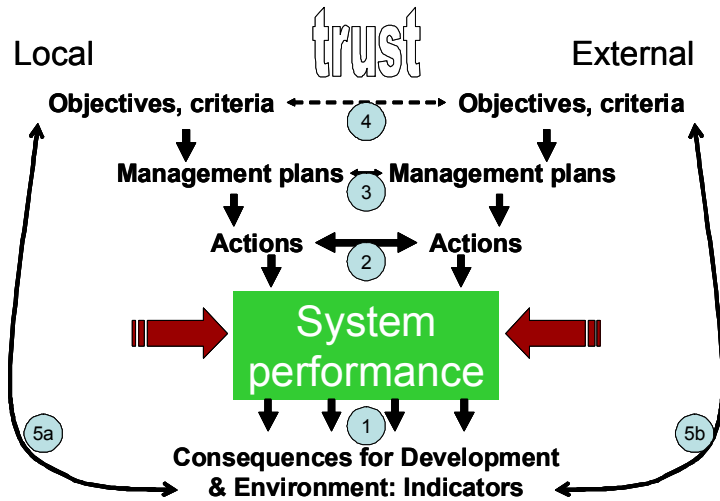


**Figure 23.** Five levels from ‘criteria and indicators’, ‘activities’, ‘management decisions’ and ‘objectives’ to ‘learning’

In a simplified view of natural resource management we can distinguish five levels of analysis:

- impacts of the actual state of the agroecosystem on indicators of the criteria derived from the main functions to stakeholders,
- activities and interventions by the various actors that, together with influences outside of actor control (such as weather) modify the actual agroecosystem
- the management decisions that the various actors make regarding these interventions, based on their resource base, the options known to them and their objectives and motivation
- the objectives and motivation that drive the management decisions
- the learning process by which the range of known options becomes expanded and the expectations of outcomes becomes updated by recent experience.

If more than one group of actors is involved, as is the reality in nearly any watershed in the world, the interaction between



**Figure 24.** Interactions and levels of 'trust' between two groups of actors, based on Fig. 23

these actors can also be analyzed at the five levels (if not at the level of 5 \* 5 interaction terms), as indicated in Fig. 24.

Just focussing on the main diagonal of the interaction matrix, we get five levels of interaction:

1. Interact via the agro-ecosystem itself
2. (Try to) regulate activities, interventions
3. (Try to) influence management decisions via incentives
4. (Try to) modify/share motivation & objectives
5. Shared learning

Most current situations on multi stakeholder interaction in real landscapes in the tropics may yet be at *level 1* or *2*: there are attempts at regulation of activities, but the intrinsic incentives for stakeholders are often not in line with the values that the system represents from a broader perspective. The effectiveness of the 'stick' approach of rules and regulations depends on the overall respect of fear for governance systems. There is a general interest in 'carrot' approaches to complement the sticks, for reasons of fairness, efficiency and effectiveness.

The idea of payments for environmental services is essentially aimed at a *level 3* process, where externalities are internalized, and decisions that are in the best interest of individual stakeholders become aligned with the broader objectives. The RUPES programme is essentially aimed at testing the approach at this level. For true believers in market functions, financial incentives that dynamically reflect the current values to outside stakeholders should be an effective way to the current situation where externalities are linked to market failure. An empirical question is whether it can achieve its goals without going to the next level.

A next step (*level 4*) on the way to 'co-management' is to try to harmonize the underlying motivation and objectives – via 'environmental education' or emphasis on conservation 'ethic' (as expressed in the Landcare movement). If successful, this does not remove the relevance of payments for

environmental services but it may make the participants in the process less calculating and it may make the outcomes less dependent on details of the reward schemes.

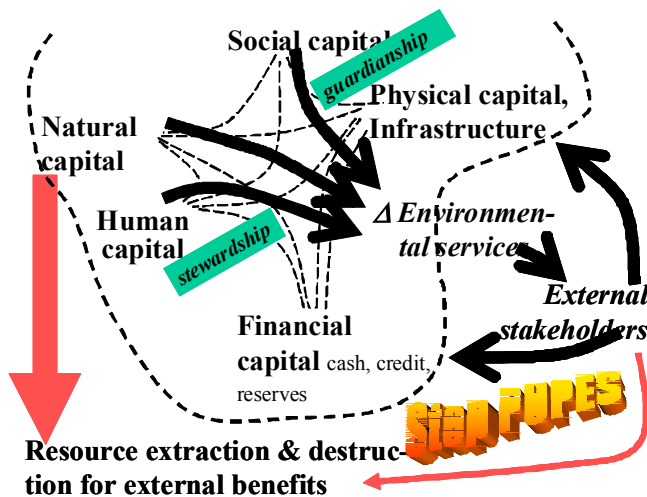
*Transactions involving ES rewards will generally not be conducted on the basis of 'criteria and indicators' as such, but require 'trust' at the level of management plans and (ideally) shared objectives.*

Finally (level 5), a more effective and shared learning on the basis of the actual performance of the agro-ecosystem with respect to the criteria and indicators is probably needed to achieve a long-term sustainable situation.

### 15. Stop PUPES before RUPES

Many of past and current government policies are seen as punishing both the upland poor as well the environment, e.g. by allowing externally resource extraction in the form of mining or logging concessions.

At the first RUPES meeting in February 2002, Ann Gouyon introduced the phrase 'STOP PUPES', or in other words stop current negative impacts on environment and rural poor – before you consider RUPES.



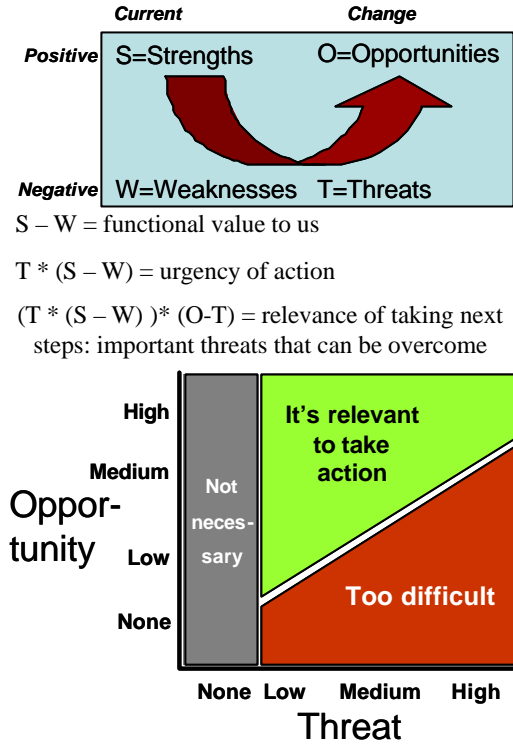
**Figure 25.** In situations where resource extraction and destruction of the environment is primarily driven by outside interests, as may be the case with mining or logging operations sanctioned formally or informally by those in power, it may be more relevant for external stakeholders to help stop these activities that 'punish the upland poor and their environmental services' (PUPES) rather than to focus on positive rewards.

*Local as well as externally appreciated environmental services may be under threat of resource extraction driven by external benefits; stopping this by joint actions may be of high priority*

### 16. Starting with 'easy wins' rather than 'most urgent issues'

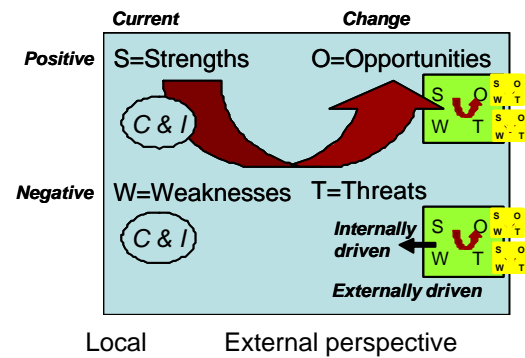
SWOT, or the analysis of strengths, weaknesses, opportunities and threats is a common tool for improving management. It lends itself to participatory methods to achieve a shared perception of the best way forward. In the RUPES context, however, we deal with multilevel SWOTs as both 'buyers' and

'sellers' will have to strategically consider the options and threats to their own, as well the other stakeholders objectives.

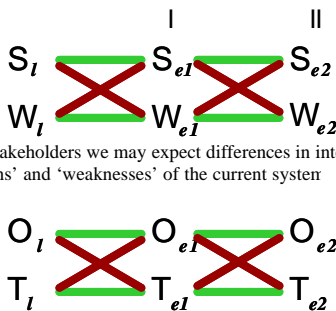


**Figure 26.** Analysis of strengths, weaknesses, opportunities and threats (SWOT) can help in selecting the most relevant course of action: focus on important threats that can be overcome

Multilevel SWOTs explain preference for starting with 'easy wins' rather than 'most urgent issues'. Both the potential buyers and the potential sellers of environmental services are weighing their options, and in one way or another are considering strengths, weaknesses, threats and opportunities. Their SWOTs however, become interlinked. What is a threat to one, may be an opportunity to the other, and vice versa.



**Figure 27.** The threats and opportunities that one considers in a SWOT are partially externally determined, but partly also derive from the internal dynamics of the system: opportunities for others may be threats to you, and vice versa.

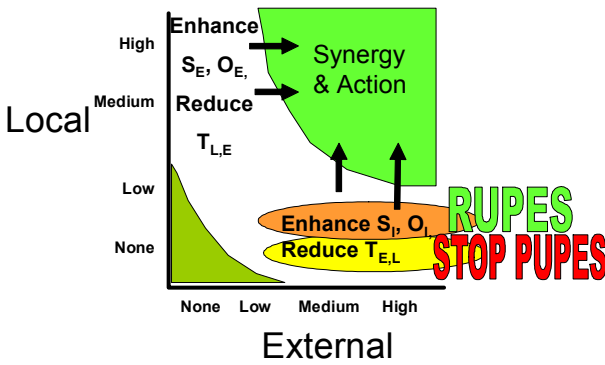


Between stakeholders we may expect differences in interpretation of 'strengths' and 'weaknesses' of the current system

Opportunities at one level may therefore appear as threats at another level, while threats to another level may be opportunities

**Figure 28.** Between 'providers' and 'beneficiaries' of environmental services there is, initially at least, an inverse relationship between opportunities and threats: threatening the current ES may provide an opportunity for 'rewards' for the ES provider.





**Figure 29.** Relationship between the ‘relevance of taking action’ for a local and external agent in the context of RUPES: only where actions are relevant to both can we expect a free choice for activities to conserve or enhance environmental services.

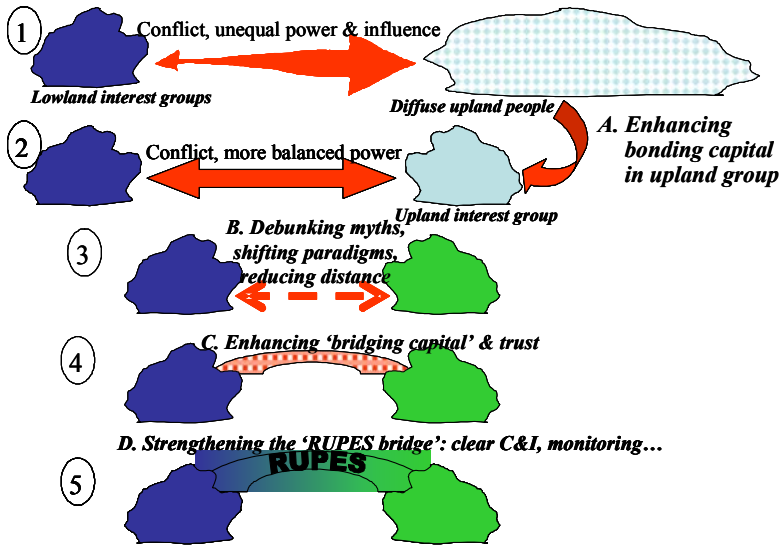
Where the opportunities for ‘buyer’ and ‘seller’ coincide transactions can be made. Where there is no synergy as yet but the external agent (potential ‘buyer’) is keen, the relevance of taking action for the local agent (potential ‘seller’) needs to be enhanced by enhancing the perceptions of strength and opportunities or reducing external threats. Where the local agent is keen but the external one not yet, the opportunities for the external agent need to be highlighted and external threats reduced.

*At an appropriate level of incentives the opportunities for ‘buyers’ and ‘sellers’ of ES may coincide, but the opportunities for the seller essentially derive from the perception of **threat** by the buyer, as they expect locally relevant ES to be protected out of self-interest by the local agents.*

## Section 5: Public policy perspective:

### 17. Public policy stages

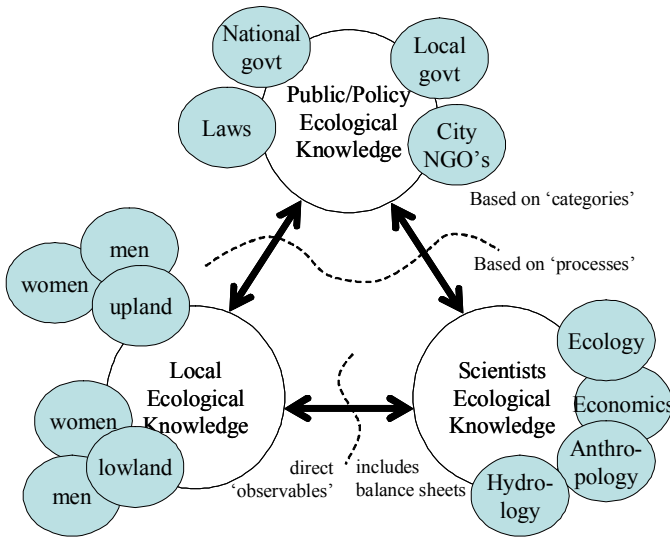
Five stages can be identified in terms of the public policy perspective: search for recognition, negotiation support, payments for environmental services, adaptive co-management,



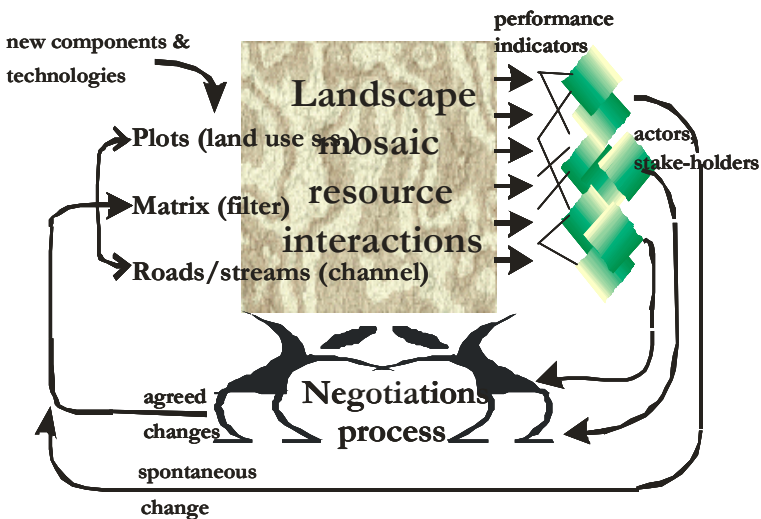
**Figure 30.** Relationships between lowland interest groups (often associated with government) and upland groups vary with situation and time: from 'unequal power and latent conflict' they can change to 'more equal power and open conflict'; conflicts can be overcome in part by shifting paradigms and debunking myths on incompatibilities of the interests of the two groups; initial levels of trust are needed before ES rewards have a chance, but such rewards can further solidify a 'bridge' between the two groups.

Where the initial study that led to the concept of 'social capital' suggested that trust developed in one type of social relationship translates to a higher initial level of trust in other relations (and thus that a generic concept of 'social capital' as public good is valid), more recent work distinguishes between 'bonding' and 'bridging' social capital. The first consists of social ties between members of a segment of society (e.g. ethnic, class, religious or ideological subgroups), and can strengthen their sense of belonging and 'strength'. The second consists of social ties between different subgroups. Put very simply: strong 'bonding' without 'bridging' social capital can lead to (violent) conflict, while the two combined can lead to a strong civil society.

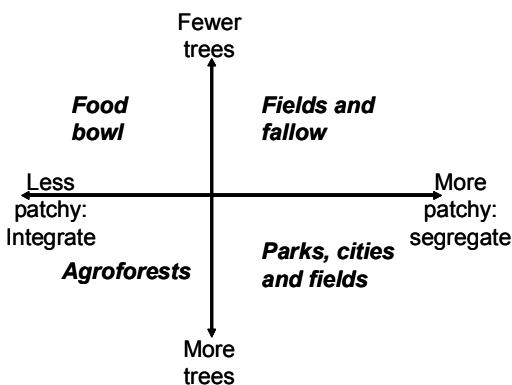
Part of the sense of conflict between lowland upland interests is based on misperceptions (myths, or myth-perceptions) of the real relationships between forests, water and biodiversity. Recognizing the differences between the three knowledge domains (local, public/policy and science) is a step in the right direction.



**Figure 31.** Three types of knowledge and perceptions on environmental services and natural resource management that need to be acknowledged as a first step towards a balanced approach that establishes and builds on trust.



**Figure 32.** Negotiation support systems require tools to enhance a shared perception of the likely consequences for stakeholder interests of the current or plausible future evolution of a landscape, and a process for negotiation that allows all stakeholders to strive for loose less or even 'win'.

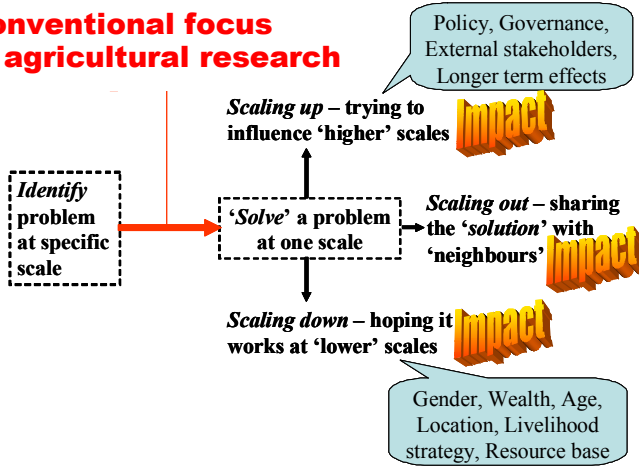


**Figure 33.** Alternative directions of change at landscape scale: changes in tree cover and/or changes in the spatial organization of the landscape along a segregate – integrate axis (Lebel et al., 2004 unpublished).

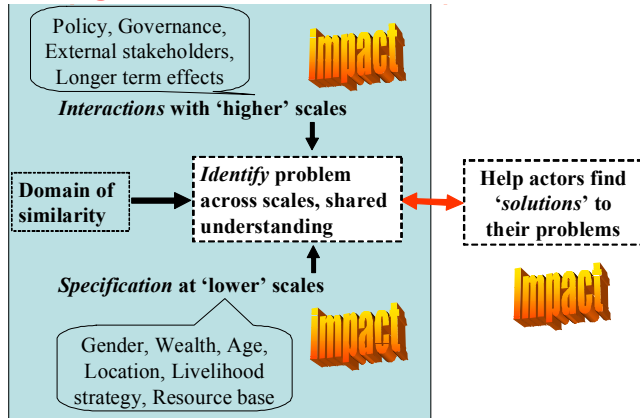
## 18. Baselines, leakage, additionality and permanence are scale issues

Baselines, leakage, additionality and permanence are essentially scale issues; rehabilitation investment is easier to justify than long-term payments for avoided degradation for fear of ‘perverse incentives’.

### Conventional focus in agricultural research



### Integrated Natural Resources Management research



**Figure 34.** Paradigm shift on ‘scaling’ in moving from agricultural technology research to ‘integrated natural resource management’

In the discussion of clean development mechanisms (CDM) and similar approaches to reduce the negative impact of human activities on the atmospheric conditions governing climate, a number of issues have emerged that in fact are relevant in regards to the issues surrounding all ES:

- **Leakage** – will a ‘solution’ at one place simply lead to a shift of damaging activities to elsewhere?
- **Permanence** – will the gains made persist beyond the project period, or will it rapidly fall back to the situation before (‘leakage’ on a time dimension)
- **Additionality** – would the solution not happen without specific efforts; is it not in the logical line of development? If it is a ‘win-win’ option, how can we decide the share in paying the costs?
- **Baseline** – what is the likely trajectory without specific interventions?

The larger the area and the longer the timeframes over which the assessments are made, the less we have to worry about these issues, as they are basically issue of ‘lateral flows’.

At the same time: the larger the areas is, the less likely it is that concerns are shared among stakeholders and the ‘economies of scale’ on the institutional side may differ from the ‘economies of scale’ on the ES side.


The politics of ‘avoiding degradation’ is far more complex than that of ‘investment in rehabilitating a degraded situation’ – the climate change debate shows that a global consensus on ‘avoiding forest loss’ is much more difficult than that on ‘reforestation’ credits, even when the cost effectiveness of the former is likely to exceed that of the second.

### 19. Transaction costs often are prohibitively high, but can be reduced by ‘honest brokers’ and ‘economies of scale’

Experience so far with carbon payments has been that 30-60% of the financial value involved was spent on transaction costs, even in situations with much less stringent requirements than the current Kyoto protocol implies (Oscar Cacho, pers. comm.). Transaction costs are likely to dominate in other ES schemes as well. There is hope, however, that more efficient ways of ‘brokerage’ can be developed that will reduce transaction costs in future.

To make transaction costs manageable, a considerable increase in the efficiency of ‘brokerage’ is needed, bringing parties to the table that really have to offer each other what the other side needs and expects. As a first step, RUPES is collecting experience on ‘rapid assessment methods’ that zoom in on the most critical questions, and lead to a step-wise investment in more thorough analyses only if these have a chance of success.

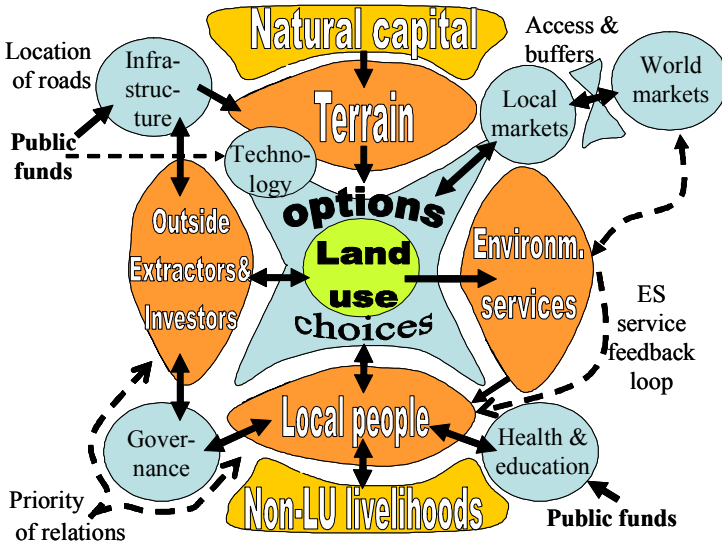
**Table 9.** Four stages in the development of ES reward mechanisms that link the interests of ‘buyers’ and ‘sellers’

	Stage	Providers, Sellers of ES	Intermediaries	Beneficiaries, Buyers of ES
I	Scoping		Rapid Assessment of Marketable ES	
II	Identifying partners			
III	Negotiations			
IV	Monitoring agreements			

*Transaction costs are linked to the level of trust that exists between parties. The current situation with high transaction costs reflects a situation with very low levels of trust.*

## 20. Rewards for ES require trust but also can be a step forward towards trust

Rewards for ES require trust but can also be a further step towards trust and broader MDGs: income, food, nutrition, water, health, education, equity, and peace.



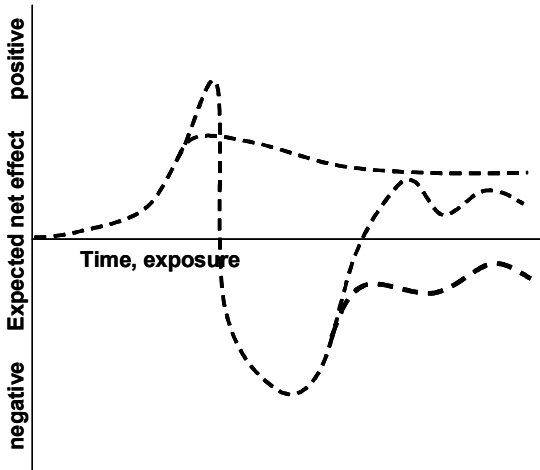
**Figure 35.** A highly schematic view on the land use dynamics in the forest margins, inspired by the situation in East Kalimantan (Indonesia). Here we can see the current pattern of land use as the outcome of interactions between outside extractors/investors (e.g. logging or mining companies), the physical accessibility of the terrain (topography, rivers, roads), the world market demand for products modulated by local market policies, the local people who try to achieve their livelihood needs by a combination of land use and non-land use activities, and a governance system that can be remote or close, leaning towards the extractor/investor side, or responsive to the local people. The land use pattern as such influences the level at which environmental services are available to both local people and the world population at large.

The scheme of Figure 35 and analysis of real-world situations suggests four **prior conditions** that need to be fulfilled before ES payments can provide their role in feedback:

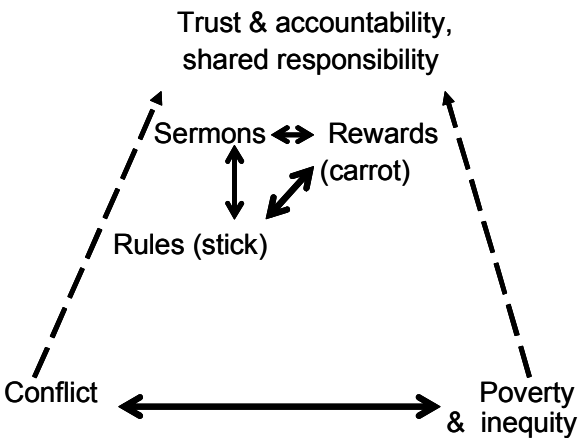
1. The governance system must be responsive to the long-term interests and perspectives of the local people, and not lean towards the outside extractor/investor option,
2. The relevance of environmental services to the livelihood of the local people must be articulated alongside with health and education systems that are provided as ‘public services’,
3. World markets need to link the environmental service consequences for outside stakeholders to the price signals that local actors perceive, at a level that is significant in relation to the direct sale value of the products
4. Basic levels of **trust** are needed between local people, governance systems and external stakeholders – without such trust, PES transactions are unlikely to be sustainable, transparent and effective.

International agreements, such the International Conventions on Biological Diversity (ICBD) and Climate Change (UNFCCC), are first of all agreements between nations. The way these nations

translate commitments to their citizens and private sectors is often left to the individual countries. For international payments for environmental services, however, be they based on carbon stocks or biodiversity, the national boundaries can only be crossed if international **trust** exists and is re-enforced.



In the response to 'new ideas' such as RUPES we can expect a learning curve where initial high expectations of net benefits crash, before realistic expectations gain ground of modest net positive or negative effects ('no silver bullet', but can be made to work – or, in balance not worth the effort). Communication between institutions and people in different parts of this learning curve is valuable and challenging.



Where the starting point is conflicts, poverty and inequity, and a rule-based approach supported by moral appeals has failed to solve the environment + development dilemma, we cannot expect 'rewards' to be the panacea. An evolution towards trust, accountability and shared responsibility will require balanced use of the various 'instruments'.

## Summary and further thoughts

Within the RUPES Program we feel that rewarding upland poor for the environmental services they provide can contribute to reducing poverty and enhancing the Millennium Development Goals. What we have presented is a conceptual basis of RUPES based on twenty facets of the RUPES ‘diamond’.

<p><b>An environmentalist perspective:</b></p> <ol style="list-style-type: none"> <li>1. ‘Environmental Service’ issues follow the ‘issue cycle’</li> <li>2. Two classification systems for ‘Environmental Services’</li> <li>3. Degradation-rehabilitation histories differ between the various ‘environmental services’</li> <li>4. Optimal choice among segregate and integrate options depends on trade-offs</li> <li>5. Tragedy of commons re-visited: regulations, property rights, rewards &amp; collective action</li> </ol>	<p><b>An economist perspective:</b></p> <ol style="list-style-type: none"> <li>6. National economic policy needs to be based on ‘genuine savings’: growth data need to be corrected for changes in environmental services and natural capital</li> <li>7. Private land use decisions do not fully consider the environmental costs to others: there are externalities that need to be internalized</li> <li>8. Emerging markets for ES can in principle correct ‘market failure’ by reducing ‘externalities’</li> <li>9. Intergenerational equity and concerns about future environmental services</li> <li>10. Exchange rates among currencies of the ‘Five Capitals’ are variable</li> </ol>
<p><b>A social justice perspective:</b></p> <ol style="list-style-type: none"> <li>11. Environmental services are part of basic human rights and millennium development goals (MDGs)</li> <li>12. Dimensions of poverty vary along the intensification landscape, co-varying with ES impacts</li> <li>13. Rewards for ES enhancing labour are more likely to be ‘pro-poor’ than rewards for land-based actual ES levels</li> </ol>	<p><b>An INRManagement perspective:</b></p> <ol style="list-style-type: none"> <li>14. Natural resource management can be understood at five levels</li> <li>15. Stop PUPES before RUPES</li> <li>16. Starting with ‘easy wins’ rather than ‘most urgent issues’</li> </ol>
<p><b>A public policy perspective:</b></p> <ol style="list-style-type: none"> <li>17. Public policy stages</li> <li>18. Baselines, Leakage, Additionality and Permanence are scale issues</li> <li>19. Transaction costs often are prohibitively high, but can be reduced by ‘honest brokers’ and ‘economies of scale’</li> <li>20. Rewards for ES require trust but also can be a step forward towards trust</li> </ol>	

There are many more sides to explore of the RUPES diamond. For example, the economic paradigm of ‘borrowing’ and ‘interest’ has an alternative in the form of ‘investment for profit sharing’ in the Islamic banking world. We might find that rephrasing the environmental service debate in that language provides some new insights – as well as possibly new financial mechanisms for achieving the financial transfers between ‘have-a-lots and ‘have-not-much’ that constitutes the lot of the rural poor. But this aspect needs further discussion



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## RUPES working papers (abstracts)

**Rewarding Upland Farmers for Environmental Services: Experience, Constraints, and Potential in Vietnam** Bui Dung The, Dang Thanh Ha, and Nguyen Quoc Chinch

**Published: May 2004**

This report presents the findings of a study to explore constraints and potential to addressing important aspects of poverty in Vietnam Uplands through rewarding the upland poor for environmental services they provide. The study was done by a team of three Vietnamese researchers, under the coordination and supervision of the International Center for Research in Agroforestry in South East Asia (ICRAF SEA). The study was done to provide information for use by the Program Rewarding the Upland Poor in Asia for Environmental Services They Provide (RUPES) and Swedish International Development Cooperation Agency (Sida) in planning future activities.

The study attempts to review RUPES-related experience of rural development projects in Vietnam, with particular focus on rural development projects that are funded by Sida and the International Fund for Agriculture Development (IFAD) in northern Vietnam. Given the “Terms of References” by ICRAF SEA, the projects included in the study were Vietnam-Sweden Mountainous Rural Development programme (MRDP) and five IFAD-funded projects, namely Ha Giang Development Project for Ethnic Minorities (HGDPEM), Participatory Resource Management Project (PRMP) and Rural Income Diversification Project (RIDP) in Tuyen Quang province, Agricultural Resources Conservation and Development Project (ARCDP) in Quang Binh province, and Ha Tinh Rural Development Project (HTRDP).

This study was explicitly conceived as an analytical study, to attain better understanding of RUPES-related experiences, constraints and opportunities to the application of RUPES concept in Vietnam. This study is neither a project evaluation nor an operational planning. However, it provides a background for the development of future RUPES activities in Vietnam.

**Developing Pro-Poor Markets for Environmental Services in the Philippines**

Rina Maria P. Rosales

**Published: 2003**

Originally commissioned and published by IIED, this study was a preliminary assessment of the development of markets for environmental services in the Philippines with a focus on the distribution of costs and benefits among different stakeholder groups, in light of widespread public concern about the impacts of market based instruments on the poor.

There are three objectives of the study (1) to document all efforts undertaken in developing markets for environmental services in the Philippines, (2) to conduct a rapid assessment of institutional mechanisms that have evolved in the development of markets for environmental services, (3) to develop and test a robust framework for monitoring and evaluating the efficacy of markets for environmental services in environmental, economic and social aspects.

**Eco-Certification as an Incentive to Conserve Biodiversity in Rubber Smallholder Agroforestry Systems: A Preliminary Study**

Anne Gouyon

**Published: 2003**

Rubber agroforests managed by smallholders, a low intensity cultivation system with a forest like structure, cover more than 1 million ha in Indonesia and contribute significantly to the conservation of forest species. In the face of the rapid deforestation that is taking place in Indonesia, their importance for conservation is of fundamental importance. Rubber agroforests offer many economic advantages to smallholders, such as low development costs and minimal risks. However, they offer a smaller return on land and labour than alternative land uses, such as the monoculture of high-yielding hevea clones, oil palm, and, in areas close to urban markets, intensive food crop production. In the absence of specific incentives, there are no reasons why smallholders should forego the benefits of more profitable land uses for the sake of biodiversity conservation. This means that the conservation community must be ready to reward the services rendered by smallholders willing to conserve their agroforests instead of converting them to higher-productivity land uses. One way of

internalising the cost of the conservation services is through eco-labelling of the products coming from the agroforests. Selling eco-labelled products at a higher than average price would increase the economic returns from the agroforests. This report examines prospects for selling eco-certified products from agroforests and the potential benefits and constraints of eco-certification.

### Rewarding the Upland Poor for Environmental Services: A Review of Initiatives from Developed Countries

Anne Gouyon

**Published: 2003**

Developed countries have already established a number of mechanisms to implement environmental transfers either within their own country, or towards other countries, including developing nations. The present review looks at a number such of mechanisms with a common matrix of analysis and tries to draw lessons for the design of RUPES mechanisms in Asia. All these mechanisms have been designed to provide reward to farmers for environmental services, and we put the priority on the ones which were clearly targeting upland farmers. Not all these schemes had poverty alleviation as their objective, but many did have a clear social orientation, and in all cases we tried to look at whether these schemes could be targeted to reach poor upland communities.

### Development Assistance to Upland Communities in the Philippines

C. Jensen

**Published: 2003**

Over the last two decades, there has been a growing concern about the alarming rate of Philippines forest degradation and upland poverty. The government have initiated and implemented programs, and policy reforms adopted to address the problem. The country has also been recipient to substantial development assistance of loans and grants from international funding agencies in support of sustainable forest management and poverty reduction. Although there were some successes, upland development assistance has been short of its targets in addressing poverty reduction and natural resource degradation attributable to the following:

1. Sustainable forest management is a long and costly process.
2. Community based forest management democratizes resource use rights, but politics still has the "distributive power".

3. Ineffective policy implementation contributes to deforestation. Ineffective policy implementation have been attributed to lack of understanding, inconsistent interpretations, constant policy changes due to change in administration, "patronage politics" and lack of political will.

4. Ecological values of the forest are implicit in the programs.

5. Good environmental governance is key to effective forest management as it promotes transparency and accountability, hence, could effectively address the systemic graft and corruption prevailing in the forest sector.

### Forest Area Rationalization in Indonesia: A Study on the Forest Resource Condition and Policy Reform

Harry Santoso

**Published: 2003**

Looking at empirical fact, at least there are 2 (two) driving factors which can cause change in Indonesia's forest area, i.e. juridical factor and dynamic factor.

The phenomena of susceptibility of Indonesia's forest area to change mentioned above, gives an indication about many constraint to the claim of state control of the forest area in Indonesia. So that the implementation of this study concerning forest area rationalization is quite reasonable.

In relation to that, the World Bank (by consultation with several parties including ICRAF) has initiated a preliminary study about forest area rationalization in Indonesia. The result of this study will be used as country strategy for the World Bank to give input for the policy of Indonesian Government in arrangement and management of forest area. In the framework of giving contribution of idea concerning the topic of the study, the author prepares this paper as one of contributors from several members of the study team, each with different focus of study.

Partly based on the knowledge and experience of the author, the material and opinions presented in this paper are also supported by the results of field visits (in Lampung province), intensive discussion with several related parties such as experts, government officials, NGO, international institution, as well as the result of discussion in multi-stakeholder workshop.

## Environmental Service “Payments”: Experiences, Constraints and Potential in the Philippines

H. Arocena-Francisco

**Published: 2003**

This paper reviews the form of incentives or rewards that have been provided to upland communities in a number of sites under different management leadership in the Philippines. It also discusses what the upland farmers have to do in return for these rewards. The goal of such a review is to evaluate what elements are present in these communities that will support an environmental reward system and in the process, assess the potential of the case study sites for inclusion in RUPES.

## Assessing the Livelihood Benefits to Local Communities from the Profafor Carbon Sequestration Project, Ecuador

M. Milne and P. Arroyo

**Published: 2003**

This study assesses the actual and potential livelihood impacts of PROFAFOR, a carbon sequestration project in Ecuador. For PROFAFOR, addressing the livelihood needs of contracted communities will help to increase the duration of the carbon sequestered.

A modified sustainable livelihoods approach and financial budget analysis were adopted to examine the local livelihood implications for communities involved in the projects. The 'before project' status of community activities, income sources and capital endowments (financial, environmental, human, social and physical) were evaluated to provide a 'business as usual' scenario. The short-term and long-term livelihood impacts of the projects were then assessed, in terms of actual and potential changes in activities, income sources and assets. Long-term financial profitability and expected revenues of community enterprises were calculated, considering best case and worst case scenarios. Primary data were obtained from 7 community workshops and four interviews on-site with individual landholders. The information was verified through interviews with the project teams, non-government organizations, government officials, research institutes and timber buyers. Financial data were collected from the project managers and independent sources.

## A RUPES Project Training Workshop Combining Theoretical Knowledge and Case Studies on Reward Mechanisms for Environmental Services: Chiang Mai, Thailand, September 17-25, 2003

RUPES Management Team

**Published: May 2004**

The RUPES Project recognises that capacity building in understanding rewards for environmental services must be greatly enlarged in order to facilitate a higher proportion of projects and programs designed to tap global transfer payment flows to meet the interests of the most disadvantaged populations in the uplands.

The SII/CRAF project 'Teaching advances in agroforestry research and development' is supporting RUPES and its capacity building activities.

Topics included in the training workshop were reward mechanisms and institutional/policy arrangements, environmental services and the needs and characteristics of the providers and buyers of the environmental services.

All materials related to the workshop including the training workshop modules were compiled in this CD.



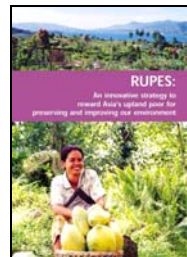
## RUPES Booklet

RUPES Management Team

**Published: September 2004**

The booklet serves as a tool to provide investors and partners the magnitude and importance of the RUPES project and the prospects for the future. It functions as a platform for equipping RUPES investors and partners to make the case for RUPES. It enables a broader access to stakeholders and investors who are not currently aware of the RUPES efforts and the potential of rewarding and recognizing environmental services for poverty alleviation.

Written to target at audiences not fully familiar with agroforestry and payments for environmental services, this booklet is crafted to enhance investor understanding.



## Review of Developments of Environmental Services Markets in Sri Lanka

Mikkel Kallesoe & Diana De Alvis

**Published: December 2004**

Sri Lanka holds great potential for developing PES and environmental service markets. It is however a relative new concept and improving awareness and building institutional capacity remains a top priority and challenge. Therefore, site specific assessments in support of PES should be developed with the purpose of: identifying, assessing and prioritizing ecosystem services; and supporting the development of equitable institutional arrangements that ensure access to benefits by potential buyers.

Environmental issues and considerations have to a high extent become an integrated part of most laws and regulations in Sri Lanka, and a growing number of decision makers and planners are promoting sustainable management approaches and conservation efforts. Enforcement and state management is however still weak and experiences with implementing sustainable financing mechanisms in an effort to improve local livelihoods and secure environmental integrity are limited. The decentralization of resource management authority in Sri Lanka does however have a beneficial impact on the potentials of establishing PES and environmental services markets. Decentralization can namely potentially reduce transaction costs and improve transparency – elements important to the sustainability of developing service rewards. Also a number of development and conservation projects and initiatives offer some lessons learnt, even though they are not specifically dealing with markets for ecosystem services.

The entire agenda of rewards for environmental services has to be adopted at the practical, problem-solving level so that it can be pushed beyond the rhetorical plane in which it has been relegated because of competing policies and environment-related programs, the opportune investment climate for privatization of common resources in the light of global imperatives, and civil society demands.

The identified policy gaps (at the implementation level) and institutional constraints, as the study shows, can be addressed by an agenda that promotes (a) policy enhancement and re-appreciation to recognize the requisites of commons management and benefit sharing, not an all-out reformulation process; (b) capacity and capability building in ES negotiation, valuation, and protection; and (c) research and advocacy on ES management and benefit sharing.

## Rewards for Environmental Services in the Philippine Uplands: Constraints and Opportunities for Institutional Reform

Rowena R. Boquiren

**Published: December 2004**

This study examined the policy context and institutional arrangements guiding the payment of rewards and incentives for environmental services (ES) in the Philippines.

The review covered three general legislations that provide the over-all policy framework on natural resources use, access and control, 13 that define institutional arrangements within the environment sector, and a minimum of 15 specific issuances, either officially adopted or still in draft form, which deal with on-the-ground implementation or enforcement.

The study identified a healthy community of stakeholders in environmental services. Institutional players in ES include the Philippine State as primary stakeholder, local economic interest groups, external economic interest groups, internal state mediators, external state mediators, civil society mediators, and the donor community.

The identified policy gaps (at the implementation level) and institutional constraints, as the study shows, can be addressed by an agenda that promotes (a) policy enhancement and re-appreciation to recognize the requisites of commons management and benefit sharing, not an all-out reformulation process; (b) capacity and capability building in ES negotiation, valuation, and protection; and (c) research and advocacy on ES management and benefit sharing.

## Case Study of the Maasin Watershed: Analyzing the Role of Institutions in a Watershed-Use Conflict

Jessica C. Salas

**Published: December 2004**

This case study analyzes the socio-institutional relationship of watershed protection over the past decade in the Maasin watershed in the Philippines.

In this study, the methodology of data gathering basically made use of a historical transect tool of Participatory Rapid Appraisal (PRA). Interviews, focus group discussion, workshops, photo documentations were conducted.

The analysis followed the framework of institutional channels described in the classification from Norman Uphoff, namely; (a) local administration (b) local

## *An Introduction*

government (c) membership organization (d) cooperatives (e) service organizations in private philanthropy (f) service organizations in marketization, and (g) private business. Culture and practices could be institutions in themselves. These informal non-organizational institutions are classified in here as (g) user-management.





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