

# **Criteria and Indicators for Ecosystem Reward and Compensation Mechanisms: Realistic, Voluntary, Conditional and Pro-Poor**

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## **Abstract**

The sustainable use of sloping lands and watersheds requires ways of linking downstream effects (negative or positive) to the decisions made upstream. The concept of 'payments for environmental services' and the use of market-based institutions is gaining ground. In this paper we review the conceptual basis of such mechanisms and draw on experience (at the local, national and international scale) gained in the Rewarding Upland Poor for the Environmental Services they provide (RUPES) project in Asia. Mutually beneficial opportunities exist for 'modifiers' and 'beneficiaries' of environmental services to interact as an alternative to a purely regulatory approach to environmental issues. The scope for voluntary, conditional rewards for environmental services is constrained by existing regulations and questions regarding entitlement to a share in the available environmental services. Two groups of criteria describe the existing problems. The first group relates to the effectiveness, efficiency and sustainability of institutions in improving the supply of environmental services on the basis of three key questions: Would rewards be realistic? Will they be voluntary? What conditions will apply? These issues govern the scoping, stakeholder analysis and negotiation as well as implementation stages, respectively. The second group concerns equity. It also has three main questions for the three stages of scoping, negotiation and implementation: Is poverty linked to environmental services issues? Who is/will be excluded? Are the rewards 'pro-poor'?

*Keywords: action research, integrated natural resource management (INRM), multiple scales, payments for environmental services (PES), poverty.*

## **1. Introduction**

### **1.1 Payments and Rewards for Environmental Services**

In the last decade the concept of 'payments for environmental services' or PES has gradually emerged and evolved in response to actual experience as well as shifts in theoretical and regulatory foundations (Landell-Mills and Porras, 2002; van Noordwijk et al, 2004; Tomich et al, 2004b; Arifin, 2005; Wunder, 2005; van Noordwijk, 2006b). Common points and differences can now be seen across a wide range of institutional arrangements linking the modifiers of environmental services (ES) and the (former, potential) beneficiaries of these services in forms of 'compensation' (or 'polluter pays') and 'rewards' (for foregoing the 'rights to pollute' or for efforts to protect or restore and rehabilitate).

Analysis of these systems (broadly labelled as Compensation and Rewards for Environmental Services (CRES), with PES as a subset of Rewards for ES; Swallow et al, 2007; van Noordwijk et al, 2007) has so far identified four key properties, or dimensions among which variation occurs:

- ✓ Realistic: relating to real impacts on tangible environmental services of importance to at least some stakeholders;
- ✓ Voluntary: not fully imposed, but leaving space for innovation and aiming for increased efficiency through voluntary agreements to fill the gap between 'willingness to pay' and 'willingness to accept';
- ✓ Conditional: including conditions for the rewards to relate to the actual achievement of goals and standards;
- ✓ Pro-poor: involving all stakeholders in the landscape, avoiding increases in inequity or actively enhancing equity on gender and/or wealth basis.

For each of these dimensions more detailed criteria and indicators are now available (Van Noordwijk et al, 2006b; 2007).

The Rewarding Upland Poor for the Environmental Services they provide (RUPES) project, which is supported financially by the International Fund for Agricultural Development (IFAD) and implemented by the World Agroforestry Centre (ICRAF) together with a range of international and national partners, has gained direct experience in six action research sites. Two of these are located in the Philippines (at Bakun and Kalahan), three in Indonesia (Singarak, Sumberjaya and Bungo), and one in Nepal (Kulekhani).

### ***1.2 Supporting natural resource managers at multiple scales***

Rewards for ES, such as those explored by RUPES, can be seen as a 'missing link', providing an essential feedback mechanism in Integrated Natural Resource Management (INRM). To play this feedback role, the reward mechanisms must take into consideration the multiple layers of 'management' involved:

- ✓ Farmers trying to manage their agroecosystem;
- ✓ The local community trying to manage/influence the action of individual farmers (or farm households);
- ✓ The government (on behalf of downstream interest groups) trying to manage/influence what the communities are doing;
- ✓ International stakeholders trying to manage/influence the way all these other layers interact.

The various types of managers at these levels require skills and an ability to learn from the current state of the system they deal with (van Noordwijk et al, 2001; figure 1).

1. Managers need to know whether there is a gap between the current performance of the system and existing objectives. If objectives have been met then they can focus on other issues. On the other hand, if objectives have not been met then the manager may first need to reevaluate the

suitability of the objectives. If these are still realistic, then new options or better ways of allocating scarce resources to cover existing options are needed;

2. In order to meet objectives, managers may need to have new options available, by true innovation or by access to innovations elsewhere;
3. Managers must learn by doing and adjust their expectations of the benefits of the various options;
4. The allocation of scarce resources to cover the various options usually involves trade-offs determined by the expected usefulness of the options with respect to the various objectives but there may be better ways of allocating resources;
5. Even when there is no gap between objectives and their implementation, this does not mean that the system is only responding to management inputs. It also responds to factors outside the manager's control; thus in learning from the real system performance, one needs to acknowledge these outside forces based on a conceptual model of 'how the system works'.

## Understanding the managers

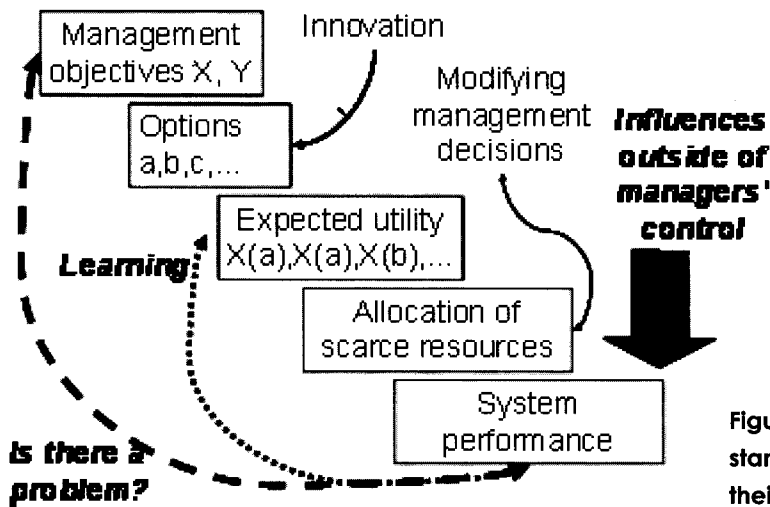


Figure 1: The five levels of understanding needed by managers to do their job (van Noordwijk et al, 2001)

The initial conceptualisation of RUPES dealt with at least three managers: upland communities who are modifying ES and may become 'sellers'; downstream communities who benefit from these services and may become 'buyers'; and a group of intermediaries/brokers who try to link 'supply' and 'demand'. As RUPES belongs to the broker category, learning is closely linked to the learning of the two other groups. The rest of this paper presents some emerging highlights at three levels of organisation within RUPES:

- ✓ Learning at the local level (box 1 provides an example of a RUPES site);
- ✓ Learning in National Policy Networks;
- ✓ International level learning across all participating and associated countries.

**Box 1: RUPES Kalahan**

The tribal elders of the Ikalahan People of Nueva Vizcaya and Pangasinan in the Philippines organised the Kalahan Educational Foundation (KEF) in 1973 to protect their ancestral lands and culture. They have pioneered Community-Based Forest Management and several other concepts, now being copied throughout the Philippines and parts of Southeast Asia. These high-mountain dwellers feel that in the past lowlanders looked down on them. For the Ikalahan, gaining recognition of their historical land rights is linked to gaining respect for their way of life and their role as guardians of the landscape.

This role comes at a price. The economic realities in much of the uplands drive the younger generation to urban jobs or abroad. These economic circumstances seem at odds with the richness of Ikalahan's natural resources. The Ikalahan ancestral domain encompasses the mountains that rise above watershed basins abundant with rice paddies. The domain receives 3,000 to 5,000 mm of rain per year and feeds three rivers that support irrigated rice fields and hydropower generation. The landscape is an ecologically sensitive area with rich biodiversity. Although much of the area lost its forest cover due to logging concessions the government granted to outsiders, some natural forest, dominated by Dipterocarp trees, remains intact. The Ikalahan have imposed a strict conservation regime on this area. Elsewhere, they have actively pursued regeneration of the native forests or the planting of fast-growing species. The KEF has also designed a forest management system aimed at keeping the forests productive by thinning and local regeneration, as an alternative to the plantation system of rotational clear-felling. Currently, the KEF, with the support of RUPES, is targeting the Kyoto-based international reforestation market under the Clean Development Mechanism, as well as the non-Kyoto based voluntary market for reducing emissions by forest protection.

"The KEF began monitoring the growth of its forests. Its methods were not very accurate but they were helpful. When the RUPES consortium entered the picture and offered to help, we made contacts with a Carbon Expert at the University of the Philippines Los Baños (UPLB) and he helped us to improve our computations to include branches and tops of the trees, not just the trunks. We discovered that we had underestimated the efficiency of the Ikalahan forests by at least 60%." Delbert Rice, KEF Director for Research.

The KEF's hard work is well recognised. This RUPES project is building the capacity of indigenous communities to begin negotiations. It will also increase awareness and participation in carbon sequestration projects and other related issues around the ancestral domain communities through public education programmes.

[http://www.worldagroforestry.org/sea/Networks/RUPES/download/SiteProfiles/RUPES-Kalahan\\_FINAL.pdf](http://www.worldagroforestry.org/sea/Networks/RUPES/download/SiteProfiles/RUPES-Kalahan_FINAL.pdf)

## 2. Learning at the local level

### 2.1 Five types of poverty for which forms of RES are known to work

Forms of compensation and rewards for ES can reduce rural poverty in a number of specific situations. This section first discusses the dominant causes of rural poverty, and then recommends steps for the development of site-specific mechanisms.

The 'livelihood' framework introduced the concept of five types of assets or capital that are jointly needed to secure human welfare. 'Natural capital' defines the basic framework for resource availability, determines the local options for land use and the direction of flows that link 'upstream' and 'downstream', where water is involved. Four types of man-made capital interact with this natural capital and jointly determine the provision of ES and marketable goods: human, social, physical and financial capital. Human capital determines the availability of knowledge and labour as well as local demand for ES and goods. Social capital governs access to land and other aspects of natural capital, influences the development and access to knowledge, and shapes regulations for other assets and markets. The physical capital of infrastructure, buildings and modifiers of water flows has a major influence on which goods can reach markets and where and how ES are perceived. Finally, financial capital is linked to market function, input and output prices and availability of investment funds; the energy dependence of local land use and life styles has a direct relationship with both financial and physical capital (figure 2).

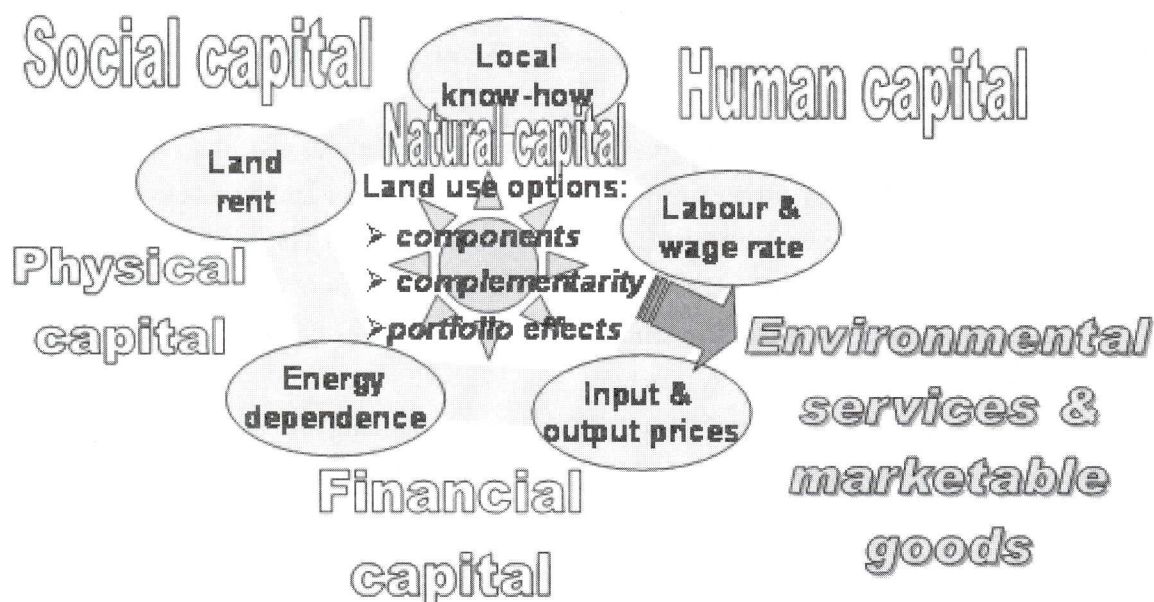


Figure 2: Five types of capital (natural capital interacting with four types of 'man-made' capital) jointly determine land-use options and the production of marketable goods and environmental services.

In this context, five major factors that create rural poverty are identifiable:

1. Lack of access to and rights to use land (social \* natural capital);
2. Lack of access to clean water and local agrobiodiversity, which causes health problems (natural \* human capital, modified by physical and social capital);
3. Lack of investment funds for clean development (financial \* natural capital, interacting with social and human capital);
4. Lack of income opportunities (human \* financial capital);
5. Lack of a (political) voice, being scapegoats for environmental destruction (social \* natural capital).

The positive effects of reward schemes for ES on poverty reduction may stem from a number of different pathways. Eight have been recognised so far in the RUPES programme (table 1). They address different dimensions of (rural) poverty.

**Table 1: Pathways for ES Reward schemes to alleviate poverty in RUPES**

	Pathway	Poverty dimension addressed
P1	Stop negative 'drivers' that enhance poverty and degrade environmental services	Assets/ Risk/ Health/ Indirect income
P2	Enhance local environmental services and resources (e.g. regular supply of clean water, access to beneficial plant and animal resources)	Health/ Assets
P3	Enhanced security of tenure, reduced fear of eviction or 'take-over' by outsiders, allowing investment in land resources; increased asset value	Assets/ Risk/ Indirect income
P4	Enhanced trust with (local) government, increased 'say' in development decisions	Empowerment/ Reduced informal taxes (corruption)
P5	Increased access to public services (health, education, accessibility, security)	Health/ Education/ Indirect income
P6	Payment for labour invested at a rate at least equal to opportunity cost of labour	Direct income (labour based)
P7	Increased access to investment funds (micro credit or otherwise) for potentially profitable activities	Indirect income
P8	Entrepreneurism in selling 'commodified' environmental services	Direct income (land based)

## **2.2 Linking knowledge to action in a stepwise approach**

The emergence of location-specific reward mechanisms, and the role of intermediaries (boundary organisations) can be classified into four stages, that focus on various combinations of Knowledge (K) and Action (A):

1. Scoping of the way local issues are understood ( $K \leftrightarrow K$ ) ;
2. Identifying stakeholders ( $A \leftrightarrow A$ );
3. Negotiations ( $K \leftrightarrow K$ )  $\leftrightarrow$  ( $A \leftrightarrow A$ ), aiming for (unified  $K \leftrightarrow$  unified  $A$ );
4. Implementation, monitoring and learning (unified  $K \leftrightarrow$  unified  $A$ ).

Early experience showed the limitations of a pure 'environmental economics' template of science-policy interactions, with a single currency expression of environmental costs and benefits informing a supposedly benign central decision making authority. It has become clear from the local site-level experience of RUPES that the main 'currency' of rewards for ES can vary from financial ('PES') to rewards based on the provision of public services (e.g. for health, education or transport), enhanced market access (e.g. certification for niche markets) or tenure security. For example, in areas where large numbers of upland poor are in conflict with the state and its regulations about land access, the provision of 'conditional tenure security' has been found to be particularly effective.

'Security of land tenure' was originally seen as a pre-condition before communities could be effectively rewarded for their ES. However, in a broader context of 'rewards' rather than 'payments', it was realised that providing 'conditional tenure' itself can be an important 'reward' mechanism, as well as a step towards conflict resolution and opening up new ways of engagement for upland communities. In a pure 'indigenous' context, tenure security is often seen as an 'unconditional' right that simply needs to be recognised. In a context of more recent migration of people into uplands, a treatment of tenure security conditional to ES provision has been found to be effective in Indonesia, using legal options of 'community based forest management'.

### **2.3 Rapid appraisal tools for the scoping stage**

As part of RUPES Phase 1 a number of 'tools' were developed, especially for the scoping and stakeholder identification stage. These tools can be seen as more specialised forms of 'rapid rural appraisal':

- ✓ RHA – rapid hydrological appraisal (Farida et al, 2005; Jeanes et al, 2006);
- ✓ RABA – rapid agrobiodiversity appraisal (Kuncoro et al, 2006);
- ✓ RaCSA – rapid carbon stock appraisal;
- ✓ RaTCA – rapid tenure claim appraisal.

These tools aim to clarify questions relevant at the local scale and suggest multiple ways of providing cost-effective answers to link the multiple ways of knowing of local stakeholders, governance agencies and relevant scientific disciplines. These tools are designed to be efficient (e.g. the six-month and US\$10,000 time and cost design of the Lake Singkarak RHA) and aimed at keeping transaction costs manageable (as potential payments by the local hydropower company are of the order of \$100,000 per year).

**Box 2: Rapid Hydrological Appraisal of Lake Singkarak watershed functions**

*The rapid hydrological appraisal for the Lake Singkarak catchment in West Sumatra (Farida et al, 2005) analysed the perspectives of a range of stakeholders –local communities, researchers and policy makers. A topic that appeared to be controversial is the effect of planting Pinus merkusii or other fast growing evergreen tree species on the quantity of water supplied to the lake. Although these species were favoured by foresters for past ‘re-greening’ efforts, water used by canopy interception and transpiration of such trees reduced total water yield to the lake according to villagers, and the expected increase in regularity of flow through better soil structure is not scientifically expected to fully compensate this effect.*

*The hydrological model pointed to a strong dependence of performance of the hydropower plant on variations in annual rainfall and possible increase of (El Niño) years with long dry seasons under the influence of global climate change. This effect exceeds that of local land cover change. The study pointed to the importance of maintaining water quality in the lake for all stakeholders, with concerns over sediment inflow, as well as nutrients and urban waste.*

*In response to this rapid appraisal, the local debate has indeed shifted towards a focus on water quality and involvement of all the communities surrounding the lake, rather than a focus on the community with the largest number of trees. Reforestation efforts using appropriate tree-species and focused on relevant ‘erosion hot-spot’ locations can lower sediment influxes to the lake and improve regularity of water flow. It requires ‘the right tree in the right place’ (Agus et al, 2004; van Noordwijk et al, 2006a; van Noordwijk, 2006a). As part of these findings are surprising to some of the stakeholders, good communication is needed early on in the process to avoid over-responses on perceptions that reforestation is either sacred or evil and to bridge the gaps in the way different stakeholders understand the relations between climate, forests, water flows and soils. (Leimona et al, 2006).*

**2.4 Multiple approaches to conditionality**

As PES mechanisms evolve different approaches to ‘conditionality’ evolve (figure 3). These relate to the various parts of the management cycle as portrayed in figure 1.

Where issues raised during evaluation ended up being part of the negotiation process, such as in the case of the conditional tenure for community based forest management in the Sumberjaya test site, emphasis has been on administrative compliance rather than on actual provision of measurable environmental services. RUPES is currently experimenting with a ‘river care’ payment scheme with a level 1 type conditionality: rewards will depend on the sediment concentrations in the river actually achieved, with a simple sediment measurement method that the local community can apply themselves.



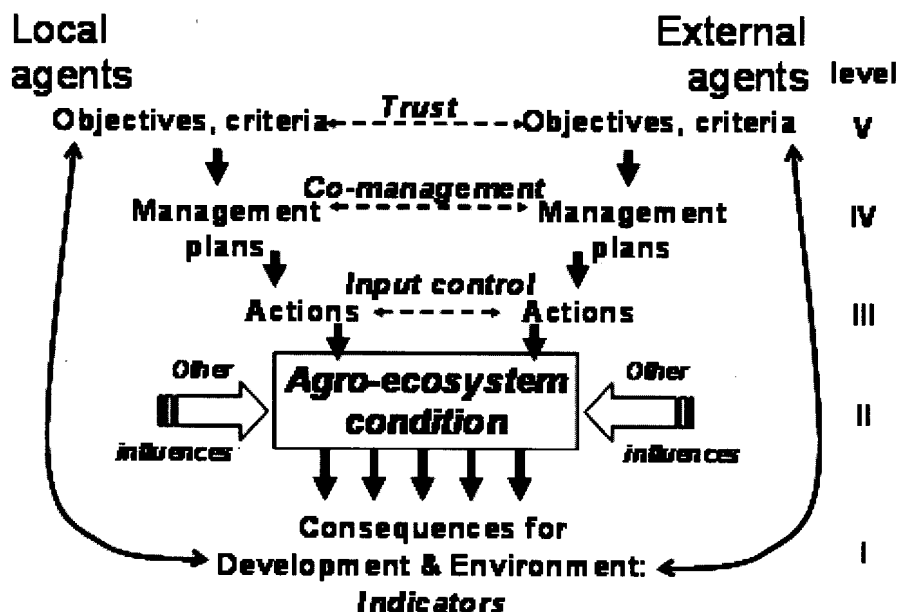


Figure 3: Five possible levels at which interaction between local agents and external stakeholders can take place; level I, exchanges on the basis of the 'ES produced' represent a typical 'market-based' paradigm of buyers and sellers, while interactions at level IV represent 'adaptive co-management'.

Overall, the experience so far suggests that a mixed approach to conditionality is needed: the payment mechanisms need to provide for the opportunity costs of labour at 'activity' level (III), be embedded in local resource management plans (level IV) and use a mix of conditions of the system (II) and actual services (I) where possible. Mechanisms fully based on 'trust' (V) ('indigenous people know best') have been proposed but are not viable: a mixture of factors from the other levels is required.

### 3. Learning in National Policy Networks

#### 3.1 Issue cycles: regulation or incentive based outcomes

A further building block of current thinking is the 'issue cycle' that has been recognised as underlying many issues that become of public concern and that have to rise from a stage of 'denial' towards recognition as an issue and then onwards to attempts at solutions (through mitigation, adaptation or reduction of 'root' causes) that have sufficient political support and that usually involve both 'regulatory' and 'voluntary' mechanisms (Tomich et al, 2004a).

One of the key lessons learned during RUPES Phase 1 is that the emergence of 'voluntary' reward mechanisms for ES provided by upland poor is strongly constrained by existing regulations, which often classify upland poor as illegal occupants of the uplands, a domain that is supposed to provide

ES as a public good to 'downstream' society. The concept of 'downstream' is literal in terms of watershed functions, and a metaphor for biodiversity conservation (Swift et al, 2004) and carbon storage (Suyamto et al, 2006). Finding solutions that work locally is difficult when local issue cycles on poverty and environmental issues are often at stages constrained by the 'solutions' that have emerged from national level issue cycles. Often these 'solutions' pose new 'problems', in the form of administrative and compliance hurdles.

More specifically, the experience in both the Philippines and Indonesia has shown that existing regulations have many interfaces with the reconciliation of rural poverty and enhancement of environmental services. However, many of these interfaces are incomplete and will need attention before the mechanisms become fully functional:

- A. Existing rules for hydro-electricity infrastructure, depending on their origin and the multilateral or bilateral support for the initial investment, often already have obligations to provide financial benefits to the local government and community. The allocation of these funds is often far from clear and transparent and in a number of cases funds have accumulated without proper means set up for their spending. The development of realistic, voluntary and conditional mechanisms for situations where there is in fact a mandatory 'buyer' can achieve rapid impact. Similarly, conservation funds have accumulated intended for support of local communities, but with little effective use;
- B. Over the years, countries such as Indonesia have accumulated a large 'reforestation' fund from levies on logging. Governments are only gradually learning that such funds can be used for realistic, voluntary and conditional activities by the local community, rather than for top-down planning of reforestation, with its well-documented low rates of success;
- C. National authorities are at the interface of local and international stakeholders, and need to ensure national autonomy. In the case of the Climate Convention, a Designated National Authority can set its own standards for what it considers to be sustainable development and its approval is needed for international deals. However, the experience so far has been that the *transaction costs* that stem from the complex approval procedures are a major obstacle in the development of effective mechanisms, and substantially reduce the benefits that local actors (as opposed to consultancy agents and intermediaries) can earn from the agreements.

### **3.2 Interacting policies**

Local rural poverty issues and the five types of assets are embedded in a national context (figure 4). Five major policy domains link the local representation of the primary constraints to land use, to the national one:

- A. Creation and access to knowledge through responsive research and extension systems;
- B. Policies of (forest) land classification and access rules to land;
- C. Overall economic development and creation of (urban or rural) jobs out of the primary agricultural production sector;
- D. Price policies, subsidies and regulation of market access;

- E. Development of regional infrastructure for transport, water flows, energy supply and the provision of health and education services.

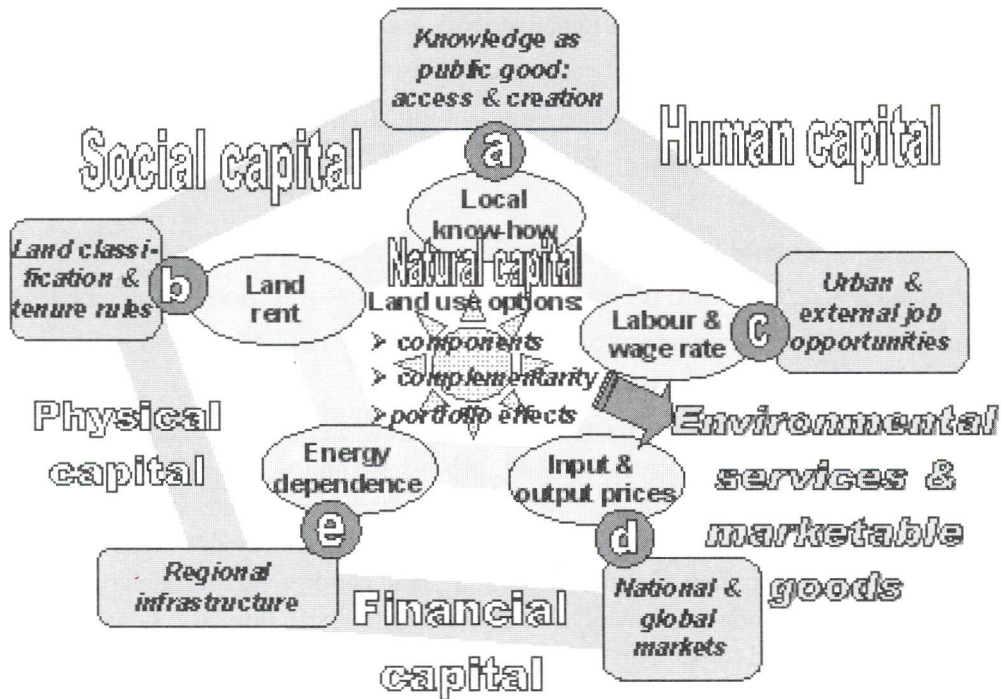


Figure 4: Interactions between the various types of capital that determine the performance of land-use options at the local scale vis-à-vis multiple local requirements for goods and services, the flow of goods and services that reaches downstream markets and stakeholders, and the national scale processes (a, b, c, d, e) that link local to national scale.

All these five policy domains are embedded in the overall context of governance and poverty reduction strategies. The opportunities for specific forms of RES to contribute to the reduction of rural poverty are thus dependent on the national context. In many situations, policy reform may be needed before the full potential of realistic, voluntary and conditional mechanisms for rewarding the maintenance and enhancement of ES can be realised. Experience in each of the RUPES sites has been that the communities receive a confusing mix of positive and negative messages from national policies. On the one hand these government measures provide resources for the development of infrastructure, education and health services to improve quality of life in rural areas. On the other hand the overall economy continues to pull people towards cities and/or jobs overseas. Complaints from lowland stakeholders about ‘deforestation’ and the loss of ES as free ‘public goods’ tend to give a negative image of the upland people, rather than a set of positive incentives for above-average efforts to enhance ES. Payments for ES are unlikely to be of sufficient magnitude to really change the local land-use agenda in cases, for example, where improved road access allows the intensive and profitable production of vegetables or livestock, for which the uplands have a climatic advantage. In most cases the ES rewards will be a relatively small component in the overall incentive structure.

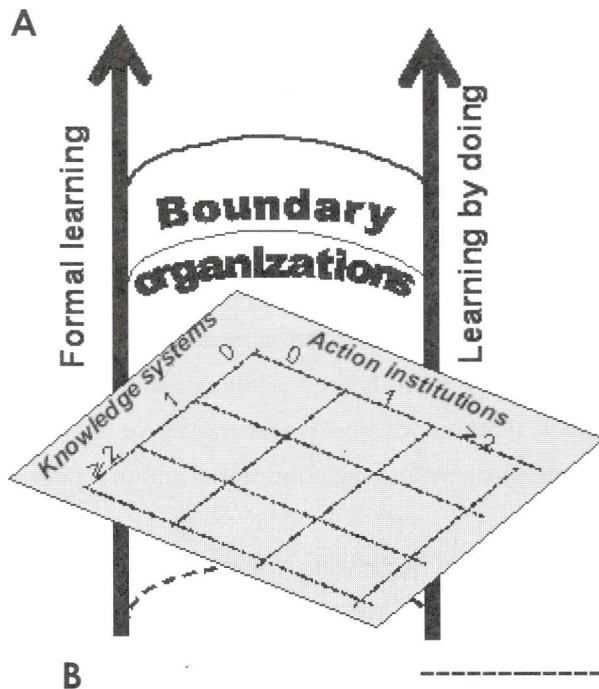


Figure 5A. By building bridges between the formal learning in knowledge systems and the learning by doing of action institutions, boundary organisations can both contribute to current issues and try to be 'ahead of the curve' for the future.

B. Classification of boundary organisations on the interface of knowledge and action, with examples of six classes of boundary work

	0. None	1. Decision	≥2 Collective action
0. Conjecture & ignorance	Daily life of U&Me @	A (ignorant decisions)	0 $A_1 \Leftrightarrow A_2$ (ignorant politics)
1. One truth	K (science, Knowledge for own sake)	II $K \Leftrightarrow A$ (Technology Transfer; Scientific policy advice such as IPCC; Decision Support Systems - DSS)	III $A_1$ $K \Leftrightarrow \updownarrow$ $A_2$ (Joint fact-finding)
≥2 Multiple ways of knowing	$K_1 \Leftrightarrow K_2$ I (Interdisciplinarity, tacit + scientific knowledge)	$K_1$ $\updownarrow \Leftrightarrow A$ $K_2$ (Integrated Assessments such as MEA)	$K_1$ $A_1$ $\updownarrow \Leftrightarrow \updownarrow$ $K_2$ $A_2$ V (Negotiation Support Systems - NSS, RUPES)

## 4. International level learning

### 4.1 Boundary organisations

The concept of 'boundary organisations' - institutions which straddle the shifting divide between politics and science - has emerged over the past decade in efforts to more closely link 'knowledge to action' or 'action to knowledge', depending on one's perspective. Large international assessment efforts, such as the Inter-government Panel on Climate Change and the Millennium Ecosystem Assessment

are examples of boundary organisations. These have been both the stimulus and the initial targets of learning for defining these organisation, their role, and potential functions. Based on the initial experience of the RUPES Phase I project, the emergence of effective mechanisms for ES rewards falls into a class of multiple knowledge and multiple actors, which is the most complicated (and rich) class of boundary work. Projects in this class must acknowledge that there are multiple knowledge pathways and multiple actors involved in the problem and find effective bridges to link the two.

#### **4.2 Realistic, voluntary, conditional and pro-poor ES reward schemes**

The experience gathered so far in RUPES Phase 1 has helped to identify the four dimensions that describe existing attempts to enhance ES through contracts that provide positive incentives for guardianship (avoiding damage) and stewardship (restoration): realistic, voluntary, conditional and pro-poor.

A strict definition of PES (Wunder, 2005) states that they should be realistic, voluntary as well as conditional. In fact, however, there are no known cases that provide a 100% match with these three terms: regulations often constrain the space and/or the stimulus for 'voluntary' deals between buyers and sellers; it is hard to be realistic, because assigning the impacts on ES to one or a few causes is usually not possible, while there are substantial time lags and spatial interactions in the system responses involved; finally, the implementation of full conditionality requires a political platform for support that usually does not exist. Luckily, a full match of the realistic + voluntary + conditional targets is not needed. There are so many unrealistic, involuntary and unconditional mechanisms around, that progress can be readily made along one or more of these dimensions.

The ultimate combination of realistic, voluntary and conditional may be called a 'market', but many of the current environmental issues derive from 'market failure', and further analysis of these failures is needed before we can expect constrained markets to provide sustainable, effective and efficient solutions. The inherent innovations of 'means' to achieve 'ends' that a market-based paradigm can bring, however, are needed to overcome the rigidity that most regulation-based solutions to environmental issues entail.

There is still discussion on the role of the 'pro-poor' criterion in relation to CRES. Put simply, one view is that PES is difficult enough as an environmental management instrument without additional social targets, and poverty should only be considered in as far as it has a direct link with 'willingness/ability to pay' and 'willingness to accept'. The opposite view is that exclusion of rural poor (and women) will lead to unsustainable mechanisms that will be ineffective and therefore inefficient. Pro-active involvement of rural poor, across gender and age dimensions will lead to better outcomes from a pure environmental perspective and it is worthwhile for agencies with primarily a poverty alleviation agenda to engage and support the 'pro-poor' side of emerging mechanisms and institutional arrangements.

A set of more detailed criteria and indicators for each of these four dimensions has been developed and used to characterise and learn from the experience in the RUPES action and associated learning sites, as well as a broader list of efforts in the sphere of PES. The four dimensions have distinctive consequences for the role of intermediaries/ brokers in the emergence of location specific reward mechanisms.

### 4.3 Boundary objects and boundary work

An articulation of the four stages (scoping, stakeholder identification, negotiation and implementation/monitoring) as 'boundary work' suggests a focus on the 'boundary objects' and 'boundary work' that can help move the process forward (tables 2 and 3). Reducing transaction costs may be possible if the transformational 'experience' of the initial RUPES sites is used to identify critical 'services' with emergence of a team of qualified, demand driven 'service providers', and a set of concrete 'boundary objects' that can serve as 'commodities' with a set of quality characteristics as yardsticks and drivers of further innovation and cost reduction.

**Table 2: Typical 'boundary objects' for the four stages of ES reward mechanisms**

<p><b>Scoping: K↔K</b></p> <p>Words (articulation of existing land use and effects on products and services, such as <i>kebun lindung</i> or 'shifting forestry')</p> <p>Icons/images</p> <p>Maps of space and lateral flows</p> <p>Representation of historical roots of the present situation</p> <p>Explanatory models used by various stakeholders for local system dynamics</p>	<p><b>Stakeholder identification: A↔A</b></p> <p>Stakeholder classification based on concerns and preferences</p> <p>Maps of 'rights and resources'</p> <p>Negotiation table ('neutral')</p> <p>Workable bounds in the trade-off between an 'all stakeholder' paradigm, external impacts, concerns and transaction costs</p>
<p><b>Negotiation: (K↔K) ↔ (A↔A), aiming for (unified K↔unified A)</b></p> <p>Trade-off matrix as 'agreement to disagree' and baseline of current ES provision</p> <p>Scenario analysis based on all major stakeholder concerns and plausible change</p> <p>Assessments of additions, external impacts and permanence</p> <p>Project Design Document (PDD) in the Clean Development Mechanism cycle</p> <p>New use of existing legal opportunities for 'community based forest management'</p> <p>Standards of service delivery respecting multiple 'ways of knowing'</p> <p>Contracts: conditional service delivery agreements with realistic rewards and voluntary 'buy in'</p>	
<p><b>Implementation, Monitoring and Learning: unified K ↔ unified A (or reverting to (K↔K) ↔ (A↔A))</b></p> <p>Operational indicators for monitoring aligned with the main criteria for success</p> <p>Certificates of compliance to agreed standards</p>	

**Table 3: Typical 'boundary work' carried out in the four stages of ES reward mechanisms in RUPES sites**

<b>Scoping: K↔K</b> Participatory landscape analysis to appraise the logical relations perceived Reconstruction of recent history of land use and its socio-ecological impacts Local land-use options and trade-offs Mapping of terrain and boundaries of jurisdiction and applicable rules Rapid Hydrological/ Agrobiodiversity/ Carbon stock/ Tenure Claim appraisal Develop local monitoring tools and skills	<b>Stakeholder identification: A↔A</b> Trust/confidence building Support key individuals with (potential) leadership roles in local organisation Presence at site level to be 'on call' for events initiated by stakeholders Transparent handling of resources Enhancement of negotiation and mediation skills Nomination for environmental/social reward (recognition)
<b>Negotiation: (K↔K) ↔ (A↔A), aiming for (unified K↔unified A)</b> Formalise plans in Project Design Document for participation in Carbon market Negotiate contacts under Community Based Forest Management rules Auctions of contracts for improving watershed services Auctions of contracts for conserving (agro)biodiversity	
<b>Implementation, Monitoring and Learning: unified K ↔ unified A (or reverting to (K↔K) ↔ (A↔A))</b> Monitoring protocols for the key environmental service of interest (I) Monitoring protocols for land cover as a proxy for environmental service provision (II) Compliance monitoring tools at 'activity' levels (III) Compliance monitoring tools at community scale 'resource use planning' level (IV)	

#### 4.4 Learning for new sites

At the start of the RUPES project, a hypothetical 'level of preparedness' was discussed and the target was to first work with and learn from sites where ES reward mechanisms already existed or were about to 'break through'. The thinking was that these sites would be 'living laboratories' that could provide lessons to apply at other sites. In fact, most of the sites selected were probably a few more steps away from effective reward mechanisms than initially expected. It became apparent that the overall 'level of preparedness' is at least a four-dimensional problem of being '*realistic, voluntary, conditional* and *pro-poor*'.

### 5. Next steps for RUPES?

In initial RUPES project design the idea was to explore and set up a 'broker' institution at the end of the project phase, which would play a market-based role to match supply of ES by upland communities and demand by international/national stakeholders. In the RUPES project implementation phase the idea of a broker institution along the lines initially envisaged was found to be premature, and the RUPES International Steering Committee as well as IFAD as investor, agreed to remove this objec-



tive from the log frame and project deliverables. Now, in the last year of the IFAD project, however, it may be time to revert to the issue and capture all lessons learned so far into the creation of RUPES as a **boundary organisation**, operating at the international/continental scale, which would facilitate both international and regional (e.g. ASEAN) learning and **national level RUPES boundary organisations** (with Indonesia, Philippines and Vietnam as obvious candidates for an initial round). The national level organisation would deal with the national regulatory aspects and institutional learning, and facilitate the emergence, initial growth and independence of '**site-level**' **RUPES boundary organisations** to negotiate and help implement and monitor realistic, voluntary and conditional ES reward schemes that are designed to be pro-poor.

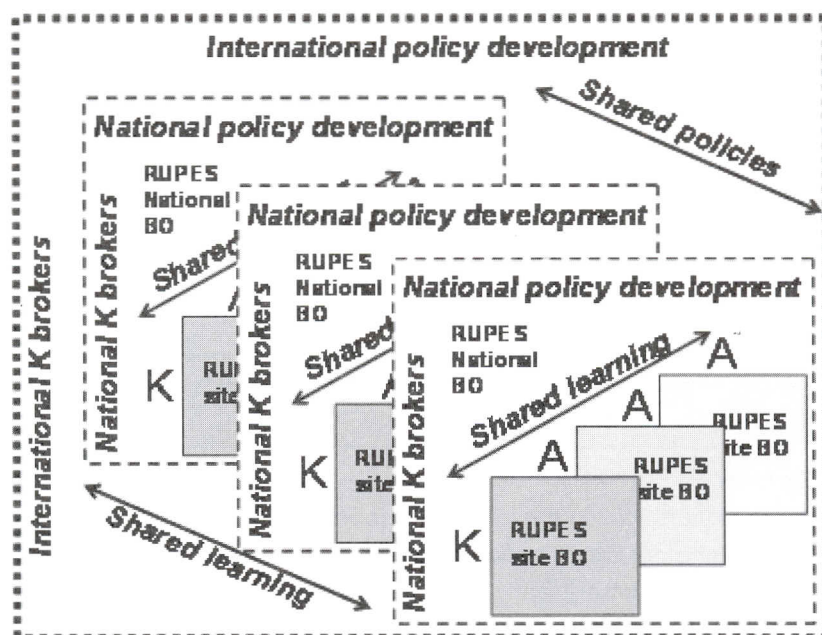
**Table 4: Steps needed to clarify function and structure of a potential RUPES boundary organisation**

Function	Structure
<b>Site level</b> Crystallization point in the initial, fluid scoping and stakeholder identification stage, establishing a role as an 'independent' and 'mutually trustworthy' agent of salient, credible and legitimate knowledge products relevant for local action	<b>Institutionalising of site-level boundary organisation</b> of local stakeholders (with participation of local knowledge brokers) after scoping and stakeholder identification stage; facilitate negotiations and provide oversight and a primary litigation forum in the implementation stage
<b>National</b> N1. National level learning from experience, bottlenecks and opportunities on the environment*poverty nexus N2. National policy advise to facilitate evolution of conducive policy environment and locally applicable performance standards N3. Development of team of 'honest brokers' for the various stages of effective reward mechanisms N4. Stimulation of 'corporate social responsibility' involvement and voluntary buyers/investors N5. Network of site-level actors and intermediaries for enhanced learning	<b>Institutionalising of national scale boundary organisation</b> of 'knowledge and action' stakeholders on the poverty * environment nexus  Institutional representation of site-level boundary organisations and national institutions (GO, national research agencies, universities, NGOs and private sector) or qualified/ respected individuals with renewable tenure?  Secretariat and function convenor
<b>International</b> I1. Contextualised, shared learning I2. Evolution of methods and performance standards I3. Advise and feedback to evolving international policies	<b>Institutional representation</b> of national nodes plus international actors on the knowledge and action side of development/ poverty and environment  Secretariat and function convenor



Instead of a single-level 'ES reward broker' as originally envisaged for RUPES, we can now see the emergence of a three-tiered boundary organisation (figure 6; table 4), that crosses boundaries between multiple actors and multiple ways of understanding at site, national and international levels.

Figure 6: Nested structure of site-level boundary organisations (such as RUPES-Singkarak and RUPES-Bakun), national boundary organisations (such as the RUPES-Indonesia COMMITTEES and RUPES-Philippines) and the RUPES-Asia boundary organisation.



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