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Criteria and indicators for eco-system reward and compensation mechanisms: realistic, voluntary, conditional and pro-poor

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Abstract

Sustainable use of sloping lands and watersheds requires ways to link downstream effects (negative or positive) to the decisions made upstream. The concept of 'payments for environmental services' and the use of market-based institutions for such is gaining ground. In this paper we will review the conceptual basis of such mechanisms and the existing array of institutional innovations in both insular and mainland Southeast Asia. Markets are by definition realistic, voluntary and conditional. Their effects on poverty are mixed. Many environmental issues and the increasing scarcity of ecosystem services are linked to 'market failure'. Time-lags, complex cause-effect and multiple layers of rights and responsibilities of environmental issues make 'service' considerations externalities of decision making processes that are focussed on 'marketable goods'. Which combination of characteristics, short of full markets, is needed for effective, efficient, sustainable and equitable mechanisms to avoid environmental degradation beyond thresholds of sustainability? Are pro-poor market-based mechanisms possible? We set out to identify mutually beneficial opportunities for 'modifiers' and 'beneficiaries' of environmental services to interact as an alternative to a purely regulatory approach to environmental issues. The domain for voluntary, conditional rewards for environmental services (ES) is constrained by existing regulations and the rights it specifies to a share in the available ES (including the ES of buffering against pollution or the transfer of rainfall to usable water flows). We combined principles and insights from social welfare theory (development and environmental economics and project appraisal), institutional economics (principal agent problems, game theory) and integrated natural resource management approaches with emerging experience in action research sites and pilot application schemes to obtain a general framework of criteria and indicators, a consistent terminology and to clarify the multiple pathways (8 identified so far) and challenges of poverty reduction through reward and compensation mechanisms. Two main classes and four main criteria were formulated. The first class relates to the *effectiveness, efficiency* and *sustainability* of the CRES institutions, with the environmental services as the primary target and criteria that relate to three questions (Would rewards be realistic? Will they be voluntary? What conditionality will apply?) that predominate in the scoping, stakeholder analysis and negotiation + implementation stages, respectively). The second class is aimed at the *equity* dimension with also three main questions (Is poverty linked to ES issues? Who is/will be excluded? Are the rewards 'pro-poor'?) for the three stages.

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1. Introduction

In the last year of its first phase, the RUPES (Rewarding Upland Poor for the Environmental Services they provide) project financially supported by International Fund for Agricultural Development (IFAD) and implemented by the World Agroforestry Centre (ICRAF) together with a range of international and national partners is reaching a phase of reflection and self-evaluation. While we have learnt a lot, both in theory and in practice, we need to look beyond the traditional project input – output / outcome /impact relationships, to a full cycle learning from the framing of the problem, through internal capacity building to outputs, uptake and policy follow-through (on the way to outcomes and impacts). Because RUPES operates at site, national and international level, we need to see how the three learning cycles have influenced each other. While the full evaluation is under way, this paper aims at drawing some lessons as steps towards the next learning cycle (Fig. 1).
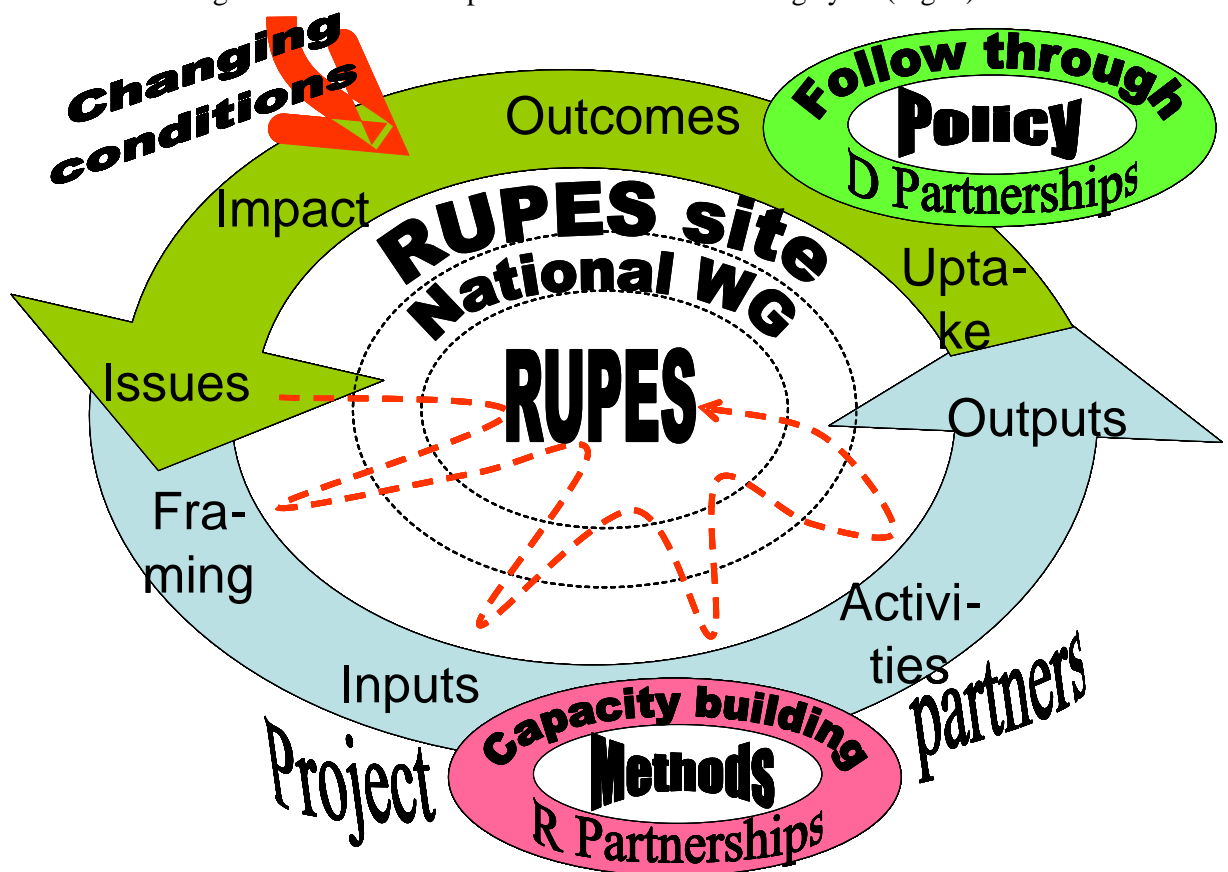

Figure 1. Learning cycle as articulated for the self-evaluation of the RUPES project at site, national and international level

Impact studies in the domain of Integrated Natural Resource Management, of which RUPES is a part, has to consider the multiple layers of 'management': the farmers trying to manage their agro-ecosystem, the local community trying to manage/influence what individual farmers (or farm households) do, the government (on behalf of downstream interest groups) trying to manage/influence what the communities are doing, and international stakeholders trying to manage/influence the way all these other layers interact. As we deal with multiple objectives, evaluate the performance of the agroecosystem through multiple lenses and have access to different arrays of options and knowledge about past performance, it is not usually possible to extract

simple causative 'impact pathways'. However, we can certainly document and try to quantify the degrees of learning that take place. In reviewing the level of 'learning' of managers, we can distinguish five layers, based on an understanding of what managers do (van Noordwijk et al., 2001; Fig. 2).
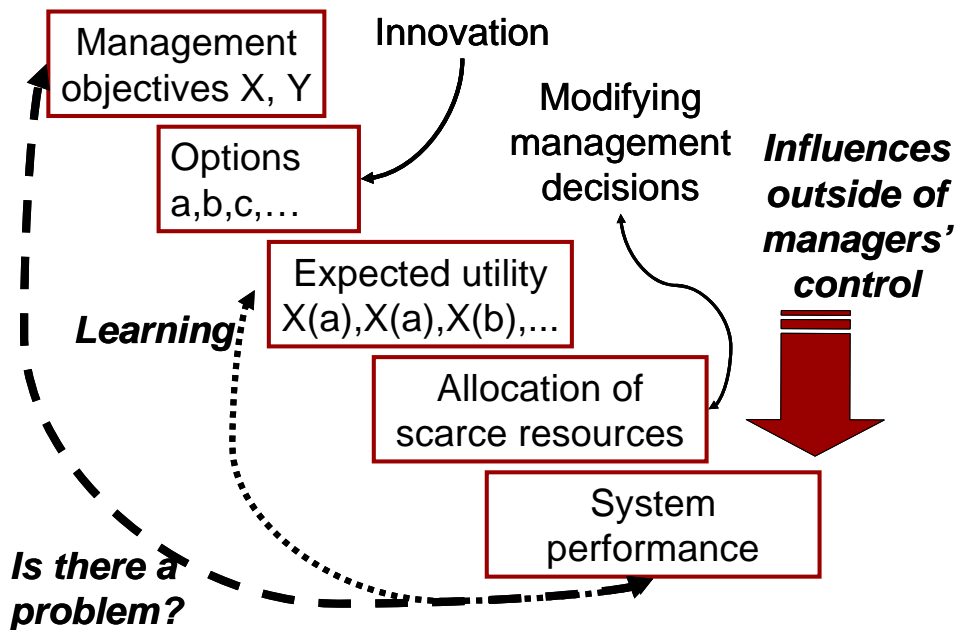
Understanding the managers

Figure 2. Five levels of understanding that managers need in order to do their job (van Noordwijk et al., 2001)

First of all –managers need to know whether or not there is a contrast between the current performance of the system and existing objectives. If not, they can focus on other issues; if yes, they may need to reconsider the management objectives but if these are confirmed as being reasonable, they need to look for new options or better ways of allocating their scarce resources over the existing options.

Secondly, they may need to have new options, by true innovation or by access to innovations elsewhere.

Thirdly, they have to learn by doing and adjust their expectations of the utility of the various options that exist.

Fourthly, allocation of scarce resources over the various options is in some way related to the expected utility of these options with respect to the various objectives (usually involving tradeoffs, as one normally can't reach all to the maximum extent) -- but maybe there are better ways of allocating these resources.

Fifthly, assuming that there is no implementation gap and one actually does what was planned, one has to realize that the system is not only responding to the management inputs, but also to factors outside of the managers control; in learning from the actual system performance, one needs to acknowledge these outside forces based on a conceptual model of 'how the system works'.

In the conceptualization of RUPES we deal with at least three managers: the upland communities who are modifying environmental services and may become 'sellers', the downstream communities who benefit from these services and who may become 'buyers', and a group of intermediaries/brokers who try to bridge between 'supply' and 'demand'. As RUPES belongs to the broker category, our learning is closely linked to the learning of the two other groups.
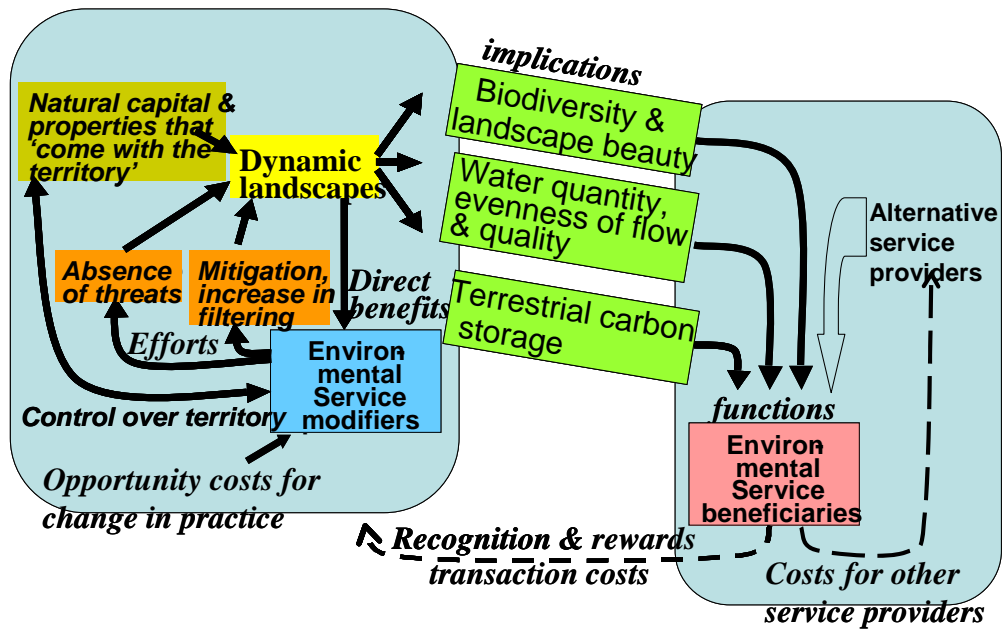
Figure 3. Conceptual representation of the relationship between 'upland' modifiers of environmental stocks and flows (often as an 'externality' of current livelihood strategies) and downstream beneficiaries who perceive changes in environmental stocks and flows as changes 'environmental services' and may try to influence upland decision makers by appropriate mix of recognition and rewards, when a pure regulatory approach to 'control' them doesn't work

Figure 4. The network of RUPES action research sites in Asia

In the rest of this paper we will present some emerging highlights on four aspects from the following:

- International level learning
- Learning in National Policy Networks
- Learning at site level

2. International level learning

2.1 Boundary organizations

The concept of 'boundary organizations' has emerged over the past decade in the context of efforts to more closely link 'knowledge to action' or 'action to knowledge', depending on ones perspective (Fig. 5). Large international assessment efforts, such as the Inter-government Panel on Climate Change (IPCC) and the Millennium Ecosystem Assessment (MEA) have been both the stimulus and the initial targets of the learning on what boundary organizations are, do, can be and can do.
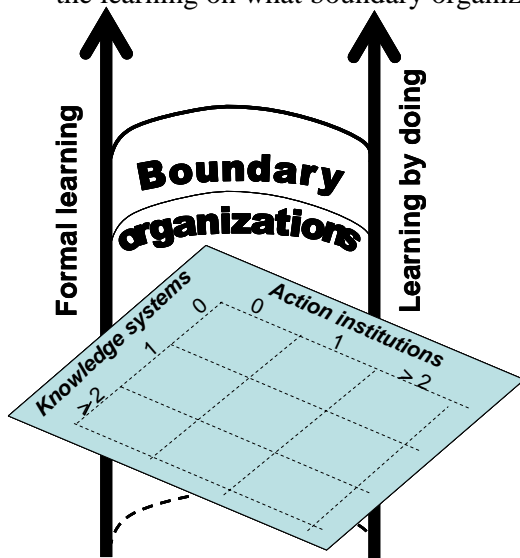

Figure 5A. By building bridges between the formal learning in knowledge systems and the learning by doing of action institutions, boundary organizations can contribute to current issues as well as try to be 'ahead of the curve' for future ones; **B.** Typology of boundary organizations on the interface of knowledge and action, with examples of six classes of boundary work

--------------Action------------------

	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 **IV** $\Updownarrow \Leftrightarrow A$ K_2 (Integrated Assessments such as MEA)	K_1 A_1 **V** $\Updownarrow \Leftrightarrow \Updownarrow$ K_2 A_2 (Negotiation Support Systems - NSS, RUPES)

----Knowledge----

At a recent workshop at the University of Arizona, a typology of boundary organizations was developed and widely accepted, that is based on a 0, 1 and ≥2 classification of actors and ways of knowing (Fig 5B). It leads to 6 classes of boundary spanning activities:

0. A ⇔ A, no K
I. K ⇔ K, no A
II. K ⇔ A – the archetypal boundary work of technology transfer, science-> policy advice, public funding for science and ***decision support systems***; the IPCC effort falls within this class with its 'policy relevant' but not 'prescriptive' synthesis of science
III. K ⇔ (A ⇔ A) -- boundary work such as 'joint fact finding' that cam emerge at a certain stage in (mediated) political negotiations
IV. (K ⇔ K) ⇔ A – integrated assessments, such as the Millennium Ecosystem Assessment (MEA)
V. (K ⇔ K) ⇔ (A ⇔ A) – ***negotiation support systems*** and the emerging reward mechanisms for environmental systems, where both the articulation of knowledge and the actions are negotiated

Based on the initial experience of the RUPES Phase I project, the emergence of effective mechanisms for environmental service rewards, falls into the most complicated (and rich) class of boundary work, class V, that has to acknowledge multiple ways of knowing and multiple actors and find effective bridges across.

2.2 Realistic, voluntary, conditional ES reward schemes designed to be pro-poor

The experience so far in RUPES Phase 1 has helped in identifying four dimensions that differentiate existing attempts to enhance environmental services by contracts that provide positive incentives for guardianship (avoiding damage) and stewardship (restoration):

Realistic – or aligned with the opportunities, opportunity costs and trade-offs that constrain the decisions of the upstream and downstream actors, linked to their preferences

Voluntary – complementing existing regulation and providing 'additionality' from the downstream perspective and bridging collective and individual action at the upstream side, alleviating the most constraining livelihood concern

Conditional – with clarity on performance and evaluation criteria in a contractual sense; conditionality can be a mix of 5 levels (Figure 4)

Pro-poor – acknowledging the distributional impact of rewards on resource-poor local stakeholders and selecting mechanisms that enhance equity

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 issue cycles entail.

A set of more detailed criteria and indicators has been developed for each of these 4 dimensions has been developed and used for characterization of and learning from the experience in the RUPES action and associated learning sites, as well as a broader list of efforts in the sphere of 'payments for environmental services' (PES).

The four dimensions have distinctive consequences for the role of intermediaries/ brokers in the emergence of location specific reward mechanisms

3. Learning in National Policy Networks

3.1 Issue cycle: regulation or incentive based outcomes

A further building block of current thinking is the 'issue cycle' that has been recognized as underlying many issues that become of public concern and that have to rise from a stage of 'denial' towards recognition as 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; Fig.6).
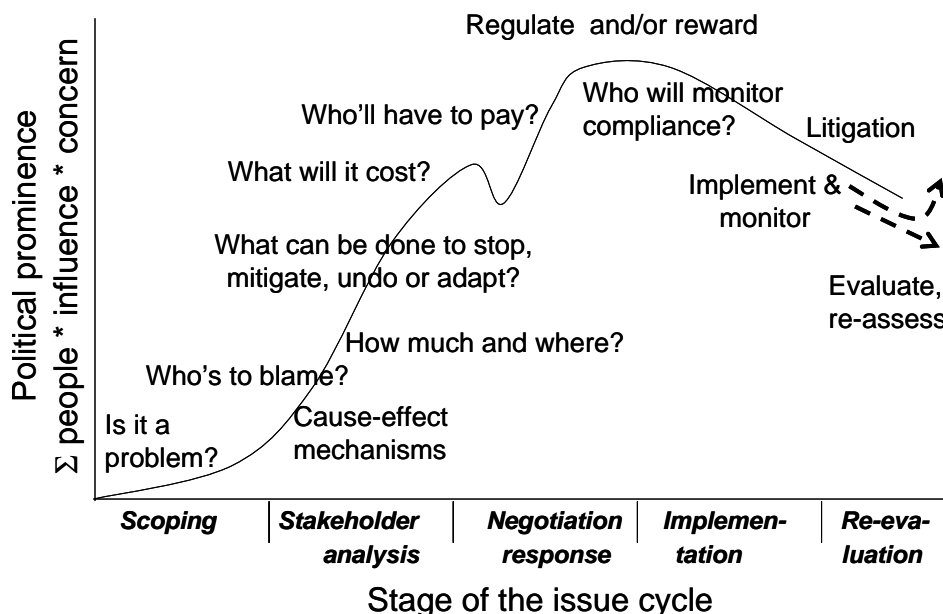
Figure 6. Issue cycle underlying the public recognition and solution of contrasts between reality and desirable states of the human and human + ecological system

The abstraction of an 'issue cycle' is a simplification of what often is a 'spiral' (i.e. a cycle that progresses along a third axis, either contracting or expanding), or multiple intertwined spirals.

One of the key lessons of RUPES Phase 1 is that the emergence of 'voluntary' reward mechanisms for ES provided by upland poor is strongly constrained by existing regulations, that often classify upland poor as illegal occupants of a domain that is supposed to provide ES as public good to 'downstream' society. The concept of 'downstream' is literal in terms of watershed functions, and a metaphor for biodiversity conservation and carbon storage. Finding solutions that work locally in the stages at which local issue cycles on poverty and environmental issues are, is often 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.

Figure 7. The relationship between the regulatory approach to 'minimum acceptable behaviour' and the domain for voluntary environmental service provision; CES = (obligatory) compensation for damage to ES; RES = reward for voluntary enhancement

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 do, depending on their origin and the multilateral or bilateral support for the initial investment, often have obligations to provide financial benefits to the local government and/or community. The 'earmarking' of these financial flows is often far from clear and transparent and in a number of cases funds have accumulated without proper ways for spending. Development of realistic, voluntary and conditional mechanisms for such situations where there in fact is a mandatory 'buyer' has the appearance of being a low-hanging fruit.

B. Similarly, conservation funds have accumulated intended for support of local communities, but with little effective use.

C. Countries such as Indonesia have over the years accumulated a large 'reforestation' fund based on levies on logging. Only gradually do governments learn 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 rate of success.

At the interface of local and international stakeholders, national authorities 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, experience so far has been that the '*transaction costs*' that derive 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 derive from the agreements (Box 1).

Box1. RUPES Kalahan

Currently, there are two markets that the Kalahan Educational Foundation (KEF) is developing – the Kyoto and the non-Kyoto markets. The efforts they allotted since 1970s to measure the biomass of their old growth forest are not wasted. With the improved formulas in quantifying their carbon stocks, results can be utilized to negotiate for the non-Kyoto markets.

"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 one Carbon Expert at the University of the Philippines Los Banos (UPLB) and 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

In 2002, KEF estimated around 38,383 tons of carbon dioxide were recycled by their forests (KEF, 2003). To date, they are analyzing the 1994-2004 data using the improved formulas to quantify their carbon stocks. Also, forest inventory in the 62 blocks (approx. 10,000ha) are being carried out. It is a huge task but they are confident that by the time they finish the project, they would able to compare the growth rates of three forest types (dipterocarp, pine and oak forests) and the carbon sequestration rates of 15 indigenous tree species.

At the mean time, the RUPES Kalahan Team is preparing the Clean Development Mechanism (CDM) - Project Design Document (PDD) for Kyoto Market. The Kalahan Forestry team with the technical assistance of ICRAF also prepared the "Forestry Project Idea Note (PIN) on Sequestration Project in the Ancestral Domain of Ikalahan." The PIN proposes a carbon sequestration project in 900 hectares grassland portion of the Domain. Among the activities conducted was the field measurement of carbon stocks in the grassland areas, which was carried out by the Kalahan Forestry team.

They are working hard to achieve rewards from this environmental service. *"The Ikalahans carry all of the burdens while the people in the lowlands receive all of the benefits"* as exhorted by one local resident.

"It seems that most of the needed legislation to enable the Ikalahan people to be remunerated for the forest services which they provide is already in place. The next step is to begin the dialogues with the beneficiaries of the forest services to convince them to pay for the services rendered," as Rice pointed out.

Though, monetary payments are not yet realized, however, KEF's hard work is well recognized. With this RUPES project, it builds the capacity of indigenous communities to begin the negotiation. It will also increase awareness and participation in the carbon sequestration and other related issues in and around the ancestral domain communities through the public education programs. The KEF is looking forward that their efforts will be soon rewarded with the best rewards.
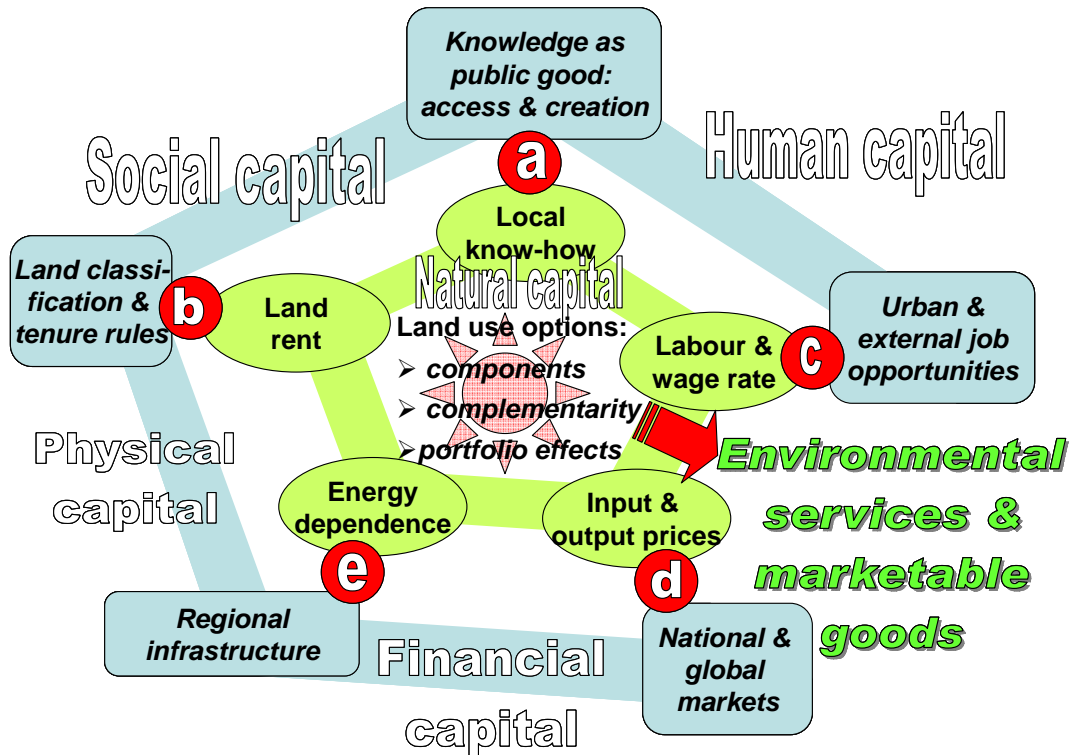
Figure 8. Interactions between the various types of capital that determine the performance of land use options at the local scale vis-à-vis multiple local requirements for goods and services, the flow of goods and services that reaches downstream markets and stakeholders, and the national scale processes (a, b, c, d, e) that link local to national scale

3.2 Cross-sectoral linkages, integrated rural development

Experience in each of the RUPES sites has been that the communities receive a confusing mix of positive and negative signals from national policies. On one hand these signals provide resources for the development of infrastructure, education and health services that can improve the quality of life in the rural setting, on the other hand the overall economy continues to pull people towards cities and/or jobs overseas. Complaints from lowland stakeholders over 'deforestation' and loss of environmental services as free 'public goods' tend to provide a negative image of the upland people, rather than a set of positive incentives for above-average efforts to enhance ES. Financial flows ('payments for ES') are unlikely to be of sufficient magnitude to really shift the local land use agenda in cases, for example, where improved road access allows intensive vegetable or livestock production to emerge 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.

4. Learning at site level

4.1 Stages

A primary step of the RUPES project has been the development of a shared perception between the project stakeholders of what rewards for ES entail (Figure 3). An early learning point also was recognition of the limitations of a pure 'environmental economics' science – policy paradigm, with a single currency expression of environmental costs and benefits informing a supposedly benign central decision making

authority. In the language of boundary organizations, RUPES shifted from a 'type II' boundary organization, to a 'type V' boundary organization. Figure 3 and the complexity it represents on the 'ES modifier' (potential ES seller) side has become a shared reality ('boundary object') between the RUPES partners.

In the emergence of location-specific reward mechanisms, the role of intermediaries (boundary organizations) can be differentiated in four stages:
I. Scoping (K ⇔ K)
II. Identifying stakeholders (A ⇔ A)
III. Negotiations (K ⇔ K) ⇔ (A⇔A), aiming for (unified K ⇔ unified A)
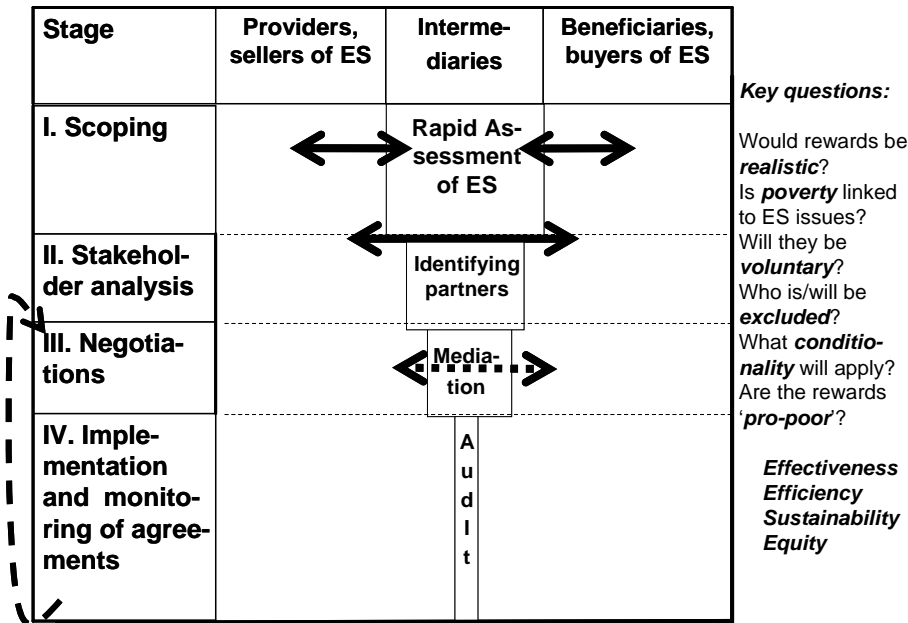IV. Implementation, monitoring and learning (unified K ⇔ unified A)

Figure 9. Stages recognized in the development of location-specific reward mechanisms for environmental services and the role of 'intermediaries' between upland modifiers/ providers of ES (who may become 'sellers') and downstream stakeholders/beneficiaries (who may become 'buyers')

The site-level experience of RUPES has made clear that the main 'currency' of rewards for ES can vary from financial ones ('PES') to ones based on provision of public services (e.g. for health, education or transport), enhanced market- access (e.g. certification for niche markets) or tenure security. 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.
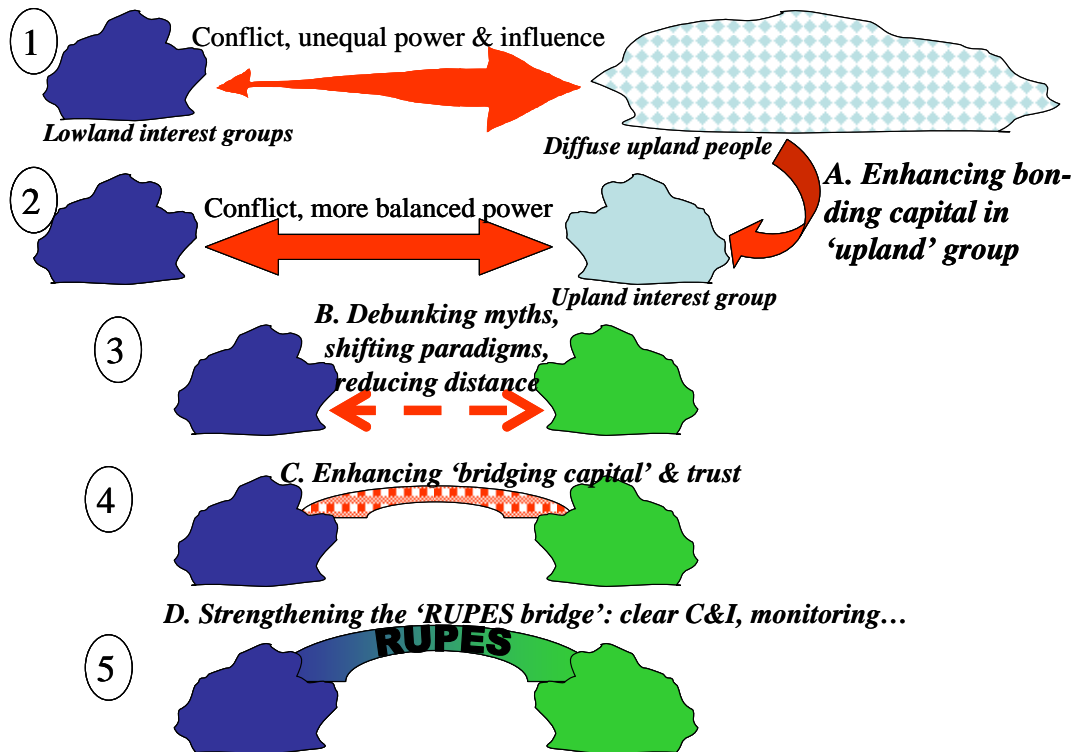
Figure 10. Representation of steps in bonding and bridging social capital formation as part of institutional conflict resolution and pre-cursors of effective conditional and voluntary ES reward mechanisms

Where 'secure tenure' was originally seen as a pre-condition for effective rewards for environmental services (Fig 10), the RUPES experience has been that providing 'conditional tenure' in itself can be an important 'reward' mechanisms, as well as being a step in 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 recognized. 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'.

4.2 Rapid appraisal tools for the scoping stage

As part of RUPES Phase 1 a number of 'tools' have been developed, especially for the scoping and stakeholder identification stage (addressing multiple ways of knowing as in Figure 11):
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.

Box 2. Rapid Hydrological Appraisal of Lake Singkarak watershed functions (Leimona et al., 2006)

The rapid hydrological appraisal (Farida et al., 2005) analyzed 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 'regreening' efforts, water user by canopy interception and transpiration of such trees reduces total water yield to the lake, and the expected increase in regularity of flow through better soil structure will not fully compensate this effect.

The hydrological model pointed to a strong dependence of HEP performance on variations in annual rainfall and possible increase of (El Nino) 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.

Reforestation effort using appropriate tree-species and focused on relevant 'erosion hot-spot' locations can lower sediment influx to the lake and improve regularity of water flow. As part of these findings are surprising to some of the stakeholders, good communication is needed to avoid over-responses on perceptions that reforestation is either sacred or evil. It requires 'the right tree on the right place'.

Figure 11. Birds eye view of Lake Singkarak in the 'rift valley' in the middle of the Bukit Barisan mountain chain that runs along the island, the forested escarpment that separates the lake from the Indian Ocean on the left (W side), the grass covered hills on the E and W side of the lake and the rice paddies at lake level; while the natural outflow of the lake to the Ombilin river on the east side of the lake has been reduced to an 'overflow' channel, most of the water is now passed through a tunnel to a hydroelectric scheme (PLTA) to the west; The village of Paninggahan owns a coffee enclave in the natural forest zone
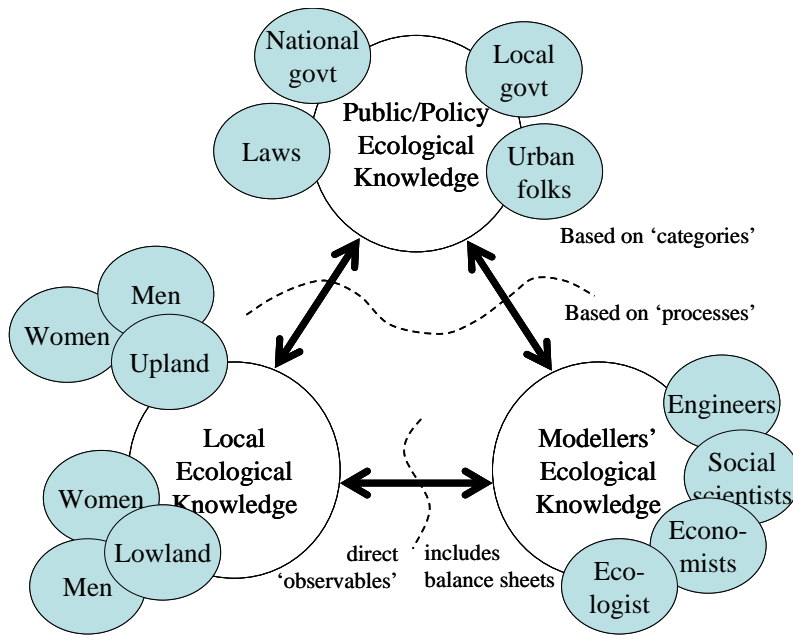
Figure 12. Multiple ways of knowing that are to be addressed and if possible reconciled in the scoping stage

These tools aim to clarify locally relevant questions and suggest multiple ways to provide cost-effective answers to bridge between the multiple ways of knowing of local stakeholders, governance agencies and relevant scientific disciplines. Their design for 'efficiency' (e.g. the 6 month and 10 k$ time and cost design of RHA) is cognizant of the transaction cost issue.

4.3 Multiple approaches to conditionality

In the evolving mechanisms we can see different approaches to 'conditionality' (Fig 13), that (by reference to Figure 2) relate to the different parts of the management cycle.
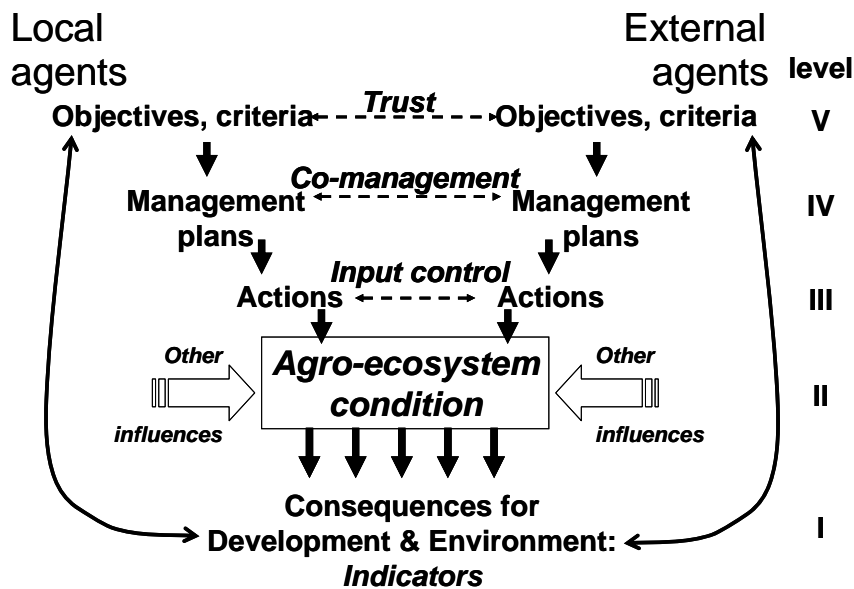

Figure 13. Distinction between 5 possible levels at which the interaction between local agents and external stakeholders can take place; level I, exchanges on the basis of 'ES produced' represent a typical 'market-based' paradigm of buyers and sellers, while interactions at level IV represent 'adaptive co-management'

Where the methods used for evaluation have themselves been 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. The current experiment with 'river care' payments on the basis of sediment measurements in streams is an attempt to provide experience with a level 1 type conditionality.

Overall, the experience so far suggests that a mixed approach to conditionality is needed: the mechanisms need to provide for the opportunity costs of labour at 'activity' level (III), be imbedded in local resource management plans (level IV) and use a mix of condition 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 without admixture of the other levels.

4.4 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 more the process forward (Tables 1 and 2). 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 cadre of qualified, demand driven 'service providers', and a set of concrete 'boundary objects' that can serve as 'commodities' with set quality characteristics as yardsticks and drivers of further innovation and cost reduction.

Table 1. Typical '*boundary objects*' for the 4 stages of ES reward mechanisms

Scoping: K⇔K	Stakeholder identification: A⇔A
Words (articulation of existing land use and effects on products and services, such as 'kebun lindung' or 'shifting forestry')	Stakeholder typology based on concerns and preferences
Icons/images	Maps of 'rights and resources'
Maps of space and lateral flows	Negotiation table ('neutral')
Representation of historical roots of the present situation	Workable bounds in the tradeoff between an 'all stakeholder' paradigm, leakage ('external impacts') concerns and transaction cost
Explanatory models used by various stakeholders for local system dynamics	

Negotiation: (K ⇔ K) ⇔ (A⇔A), aiming for (unified K ⇔ unified A)
Tradeoff matrix as 'agreement to disagree' and baseline of current ES provision
Scenario analysis based on all major stakeholder concerns and plausible change
Assessments of additionality, leakage and permanence
Project Design Document (PDD) in the Clean Development Mechanism cycle
New use of existing legal opportunities for 'community based forest management'
Standards of service delivery respecting multiple 'ways of knowing'
Contracts: conditional service delivery agreements with realistic rewards and voluntary 'buy in'

Implementation, Monitoring and Learning: unified K ⇔ unified A (or reverting to (K ⇔ K) ⇔ (A⇔A)
Operational indicators for monitoring aligned with the main criteria for success
Certificates of compliance to agreed standards

Table 2. Typical '***boundary work***' carried out in the 4 stages of ES reward mechanisms in RUPES sites

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

4.5 Pathways to poverty reduction

Positive effects of RES on poverty reduction may derive from a number of different pathways. Eight have been recognized so far in the RUPES program (Table 3). They address different dimensions of (rural) poverty.

Table 3. Pathways for ES Reward schemes to alleviate poverty as recognized in the RUPES program

	Pathway	*Poverty dimension addressed*
P1	Stop negative 'drivers' that enhance poverty and degrade environmental services ('PUPES')	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 'commoditized' environmental services	Direct income (land based)

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4.6 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 exist or where about to 'break through', to provide 'living laboratories' for other sites (Fig. 13). In fact, most of the sites selected where probably a few more steps away from effective reward mechanisms than the target was…
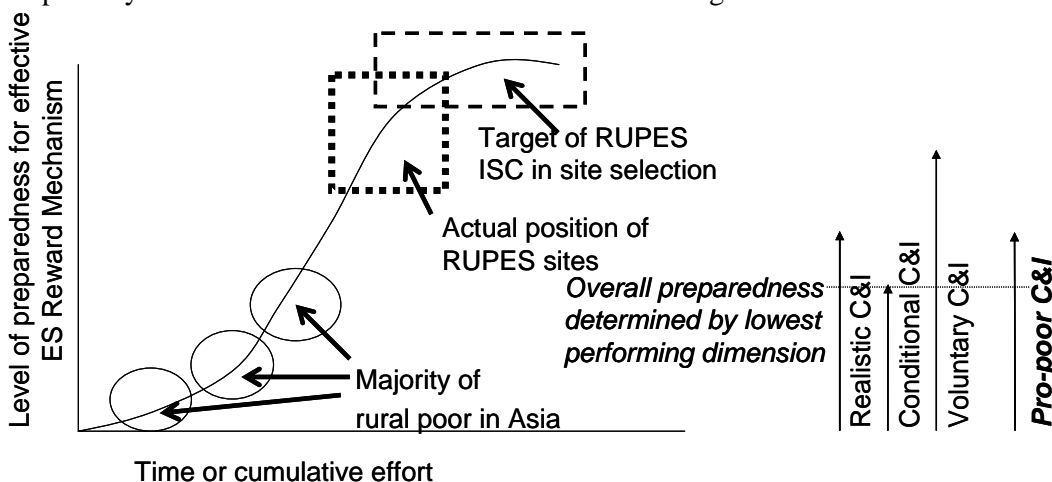

Figure 14. Conceptual progression of 'levels of preparedness' for effective, efficient, sustainable and fair ES reward mechanisms as initially perceived by RUPES and as re-interpreted based on the 4 dimensions (realistic, conditional, voluntary and pro-poor)

In the process of selecting the 6 action research sites, we learned a lot about many other situations and communities who are lower on the curve. We also learned that the overall 'level of preparedness' is at least a 4-dimensional problem of being '*realistic, voluntary, conditional and pro-poor*'. The least articulated dimension probably constrains the overall level of preparedness.

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 environmental services (ES) by up-land 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 take it out 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 learnt so far into the creation of RUPES as a *'boundary organization'*, operating at the international/continental scale (-- in 2005 the RUPES ISC agreed that we call ourselves RUPES-Asia to create space for a RUPES-Africa and other 'siblings' --) that facilitates the international and regional (e.g. ASEAN) learning and that facilitates *national level RUPES boundary organizations* (with Indonesia, Philippines and Vietnam as obvious candidates for an initial round) that deal with the national regulatory aspects and institutional learning, and facilitates the emergence, initial growth and independence of *'site-level' RUPES boundary organizations* that negotiate and help implement and monitor realistic, voluntary and conditional ES reward schemes that are designed to be pro-poor.
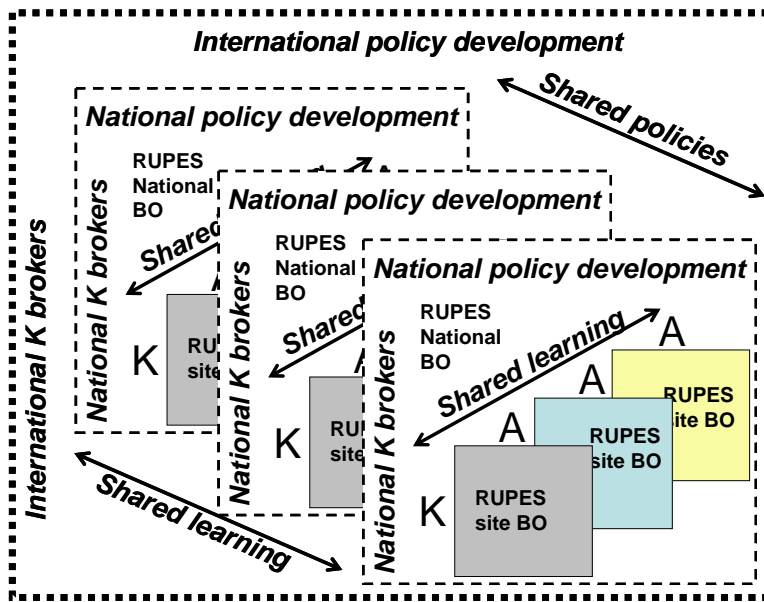
Figure 15. Nested structure of site-level boundary organizations (such as RUPES-Singkarak and RUPES-Bakun), national boundary organizations (such as the RUPES-Indonesia COMMITTEES and RUPES-Philippines) and the RUPES-Asia boundary organization

In stead of a single-level 'ES reward broker' as originally envisaged for RUPES, we can now see the emergence of a 3-tiered boundary organization (Fig. 14), that crosses boundaries between multiple actors and multiple ways of knowing at site, national and international level.

Table 4. Steps needed to clarify function and structure of such a potential RUPES boundary organization

Function	Structure
Site level Crystallization point in the initial, fluid scoping and stakeholder identification stage, establishing a role as 'independent' and 'mutually trustable' agent of salient, credible and legitimate knowledge products relevant for local action	***Institutionalizing of site-level boundary organization*** of local stakeholders (with participation of local knowledge brokers) after scoping and stakeholder identifi-cation stage, to facilitate negotiations and to provide oversight and primary liti-gation forum in the implementation stage
National N1. National level learning from expe-rience, bottlenecks and opportunities on the environment*poverty nexus N2. National policy advise to facilitate evolution of conduce policy environment and locally applicable performance standards N3. Development of cadre 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	***Institutionalizing of national scale boundary organization*** of 'knowledge and action' stakeholders on the poverty * environment nexus Institutional representation of site-level boundary organizations and national institutions (GO, NARS, Universities NGO's and private sector) or qualified/ respected individuals with renewable tenure? Secretariat and convener functions

intermediaries for enhanced learning	

International
I1. Contextualized, shared learning
I2. Evolution of methods and perfor-
    mance standards
I3. Advise and feedback to evolving
    international policies
	Institutional representation of national
	nodes plus international actors on the
	knowledge and action side of develop-
	ment/ poverty and environment
	
	Secretariat and convener functions

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