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# Insight: Notes from the Field

Issue 2.2007



**Exploring Payments for Environmental Services**



## Foreword

### Thematic issue on Payments for Environmental Services

The idea of developing a thematic issue of *“Insight: Notes from the Field”* on Payments for Environmental Services (PES) came during a workshop on the same theme in Lombok, Indonesia, January 2007. The workshop showed that there is growing interest in learning more about PES and the potential for poor communities to receive benefits from the environmental services they provide. It also became evident that, although PES is a relatively new concept in Asia, there is a growing level of valuable field experiences and lessons that can be shared with others.

This publication aims to facilitate the sharing of these practical experiences and lessons. It is organized around three key concepts within PES: environmental and economic feasibility in terms of being realistic and conditional; characteristics of service providers; and relationships to poverty. The opening synthesis paper provides some brief theoretical background on these key concepts, which are illustrated by lessons from field level practice in the six case study papers that follow.

In the case studies focused on the concept of feasibility, SNV shares their experience in implementing the Clean Development Mechanism (CDM) in Vietnam as a co-financing mechanism for a reforestation project. Also, the RUPES Program in Sumberjaya, Indonesia, describes their experience with developing an agreement for land tenure stewardship conditional on land management activities, as well as a pilot project where farmers perform and monitor sedimentation reduction activities that will benefit a downstream hydroelectric company. The next two cases go into the characteristics of service providers and their implications on the development of the PES mechanisms. RUPES in Kulekhani explains how a collective PES mechanism is being developed based on the characteristics of the many suppliers around Kulekhani watershed. Winrock shares lessons from pilot projects in three sites in India on Incentive-Based Mechanisms for watershed services and improved livelihoods for the upland people. The third and last theme explores the issues in making PES pro-poor. Here, Jindal and Kerr tell of experiences from three partner organizations in India on issues and opportunities for community involvement in carbon sequestration through international voluntary carbon markets. A case study paper from RUPES in Philippines also shows the struggle of the Bakun indigenous peoples to receive direct benefits for watershed services.

In this publication, PES refers not only to benefits in monetary terms but also to broader rewards, such as conditional land tenure agreements in Sumberjaya, support of tree saplings in India and social capacity and decision-making power in Bakun. We hope this issue of *“Insight”* gives valuable lessons and raises important issues to consider under the concept of PES.

Mikaela Nilsson Rosander  
Coordinator and editor of “Insight”  
RECOFTC

# Insight: Notes from the Field

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With editing support from Ms. Erica Lee.

**Please send your comments and suggestions!**

RECOFTC would appreciate any comments or suggestions on this publication as well as suggestions for future issues.

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## **Payments for Environmental Services:** Introduction to feasibility, supplier characteristics and poverty issues

*By Erica Lee, Beria Leimona, Meine van Noordwijk,  
Chetan Agarwal and Sango Mahanty*

### **Summary**

As Payments for Environmental Services (PES) is in its early stages of development and implementation, there are many questions to address regarding its features and functions. In this overview paper, we take a look at three themes relevant to practitioners' work - the environmental and economic feasibility of PES schemes, the characteristics of environmental service providers, and the relationship between PES and poverty. The first section on environmental and economic feasibility discusses how to develop performance-based (conditional) mechanisms built on real cause-effect relations between land use and environmental services that are economically viable for environmental service (ES) providers and beneficiaries (realistic). The second section on the ES providers discusses the characteristics of many ES providers and the issues facing them, including whether the incentives are sufficient to engage providers on a voluntary basis and whether schemes are adaptive and reflect the voices of and within communities. Finally, the third section discusses the relationship between PES and poverty, namely the opportunities and risks in reducing poverty, and the possible effects of a pro-poor focus on the viability and effectiveness of PES. This synthesis paper gives a conceptual overview of the various issues that will be further explored in the rest of the publication through case studies.



Payments for Environmental Services (PES) is an approach to resource conservation that uses incentives to influence environmental practices. More specifically, it is where beneficiaries of environmental services make payments or provide other non-financial rewards to those who secure the provision of such services. These environmental services are non-material, non-extractive benefits from natural resources, such as watershed protection and carbon sequestration. Payments, in addition to monetary exchanges, can be more broadly understood to be compensation mechanisms that reward providers of ES, and thus can include payment-in-kind and access to resources and markets.<sup>1</sup> In this publication, we take payments and rewards to consist of a range of positive incentives that may also include benefits such as decision-making power, capacity building, etc.

While PES schemes exist in some developed countries and have been piloted in various locations in developing countries, PES remains a fairly new practice with limited experience. Recently, it has been attracting increasing interest in Asia, but many questions and issues regarding its design and implementation in the region remain. This paper provides an overview of these issues and introduces the case studies that follow in this issue of *Insight*.

## Environmental and Economic Feasibility of PES: Making Schemes Realistic and Conditional

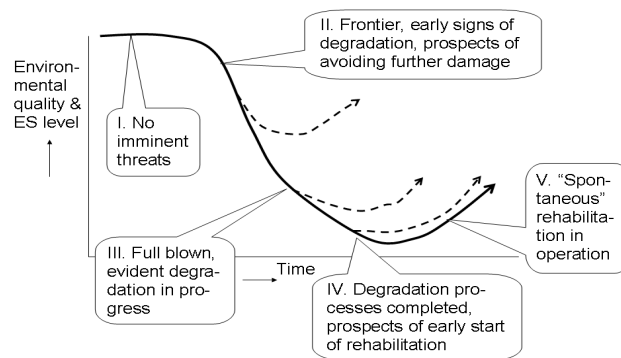
How can we ensure that PES schemes are environmentally and economically feasible? In addressing this question, the recent experience of the Rewarding Upland Poor for Environmental Services (RUPES) program highlights the importance of two criteria in the design of PES mechanisms: payments or rewards should be conditional (performance-based) and realistic.<sup>2</sup> We explore these criteria further here.

### Realistic

A realistic PES program considers both the environmental and economic factors that are necessary and feasible to effectively improve or maintain the provision of an ES. From an environmental perspective, a realistic PES scheme requires a clear relationship to have been established between the land use modification that forms the basis for the payment scheme and the proposed ES outcomes. This means that management practices by ES providers could actually maintain or improve the ES provisions. One major problem is that there are gaps in perception of these environmental services, and what actions can best secure them, among ES providers, beneficiaries and intermediaries. In many cases, providers of ES, even intermediaries, do not know the real effects of their land management practices on ES provisions. Buyers of ES often remain unaware of the level of ES provision they are receiving in return for their payments (or even that such values are being generated in the first place). Furthermore, the science of how to address the complexity of landscape and ES provision interactions is nascent. On top of these factors, a viable PES program should be realistic in terms of the timing, adequacy and quality of implemented practices, and allowing enough time for desired environmental outcomes to emerge.<sup>3</sup>

From an economic perspective, it is important that the scheme is based on an understanding of the economic costs and benefits accruing to various stakeholders. At least three types of costs are involved in a PES scheme: *operational* (or direct) costs to implement the conservation activities, *opportunity* costs of alternative land and resource uses forgone due to conservation activities and *transaction costs*, the financial and other costs involved in establishing a PES scheme. For a PES scheme to work, the payment or reward needs to be adequate and acceptable for: 1) the ES sellers to cover their operational and opportunity costs; 2) the intermediaries to cover their transaction costs; and 3) the ES buyers to be willing and able to pay for all of these costs and still receive a net benefit in ES value. Ideally, there are some real additional benefits to be shared beyond these costs. A realistic PES scheme recognizes the need to match the ES beneficiaries' willingness to pay (WTP) and the ES providers' willingness to accept (WTA) the offered payment or reward as the basis for negotiation of benefit sharing.

In determining whether a PES scheme is realistic in both environmental and economic terms, the conditions and trends of ES and analysis of threats to these services is important. Figure 1 shows how these conditions and trends can be analyzed to assess the potential for PES scheme implementation. The adjoining table recognizes "additionality" as a key factor in this analysis.<sup>1</sup> In general, it is easier to show additionality for "restoration" projects than for "avoided degradation" as the degradation is already clear and the ES improvement more tangible. Such demonstration of additionality can be instrumental in raising WTP, even though for environmental health, the rule that "prevention is better than cure" holds as much as it does for human health.



**Figure 1.** Diagram and table showing feasible environmental and economic factors for PES implementation

<sup>1</sup> This refers to the improvement in ES that would not have occurred without the change or project, or in a "business as usual" scenario.

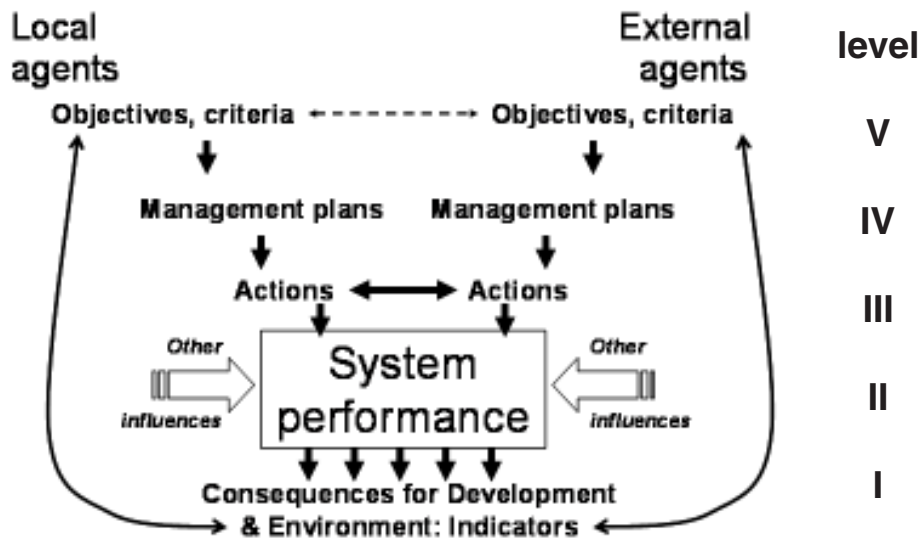


	Current ES level + evidence	Threats	Prospects for ES reward mechanisms
I.	Good ES level	No imminent threats; low accessibility and/or institutional protection sufficient	No imminent need, low additionality
II.	Good ES level, but early signs of degradation	Frontier setting, interaction of multiple actors; changing institutions	Slowing down degradation, stabilizing at higher level; potentially high project additionality, but WTP and WTA may be low as yet
III.	Declining ES; evidence starts to accumulate	Full degradation in progress	Slowing down last phases of degradation, early start of rehabilitation; potentially moderate additionality, but WTP and WTA are increasing
IV.	Low ES level, historical decline evident	Degradation processes completed; prospects of early start of rehabilitation	Triggering and/or speeding up rehabilitation; moderate but “easy to show” additionality, WTP and WTA may be high
V.	Low but improving ES level; “trends” may be unclear	“Spontaneous” rehabilitation in operation	Increasing the restoration levels attainable; low-to-moderate additionality, WTP higher than WTA where real trade-offs are concerned

### Conditionality

In order for PES schemes to be socially and environmentally sustainable in the long term, the payments for ES should be conditional on the actual delivery of such ES. If providers fail to deliver (through their activities or ES results), the buyers can withhold payments or rewards. Figure 2 introduces five levels at which conditionality of PES can be envisaged, with the likely advantage of using multiple levels in any particular scheme and the opportunities for the gradual development of trust (level V) over time.

The first mode of conditionality, which is based on measurement of ES outcomes, begins with the establishment of a set of criteria and indicators between the local ES providers and the external ES beneficiaries. This may be the ultimate target of performance-based measures, but it may be difficult to implement due to time lags and strong effects of external factors, such as climate variability. Clean Development Mechanism (CDM) projects are of this type because they are ultimately based on



**Figure 2.** Schematic representation of five levels at which the interactions between local actors and external stakeholders can take place: ES outcome (I), condition of the agro-ecosystem (II), inputs/activities (III), management plans (IV) and trust in management objectives (V) (Van Noordwijk, 2005).<sup>4</sup>

measured changes in carbon stocks that reflect net carbon sequestration; a case study on CDM in A Luoi, Vietnam, gives more details about specific criteria and indicators. A further example is in the Sumberjaya case study, where the RiverCare group monitors sediment levels in the river as a basis for performance-based rewards.

A second mode of conditionality is where payments are based on the actual overall condition of the agro-ecosystem. This kind of approach, based on analysis of the “stock” of natural capital rather than the measurement of ES flows (as with the first mode), has the potential advantage that the environmental conditions are easier to observe than ES flows. However, there can be a bias in the system as certain land cover types are overrated with respect to the ES provision and others don’t get the recognition they deserve. The debate on forests or agroforests as providers of watershed functions, touched upon in the Sumberjaya case study, is a case in point.

A third mode of conditionality rewards actors on the basis of their efforts or practices that are perceived as desirable, such as planting trees, maintaining good land management that meets specified restrictions or protecting a piece of land that is ecologically sensitive. The Kuhan case in India, in which the lower village pays the upper village to protect an area from grazing, would be an example. In cases of PES based on this mode of conditionality, the payment is often based on the willingness of external beneficiaries to pay for the change in practice by local actors, rather than on the



opportunity costs to service providers. In such cases, clear guidelines of land-use practices that lead to the depletion and improvement of ES provision need to be further developed, and critically evaluated. For example, planting trees will usually reduce water availability downstream rather than increasing it.

The fourth mode of conditionality introduces the concept of local management, which can be understood as the “right to regulate internal use patterns and transform the resource by making improvement” from providing linkages to risk-sharing and conflict resolution.<sup>5</sup> Partnership is also considered the essence of co-management, which can involve lifting policies that promote environmentally harmful practices and discriminate against poorer farmers. Harmonizing perceptions on managing the environment for a win-win solution is acknowledged by the external stakeholder, who will *pay for the way they (the local actors) decide on what to do or what not to do*. It can be seen as “avoiding micro-management.” In the Kulekhani case study, for example, part of the hydropower royalty that the upland people receive as a reward for their land-use activities are used for their own conservation and development projects.

The fifth mode of conditionality is based on trust in local objectives and ability to manage for local benefits derived from environmental conservation. An example can be certain forms of the ICDP (Integrated Conservation and Development Project) where poverty alleviation and greater participation of local communities in conservation strategies and activities are based on expectations of win-win outcomes for livelihoods and the environment. People’s participation is secured at all stages of ICDPs, from design to implementation, monitoring and evaluation. Such an approach is often seen by theorists as a weak form of PES, as the conditionality of payments is low or nonexistent and the linkage between payments and ES provision is indirect.<sup>6</sup>

## Who are the Service Providers?

Engaging effectively with the providers of an environmental service is a critical foundation for PES, to ensure the sustainability of the mechanism as well as to ensure positive environmental outcomes for the service buyers and livelihood improvements for the service providers. A starting point is to understand the characteristics and contexts of the people who provide the environmental services, which can help to plan the best strategies to engage with them in a meaningful and sustainable way. The following points describe in broad terms the situation of many service providers in the Asian context, based on experiences from the RUPES program and Winrock-IIED’s work on watershed services.

### Rural, often poor

A key characteristic of service providers is that they are usually rural or peri-urban. In most of the cases presented from Asia, they are small-scale farmers practicing subsistence and market farming, or horticulture in a mixed landscape that includes farms and forests. The providers may also be users of natural resources, such as forests, based on formal or informal rights to the resource.

### **Diverse livelihoods**

A related feature of these rural poor is that they typically draw on a diverse range of livelihood activities undertaken for their subsistence and survival. For those that own land, for instance, a household may farm their own small patch of land, keep a few animals that graze in a nearby forest, and collect a variety of NTFPs for subsistence and sale. The implication of this is that any change in land-use practices is likely to have a range of impacts on a variety of stakeholders, some that are direct and immediate, and some that may not be immediately obvious.

### **Small landholdings**

Across Asia, many of the landholdings are small; for example, in countries like India, Indonesia, Nepal, and Vietnam, average landholding size is under a couple of hectares.<sup>7</sup> In mountain regions, the size of fields and holdings may be even smaller (this is illustrated in the Kuhan case, from Himachal Pradesh, India, where landholdings are in fractions of hectares, and also the Kulekhani case, Nepal appearing later in this volume). Higher populations and small landholdings mean that functional environmental service payment schemes may have to deal with a large number of people to achieve a sufficient scale of impact on the ES.

### **Limited awareness and information**

Many poor communities have limited information, and may be unaware of the effects of their activities. In the Kulekhani case, for example, the people of the watershed did not know that their activities were benefiting others besides themselves. Service providers and beneficiaries may also have very limited information on the process of setting up functional PES mechanisms or of the skills and training that the schemes may require. Facilitators may play an important role in raising awareness of the concept of PES, as they have done in the Kulekhani case, or in capacity building and training, which was required for the service providers in Bakun watershed, Philippines.

### **Low voice and negotiation power**

Along with limited information, poor service providers usually have little political voice and even lesser power to negotiate agreements. More often, they are at the receiving end of government regulations and investments. However, where payment mechanisms are able to engage meaningfully with such stakeholders, it can provide a vehicle to both undertake land use practices that provide environmental service benefits as well as improve the circumstances and welfare of the service providers.

### **Local institutions need strengthening to play a coordinating role in PES**

Institutions that coordinate and represent the service providers can play a critical role in reducing transaction costs and helping a variety of stakeholders with differential power and voice engage in the negotiation of a PES instrument. Where such institutions are lacking or non-functional, a key interim goal for facilitators or interme-



diaries has often been to develop and nurture such representative bodies. This can be seen as a foundation activity for PES, which actually brings multiple benefits. Conversely, where such institutions do not exist and facilitators are unable to engage in such supportive work due to short time horizons or other constraints, mechanisms are less likely to succeed.

### **Lack of clear land tenure**

Another feature that is prevalent across Asia is the variation in security of land tenure for farmers, whether on private lands that are farmed individually, or common lands that are accessed and/or managed by communities. The lack of clear title and secure tenure affects the ability and incentive of individuals and communities to make longer term decisions about their land use and land management decisions. For communities, the risk is that where land use rights are unclear, actual landowners – often the government or large private landholders – can accept environmental service payments, with little trickling down to other land users who are also affected. This is particularly relevant as the timeframe involved in undertaking land use practices and seeing their full environmental impact may be measured in years and decades rather than months, while most farming and forest communities live from one harvest to the other, and have high discount rates (placing higher value on immediate rather than long term returns). The lack of clear tenure can then become a significant barrier to developing payment mechanisms and achieving sustainable resource use. Conversely, innovative payments mechanisms can help such communities to strengthen their tenure, perhaps as a reward based on environmental performance, as in the Sumberjaya case study.

### **Influence of the size of resource flows**

A key question for ES providers is whether the incentives offered for them to change their resource use and management practice is sufficient to engage them on a voluntary basis. A second question is whether the payments can vary to reflect the variations in the opportunity costs amongst the service providers, especially on common lands, e.g. graziers may bear higher costs than non-graziers, if grazing is closed. Where the size of incentives are small in proportion to the number of stakeholders, and the activities are also often on common lands, an effective practice can be to provide and use the payments at a collective level, rather than distribute small sums of money to individuals, as in Kulekhani.

### **Adaptive mechanisms**

Mechanisms that are adaptive, effectively reflect the voice of communities and balance negotiation power between stakeholders, are more likely to succeed. They will also have to be based on an assessment of the level of uncertainty and risk – whether a proposed land use change will have the anticipated benefits, whether communities have the staying power to undertake the changes and wait for the payments later, whether payments are for input activities (tree planting, terracing) or for outputs (reduced erosion), and so on. Potential buyers may also be hesitant and skeptical of the ability of the service providers to deliver here, there may be a role for

experimental “stand-in” payments that demonstrate the viability of a payment mechanism, as in the Sumberjaya case study with the RiverCare group.

Meaningful engagement with communities that have both environmental and local economic benefits will require understanding service providers’ specific characteristics and addressing them at the site level. It is clear is that, for service providers who include a significant proportion of poor people, any land-use practice change that is proposed should either have significant local benefits (a win-win solution), or provide adequate, and sometimes innovative, forms of compensation.

## **PES and Poverty: Opportunities and Risks for Poverty Reduction**

When considering the feasibility of PES programs and the service providers involved, a central issue that arises is the effect of such programs on the poor. *Can and should* PES aim to reduce poverty, and *how*? To answer this question, we must consider both the impacts of PES on the poor, and the impact of a pro-poor focus on the effectiveness of PES. More specifically, can PES programs help to reduce poverty? Are there ways in which these schemes may even worsen the situation of the poor, and how can such risks be minimized? What implications will a focus on poverty reduction have for the viability of PES schemes? Answers to these questions are rarely clear cut, especially given the limited experience and research so far on these issues. However, some general points can be made.

Firstly, experience has shown that resource management interventions of this kind, particularly where common property resources are involved, have the potential to affect livelihoods in significant ways. Furthermore, studies so far indicate that the impact of PES on the poor may be substantial.<sup>8</sup> With a better understanding of the various dimensions of the relationship between PES and poverty, more can be done to maximize PES’ poverty reduction potential and reduce risks to the poor.

### **Impacts of PES on poverty**

The opportunities and risks for the poor that emerge from PES programs seem to largely depend on specific characteristics of the programs and the context in which they take place, such as the types and locations of services being marketed, the transaction costs involved, the forms of payments or rewards, and the level of priority to target the poor.

Before we discuss the specific impacts of programs, we consider what determines the participants of PES in the first place and how the poor might be excluded. First, there must be a market for the ES being provided by poor suppliers. Though many land users are poor and so may be in a good position to be willing ES sellers, there is no guarantee that there are many users of such services or that existing users are willing to pay. Also, even when there is a potential market for the services the poor provide, a number of barriers exist for the poor to participate in PES. Certain charac-



teristics of the poor, such as uncertain property rights, small landholdings, and weak political voice, noted above, can diminish access by the poor to PES schemes. For example, if a PES program is open only to landholders, this immediately restricts the potential for PES to benefit many of the rural poor, who do not have secure title to land. Furthermore, PES programs can involve high costs, such as transaction costs and investment costs, which may hinder participation by the poor.

In this analysis, we take a multidimensional approach to the concept of poverty. Rather than understanding it to be only the lack of material income or financial assets, we understand poverty to be the lack of capabilities that enable a person to live a life that he or she values,<sup>9</sup> involving deprivation in four other areas in addition to financial assets - human, natural, social and political, and physical. The impacts of PES on poverty therefore also need to be explored in terms of the impacts on these five asset bases.<sup>10</sup>

**Financial assets:** PES may contribute positively by increasing the overall income in participating households through payments or expanded employment opportunities. On the other hand, if access to PES schemes by the poor is restricted, income may become more concentrated among the wealthy, and restrictions on land use associated with PES may reduce income from other sources for both poor participants and non-participants.

**Human assets:** Access to basic services like education and health and emergency assistance enable people to adapt to change and decrease their vulnerability to financial or environmental shocks. Public health could be improved by PES if air and water quality are improved. For participants, PES initiatives may bring an increase in human assets by bringing training associated with the projects. However, the poor may have difficulty in capturing these, and may also be further excluded due to lack of initial skill and training.

**Natural assets:** Here, a key concern is the poor's security of access to natural resources and change in the value of these resources. In some cases, PES may strengthen tenure security; land under PES agreement is not considered "idle", which can reduce the threat of encroachment. Tenure security itself has also been used as the form of payment or reward in some schemes, as seen in the Sumberjaya case study. Conversely, PES may limit access to common lands for marginal groups who use them for livelihood activities such as grazing, resource collection, and swidden agriculture. There is also a concern that land might be taken away from the poor as the land becomes more valuable under a PES scheme, as indicated in the Indian case study by Rohit and Kerr.

**Social and political assets:** Critical social resources enable people to function equitably as members of society. These assets include both social structures and processes (the internal and external relationships in communities), and institutional arrangements (the decision making structures and processes). Where PES programs

promote the strengthening or creation of institutions to negotiate agreements, they may unite communities and increase their social and political power. On the other hand, there is also risk of conflict, especially associated with problems in the equitable distribution of costs and benefits within communities.

**Physical assets:** These include access to basic infrastructure, such as sufficient housing, energy, transport systems, and communications facilities, which can create opportunities to expand livelihoods and decrease dependence on local resources. Local infrastructure may be improved due to market infrastructure provided through PES programs, such as roads, while some may have to be dismantled in order to properly deliver environmental services.

These are just some of the risks and opportunities that may face the poor through PES programs. How these weigh up against each other will vary according to each specific case. Either way, it remains important to consider the effects of PES on the poor; ignoring this can be, at best, a lost opportunity to reduce poverty, or at worst, a significant liability to the poor and a setback in the pursuit of poverty alleviation.

### Effects of a pro-poor focus on PES viability

Some say that poverty reduction should be a central objective of PES, perhaps even inextricably linked to its environmental conservation objective. Aside from ethical reasons, the inclusion of the poor can be seen as important for the long-term viability of these initiatives, and could also contribute to wider poverty reduction goals.

Others argue that conservation should be the primary objective of PES and that focusing too much on poverty reduction may cause PES to become unviable, or diminish the delivery of environmental services. The concern is that, considering the market-based nature of PES, diverting the focus too much from environmental conservation could end up preventing the delivery of environmental services, and causing buyers to pull out. In this event, there is no opportunity for the PES mechanism to help the poor.<sup>11</sup>

There is also concern that efforts to involve the poor can compromise the efficiency of PES;<sup>12</sup> for example, with the higher transaction costs for a group of smallholders. Some have also expressed concern that improvements in the five asset bases might ultimately have a negative impact on the delivery of the ES. For example, an improvement in the local economy could attract migrants and threaten the very resource that people are trying to conserve.<sup>13</sup>

It seems that there are situations where conditions for environmental conservation and poverty reduction may converge and a win-win situation is possible. However, this will not happen automatically, and the level of priority placed on poverty outcomes needs to be explicitly determined at the outset.





### **Future action**

This brief overview of the relationship between PES and poverty highlights its complexities and the need for more research to clarify the issues. What we can see so far is that PES brings a number of opportunities and risks for the poor, much of which depends on the conditions and design of PES in each case. While there is debate on the level of priority that should be given to poverty reduction within PES programs, it is imperative that proponents of PES share a commitment to “do no harm” to the poor through PES initiatives by worsening their situation. Further, PES schemes could usefully take up the identified opportunities to improve the accessibility of PES initiatives and to build the assets available to the poor.

Intermediary organizations have a critical role to play in the above tasks. They can help to improve the accessibility of PES schemes to the poor by: sharing information on ES market opportunities, facilitating innovative ways to strengthen resource rights for the poor to enable their participation, and reducing the transaction costs of their participation. They can also strengthen the assets of the poor in various areas, particularly through training and knowledge management and strengthening and developing local institutions.

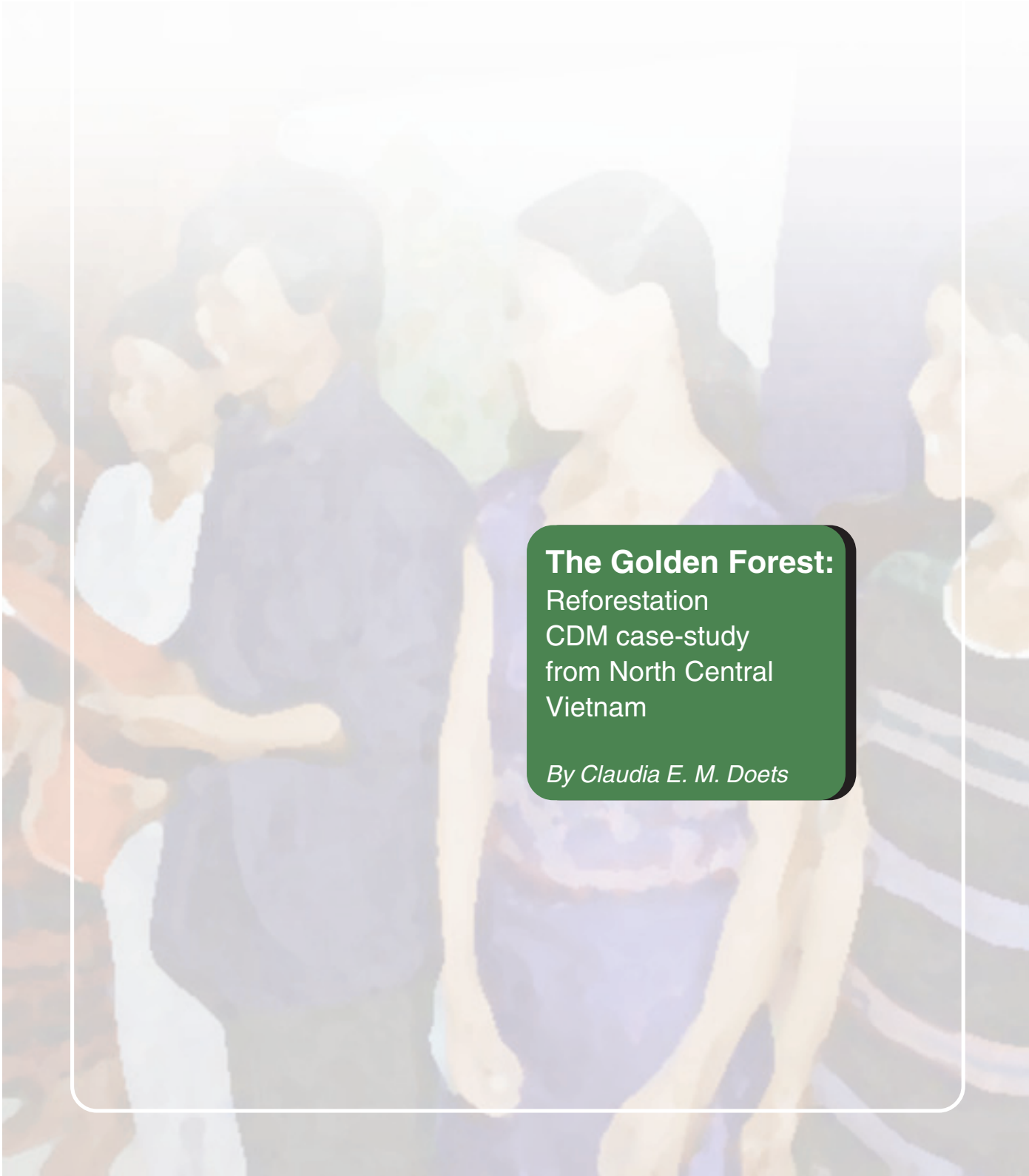
We need to also recognize that poverty reduction and sustainable natural resource management will ultimately need a range of complementary strategies, not just PES. At a particular site, PES might form one of a range of strategies including regulation, enterprise development, and community-based resource management. The poverty reduction potential of PES is perhaps best considered on a site-specific basis in the context of the other options available, to enable the most effective options for sustainable livelihoods and resource management to be supported in an integrated way.

### **Conclusion**

We have reviewed a number of important factors to consider when designing and implementing PES mechanisms – factors in ensuring mechanisms are realistic and conditional, implications of characteristics of service providers, and various aspects of the relationship between PES and poverty. Many uncertainties and challenges remain, but pilot projects and research are clearing up some questions and informing our decision-making. The sharing of information and experience is essential to taking PES mechanisms forward, and we hope the case studies that follow contribute to this process.

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**The Golden Forest:**  
Reforestation  
CDM case-study  
from North Central  
Vietnam

*By Claudia E. M. Doets*

## The Golden Forest: Reforestation CDM case-study from North Central Vietnam

*By Claudia E. M. Doets*

### Summary

The Clean Development Mechanism (CDM) refers to the flexible mechanisms of the Kyoto Protocol (under the UN Framework Convention on Climate Change) used to reduce greenhouse gases in developing countries and sell those reductions to industrialized countries that have a greenhouse gas reduction commitment under the Protocol. In this paper, we discuss the use of the CDM in the forestry sector.

In the areas of North Central Vietnam that have been devastated by the war between the USA and Vietnam, the District of A Luoi is trying to use the CDM as a co-financing mechanism for reforestation. The Golden Forest 5000-hectare reforestation project includes smallholder plantations of 3000 poor households. Through the use of CDM, reforestation will become a financially attractive option for these people. Apart from the economic gain for poor households, the use of the CDM mechanism has several additional benefits due to the fact that the mechanism's application requires high quality project design and implementation. These additional benefits might actually outweigh the financial gains, and relate to land-rights clarification, international standards of sustainable forest management and transparency. In 2005 and 2006, a proto-project has been implemented as a runner-up for a full pilot. The CDM component for the 5000-hectare project is in the development stage.



## Linking the UN Framework Convention on Climate Change (UNFCCC) to the local level

The latest report of the Intergovernmental Panel on Climate Change<sup>i</sup> states that global warming has begun and will be unstoppable for centuries. The impacts of climate change will likely include altered weather patterns, intensified droughts, storms and floods, epidemics, mass migrations and social breakdown that will ultimately threaten the lives or livelihoods of hundreds of millions of people. Developing countries will be the worst hit and their poor populations are the least capable of defending themselves. The Stern Review Report,<sup>ii</sup> published in late 2006, uses formal economic models to argue that failure to take action on climate change will result in economic losses equivalent to 5-20 percent of global GDP each year. In contrast, the costs of taking action to reduce greenhouse gas emissions (GHG) and avoid the worst impacts of climate change can be limited to around one percent of global GDP each year.

The Clean Development Mechanism (CDM) is one instrument developed to take action on climate change. It is a flexible mechanism to quantify and trade GHG emission reductions between industrialized countries with a reduction target and developing countries. These reduction targets of industrialized countries and the allowed mechanisms to fulfill commitments are stated in the Kyoto Protocol (1997). The Kyoto Protocol, in short, is the practical implementation strategy of the UN Framework Convention on Climate Change (UNFCCC) of 1992. To qualify for the CDM, projects should contribute to the sustainable development of a country and get official host country approval from their Designated National Authority (DNA).<sup>1,iii</sup> To date, most CDM projects have been large-scale and industry-oriented; additional efforts are needed to reach the multitudes of poor smallholders. SNV, the Netherlands Development Organisation,<sup>iv</sup> works to reduce poverty in 33 countries worldwide, and has taken up the specific challenge to use the CDM to contribute to income and employment generation for poor people.

### Forest carbon services and their markets

In this paper, we will explain the use of the CDM in the forestry sector and discuss the CDM component of a specific project: the Golden Forest. The CDM in the forestry sector builds on the concept of carbon sequestration provided by the process of photosynthesis, where plants convert water and carbon dioxide (CO<sub>2</sub>) with the help of radiant energy from the sun into chemical energy, in the form of glucose, while emitting oxygen.<sup>v</sup> Carbon in glucose is used to build cellulose of cell walls in

<sup>i</sup> Titled "Climate Change 2007: The Physical Science Basis" February 2007

<sup>ii</sup> [http://www.hm-treasury.gov.uk/Independent\\_Reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/Independent_Reviews/stern_review_economics_climate_change/sternreview_index.cfm)

<sup>iii</sup> See <http://cdm.unfccc.int/DNA/index.html> for DNA's for each country.

<sup>iv</sup> [www.snvworld.org](http://www.snvworld.org)

<sup>v</sup> The photosynthesis equation can be simplified to be written as [water + carbon dioxide + sunlight → glucose + oxygen] or  $[6H_2O + 6CO_2 + \text{radiant energy} \rightarrow C_6H_{12}O_6 + 6O_2]$

the woody parts of the trees and is stored until the tree dies and decomposes. In this way, growing trees temporarily reduce the amount of the greenhouse gas CO<sub>2</sub> in the atmosphere. Through easy measurements on the growth of trees, one can calculate carbon stored by using several conversion factors. It is this service of forests that is marketed. The terminology in which this is discussed differs greatly; it may be referred to as payments for carbon services, greenhouse gas emission reduction, mitigation of the greenhouse effect, generation of carbon credits, to name a few. The carbon service of forests can be enhanced by various activities like reforestation, forest conservation, forest fire control, reduced impact logging and other forms of improved forest management.

In principle, given that the calculations are sound, the carbon services provided by all different forestry activities can be marketed. Under the CDM however, only two project activities are eligible as of yet: afforestation and reforestation.<sup>vi</sup> Carbon services provided by other forestry activities can thus not result in Certified Emission Reductions (CERs) issued by the UNFCCC. However, the official market developed as an instrument of the Kyoto Protocol is only a part of the entire carbon market. There are many concerned companies, organizations and citizens that wish to compensate for their greenhouse gas emissions voluntarily, without being bound by the Kyoto Protocol. These actors buy on the voluntary carbon market instead. Sellers on the voluntary market are projects in forestry and renewable energy that are as of yet not eligible in their CDM category. The Kyoto Protocol (and also the CDM) is continuously developing through ongoing negotiations of its parties. Many project activities that have been shown to result in reliable greenhouse gas reductions on the voluntary market will be included in the official regulations in the future. The voluntary market can be seen as an experimental area for the CDM market.

### Definitions for using CDM in the forestry sector

Under the CDM-eligible afforestation and reforestation, project activities need to result in a forest in accordance with the definition of “forest” set by the host-country DNA.<sup>vii</sup> The DNA of Vietnam has already set the Vietnamese definition;<sup>viii</sup> a forest is:

- an area of at least 0.5 hectares, with
- a minimum crown cover of 30 percent, and
- a minimum tree height at maturity of three meters.

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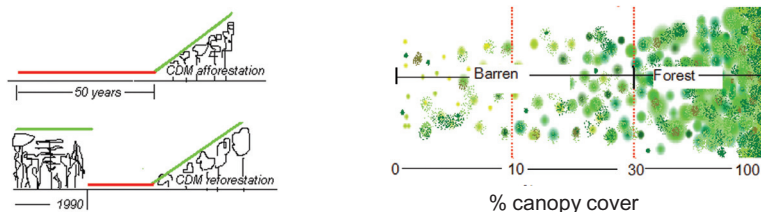
<sup>vi</sup> See definition of CDM eligible project activities at <http://unfccc.int/resource/docs/2003/sbsta/10a03.pdf>

<sup>vii</sup> [www.noccop.org.vn](http://www.noccop.org.vn)

<sup>viii</sup> See official CDM definition of VN forests at <http://cdm.unfccc.int/DNA/ARDNA.html?CID=233>



See figures below to understand the definitions of afforestation and reforestation project activities and the definition of “forest.”



**Figure 1 & 2. Left:** Drawings showing the difference between pre-project land cover requirements for afforestation (top) and reforestation (bottom); red lines depict barren land, green lines depict forest. Thus “afforestation” means establishing a forest on land that has been barren for 50 years, and for “reforestation,” land that has been barren since 1990. **Right:** Picture showing differences of canopy cover of tree vegetation, seen from above. Given that trees are minimum three meters in height, after 30 percent canopy cover, the vegetation is called a forest according to the Vietnamese CDM forest definition.

### Additionality of CDM project activities

One of the most difficult aspects of the CDM is often said to be the additionality criterion. This means that only forest carbon services resulting from a project that is additional to any that would occur in the absence of the certified project activity can be claimed. An example of not meeting the additionality criterion would be to claim carbon credits for a reforestation activity that has long been planned and has sufficient budget to be implemented. Through a financial, technological or other barrier

analysis, the project has to prove that the project activity would not take place without the use of the CDM.<sup>ix</sup>

### Practicalities in the field and benefits for local people

The mountainous forested areas of North Central Vietnam have been the battlefield of the war between the USA and Vietnam, and the ecosystem has been heavily degraded by carpet bombing, spraying and subsequent unsustainable post-war use. The most accessible areas classified as forests are now heavily degraded and often used for rotational agriculture. The project area of the Golden Forest is located in A Luoi district in Thua Thien Hue province. 35 percent of the population in the area



**Figure 3.** Map of Vietnam and location of site.

<sup>ix</sup> For more guidance, see the “additionality tool for afforestation and reforestation project activities” of the UNFCCC, [http://cdm.unfccc.int/methodologies/ARmethodologies/AdditionalityTools/Additionality\\_tool.pdf](http://cdm.unfccc.int/methodologies/ARmethodologies/AdditionalityTools/Additionality_tool.pdf)

lives under the poverty line of Vietnam,<sup>x</sup> and 80 percent of the population belongs to the ethnic peoples of Pa Co or Ta Oi (see photographs). After reforesting a 38-hectare proto-project, where a test run for the CDM was made, the program has now started to reforest 5000 hectares. The project, including roughly 3000 families, has a CDM component and intends to finish planting in 2010. Detailed experiences of the proto-project are documented in a guidebook.<sup>2</sup>

### Criteria and carbon quantification methodologies

It is important to realize that this program is foremost a reforestation program that has to meet all the technical criteria, like budgeting, mapping, site-species matching, nursery set-up and market analysis of sound Vietnamese reforestation planning. Developing a CDM component for the program will add international criteria to fulfill during program planning and implementation: financial transparency, clarification of land-rights, environmental impact assessment and carbon calculations and monitoring. In the end, there will be an additional product to sell – the Certified Emission Reductions (CER). In order to reach that point at which the program can start to sell, an extensive approval and registration process in the host country and at the UNFCCC has to be completed. Additional criteria and the registration and approval process also bring additional stakeholders to the reforestation program.



*Photographs of smallholders in traditional Ta Oi dress, the recently planted plots and the scarred landscape of A Luoi district (photo credits SNV).*

Reforestation is primarily done by smallholders on their own allocated plots that are classified as forests in the accessible uplands. The District Office of Agriculture and Rural Development coordinates the program. Smallholders choose the most suitable forestry model out of several developed by the district models based on local conditions, markets and cash flow. Models combine exotic fast-growing species with indigenous species and agricultural intercroppings. Depending on their economic situation, smallholders receive a grant or take a loan from a local bank that matches their forestry activities. The financial investors in the program include official development

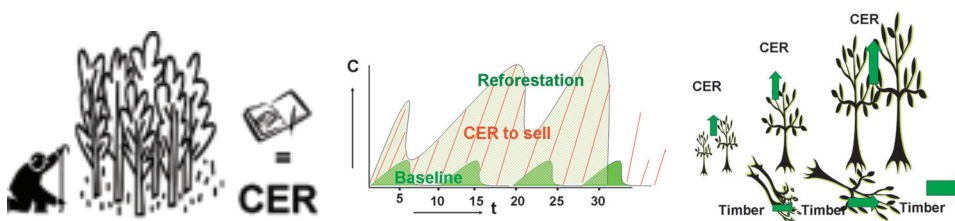
<sup>x</sup> Poverty line for period of 2006-2010, per capita/month 200,000 VND in rural areas and 260,000 VND in urban areas.





aid, national Vietnamese reforestation budget and banks through loans to individual farmers. The products from the plantation – timber and non-timber forest products (NTFP) – are sold through the regular channels. The Certified Emission Reductions, another product from the plantation, needs a separate selling body. The design of this selling body is still under construction. Expected registration of the CDM component is mid-2008, after which CER can, in principle, be sold, probably in intervals of five years depending on performance of the plantation and decisions by farmers.

After training, smallholders themselves will be responsible for the initial carbon accounting in their plots, which will feed into the carbon calculations of the entire program. CDM projects are required to use the UNFCCC approved methodologies. Currently, there are seven methodologies approved;<sup>xi</sup> other methodologies can still be submitted for approval. Guidelines for how data need to be gathered to fulfill the methodology requirements are given by the International Panel on Climate Change.<sup>3</sup> Of all approved methodologies, the reforestation program in A Luoi fulfilled the application criteria of methodology AR-AM0001 best: “Reforestation of degraded land.”<sup>xii</sup> The methodology prescribes the way of calculating the baseline carbon scenario and the project carbon scenario. In our case, the baseline scenario is zero at the time of marginal extensive agricultural cropping after burning, and a lush bamboo forest at the maximum time of abandonment just before burning. The specific carbon scenario of the project activity combines specific carbon scenarios of the chosen models.



**Figure 4-6.** **Left:** Picture shows a visualization of a smallholder engaging in basic carbon accounting. **Middle:** Graph shows sketch of a baseline carbon scenario, a reforestation carbon scenario and the amount of CER – to be calculated – available to sell. **Right:** Picture shows the timing of product sale by smallholder; CER sale can be timed in between timber sale. Intervals are to be decided by all participating smallholders together.

### Expected benefits of CDM to the smallholder

The smallholders benefit in many ways from the reforestation programs, through increased family income and improved livelihoods. The expected direct benefits from the use of the CDM also include an increase in family income through the sale of CER. Revenues depend on actual measured delivered carbon services of the forest

<sup>xi</sup> [http://cdm.unfccc.int/methodologies/ARmethodologies/approved\\_ar.html](http://cdm.unfccc.int/methodologies/ARmethodologies/approved_ar.html)

<sup>xii</sup> [http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF\\_AM\\_QFWKNKCDDDX7HG7UHQ8UPUXKWBFUPO](http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_QFWKNKCDDDX7HG7UHQ8UPUXKWBFUPO)

on the plot of the smallholder. In the planning of the program, CER projections are made that take into account the main factors that affect the actual delivered carbon services, such as chosen model, management and natural disaster. In very general terms, a smallholder can probably realize 5-10 CER/hectares per year. Depending on the market price at the time of sale (currently we calculate with a quite conservative price of US\$ 2/CER),<sup>xiii</sup> this is expected to deliver US\$ 15-30/hectare per year to each smallholder.

The indirect benefits from the use of CDM, however, are probably even more valuable than the direct financial gains for the smallholders. In principle, the use of the CDM is a sort of precondition for the reforestation project; without it, the district would not have been able to negotiate favorable loans for the smallholders and reforestation in this form would not have occurred. The CDM has also significantly increased the environmental awareness of the stakeholders in the program. More specifically, we can say that the use of CDM has introduced more long-term thinking and spurred change in the selection criteria for tree species. Indigenous tree species that effectively store carbon in the long term and provide good timber are now seriously considered. Through the clause stating that it must be clear who owns the forest before CER can be sold, the CDM also advocates land allocation. The subsequently issued land-rights are probably the most significant benefit of all. Land-rights are important assets in making households less vulnerable and can be used as collateral for a loan. As CER will be sold jointly and revenues shared, it also opens the discussion on how smallholders can be represented in carbon negotiations and sales. All of these aspects of the CDM contribute positively to the smallholders' knowledge and empowerment. Another way of looking at it is that, in the pursuit of selling CER, international concepts of sustainable forest management and transparency are introduced in the forestry sector.

## Lessons, challenges and future opportunities

Challenges in implementing a CDM project basically originate from either the fact that CDM is new and innovative, the heavy data requirements of CDM or the governance structure on the local level required for CDM.

### CDM is new and innovative

As the program is still very much under construction and CDM is still innovative in Vietnam, all stakeholders in the development of the CDM component are still learning. Therefore, progress in the CDM component development is rather slow. But the slow pace is not necessarily a negative thing as it gives all participating organizations and smallholders time to understand general concepts and their roles in the CDM component. Currently, there is still only one CDM afforestation/reforestation project registered in the world: "Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin" in China.<sup>xiv</sup> Roughly 10 more afforestation and

<sup>xiii</sup> For accurate CER prices, visit Point Carbon news agency at <http://www.pointcarbon.org>

<sup>xiv</sup> <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1154534875.41/view.html>



reforestation projects have entered the CDM registration pipeline of the UNFCCC. With the stakeholders from A Luoi, we have visited the project in China to get hands-on guidance and learn from the experiences there. This visit has been crucial in building the capacity of the stakeholders.

### **CDM requires a lot of data**

Construction of the baseline carbon scenario and project activity carbon scenario require a great deal of data, whatever approved methodology is used. Data on carbon content of native vegetation and major tree species are often simply never gathered in Vietnam. Much attention is paid by the Research Centre on Forest Ecology and Environment<sup>xv</sup> to fill in the gaps. For instance, many skills are needed to manage the data in order to make calculations and meet mapping requirements. These skills are currently taught by on-the-job training in A Luoi. It is expected that A Luoi project developers can disseminate their knowledge and provide services to other CDM projects in the future.

### **CDM requires governance at the local level**

The CDM is starting to take off in the developing world, although the least developed countries are lagging behind. The relatively rapid development of Vietnam may contribute to expectations of large-scale use of the CDM in the nation, but such expectations are not being met. The reason for this may lie in the local level governance required for CDM projects. Because the CDM is so far a project-based mechanism, it has been working well when meso-level organizations take up the challenge to pursue the use of the CDM for a specific project idea. However, for large-scale application of the CDM, these organizations require national standard guidelines. The governmental organizations in Vietnam tend to await orders from the top, while the non-government organizations are either nonexistent or very weak. As such, CDM projects currently require relative self-governance in order to monitor, negotiate and sell CER.

Although the use of the CDM in the forestry sector of Vietnam offers numerous challenges, many people are convinced of its benefits and there has been progress. The District of A Luoi has recently set up a working group to gather information and design a monitoring and governance system for the project. Once one project is fully developed and registered in Vietnam, there is huge potential to use it as a showcase for other areas in the country.

For SNV as a development organization, it is evident that the promise of CDM to contribute to sustainable development in developing countries is worth the current struggle. Along with partners of this pilot, we train local service providers and contribute to the national and regional debate on CDM by sharing our work in progress.

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<sup>xv</sup> <http://www.rcfee.org.vn/en/>

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<sup>3</sup> **Good Practice Guidance for Land Use, Land - Use Change and Forestry (GPG-LULUCF), 2003** International Panel on Climate Change.

<http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.htm>

### **Web links to additional information about CDM**

#### ***Capacity Development for CDM.***

UNEP 4-year project on Capacity Development for the CDM with funding from the government of the Netherlands. The CDM pipeline overview is especially informative.

<http://www.cd4cdm.org/>

#### ***Carbon Finance by World Bank.***

Looking for investors in your CDM project? The World Bank Carbon Finance Unit (CFU) uses money contributed by governments and companies in OECD countries to purchase project-based greenhouse gas emissions.

<http://carbonfinance.org/>

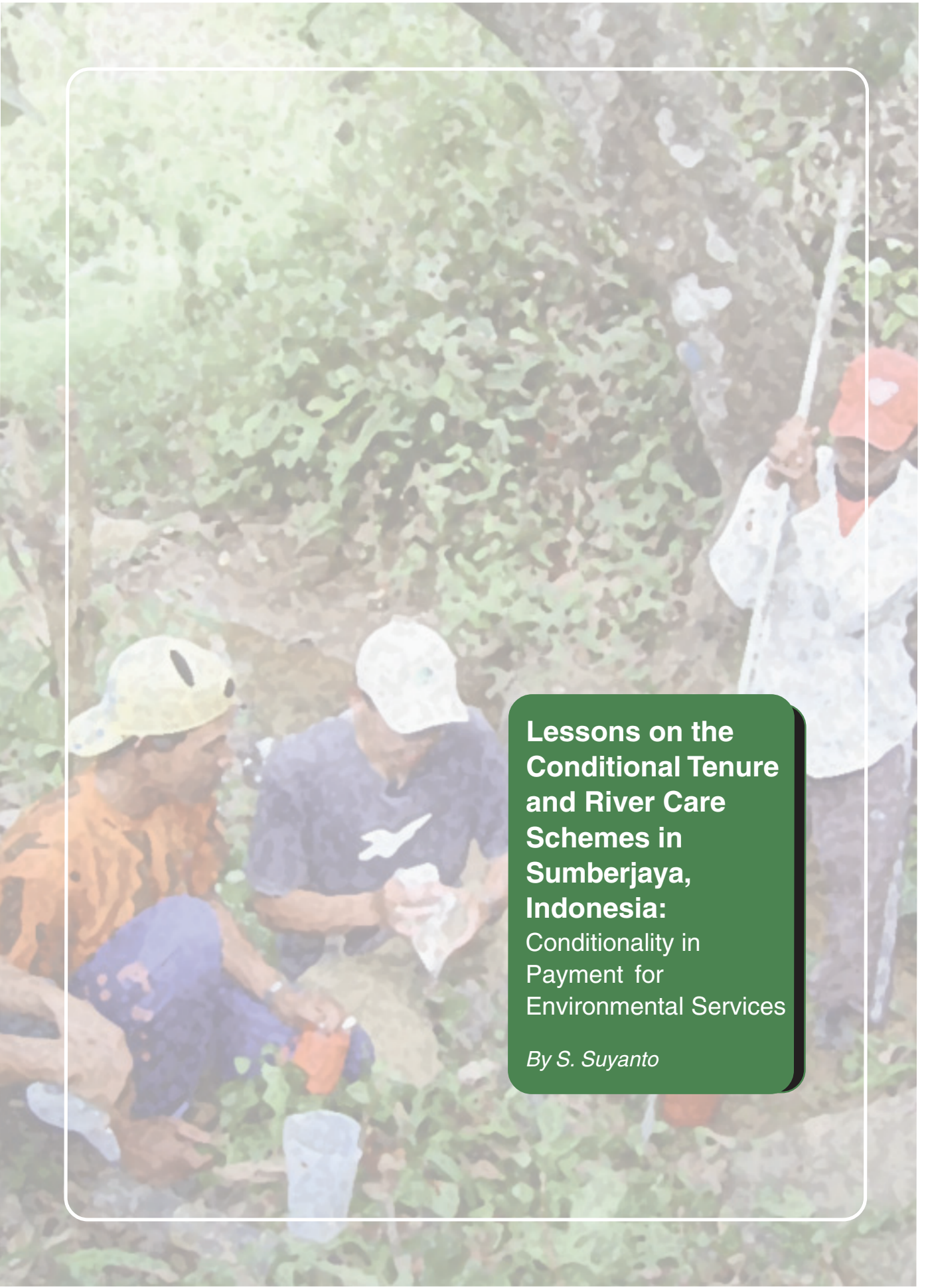
#### ***Encofor***

“Kyoto Land” analysis tool on Implications of Forest Definition on Land Area Eligible for CDM-AR. An interactive tool that produces rough maps of countries showing the consequences of setting the forest definition at certain value.

[http://www.csi.cgiar.org/encofor/forest/index\\_res.asp](http://www.csi.cgiar.org/encofor/forest/index_res.asp)

#### ***UNFCCC***

The official UNFCCC website offering all the formats, regulations, methodologies, etc. <http://unfccc.int/2860.php>



**Lessons on the  
Conditional Tenure  
and River Care  
Schemes in  
Sumberjaya,  
Indonesia:**  
Conditionality in  
Payment for  
Environmental Services

*By S. Suyanto*

## Lessons on the Conditional Tenure and RiverCare Schemes in Sumberjaya, Indonesia: Conditionality in Payment for Environmental Services

By S. Suyanto<sup>i</sup>

### Summary

In the tropics, most PES mechanisms for watershed functions are based on the assumption that such functions are being provided, without clear proof that this is actually the case. However, conditionality is a fundamental component of PES. In order to achieve conditionality, it should be clear what the service being provided is and how it will be evaluated. RUPES has implemented two action research projects in Sumberjaya, Indonesia to address the conditionality issue. In the first project, land tenure for forest land stewardship is conditional on the land management activities of the sellers. The second project involves a more advanced set of indicators, with payments conditional on the results of sediment reduction activities.

### Background

Sumberjaya, which means “source of wealth,” has ironically become emblematic of forest land conflicts. Violence has flared repeatedly as the government has removed poor squatter families from government-owned “protection forests” with the idea that the evictions would protect watersheds.

Protecting watershed functions through reward mechanisms in Sumberjaya may not only solve a local problem, but may also set an important example for approaches that could affect millions of forest squatters in government-owned forests throughout the tropics.

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<sup>i</sup> With contributions from Noviana Khususiyah, Pratiknyo Purnomosidi, Rudy Harto Widodo, Susanto, Edwin Jonson, and Bruno Verbist. The support of the RUPES Program under the International Fund for Agriculture and Development (IFAD) grant is gratefully acknowledged. The research results reported here is part of that grant.



### Watershed function of multistrata coffee

Scientific research suggests that blaming coffee gardens for erosion and degradation of watershed functions results from an incomplete understanding of the underlying issues. Research by ICRAF shows that multistrata coffee farms provide a livelihood to people with few other options and also controls erosion in a way similar to that of natural forest. The multistrata system provides a complex canopy that protects the soil surface from heavy raindrops and also creates tree litter on the garden floor that helps weaken the erosive force of water.<sup>1,2</sup>

The mixture of tree species in coffee agroforestry systems ensures different patterns of rooting depth that provide good protection of the soil surface and also increase river bank stability.<sup>3</sup> A combination of deep-rooted trees for anchoring and shallow-rooted grass with high root density for stabilizing topsoil is generally perceived to stabilize slopes prone to mass movement. Coffee is suitable for anchoring and holding the soil surface at the river bank, but it has a low root length density. Therefore, planting coffee trees with other trees in the coffee agroforestry system is important to stabilize the river bank. The combination of common shade trees (legume) used in the coffee agroforestry system that have shallow roots and a high root density – *Gliricidia sepium*, *Erythrina subumbrans* and *Calliandra calothyrsus* (the tree most frequently used in government reforestation) – with trees that have deep roots, like timber and fruit trees, helps with soil stabilization.

### Study Site

Sumberjaya is a sub-district in the Bukit Barisan mountain range (Figure 1). These mountains span the west coast of Sumatra and form the upper watersheds of all major rivers on the island. The 55,000 hectare sub-district almost coincides with the Way Besay upper watershed at between 720 and 1900 meters. The population was approximately 87,350

people in 2004, with a density of about 161 people/km<sup>2</sup>. At least 40 percent of the sub-district is classified as “protection forest” and 10 percent as National Park. Nevertheless, coffee gardens now cover around 70 percent of the total area. The Way Besay watershed feeds the Tulang Bawang River (one of Lampung Province’s three major rivers) and also supplies a hydroelectric run-off dam owned by PLTA Way Besay. Electricity generation started in 2001 with a maximum capacity of 90 MW.

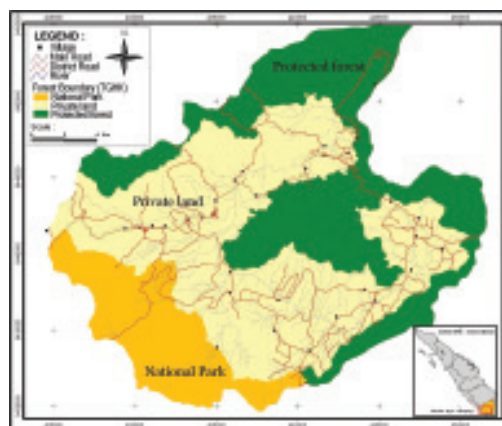


Figure 1. Study site

### Conditional land tenure: Indonesia’s experience with community forestry permits

“Today is one of the most important days in my life. I just received my community

forestry permit (HKm). It was not easy and the process took more than two years, but with assistance from RUPES Sumberjaya team, finally I got permission to stay on the land I have been farming,” says Mr. Darmadi, head of the farmer group Wana Makmur. In July 2006, Mr. Darmadi and 500 other farmers were joined by prominent local and national government officials to receive forestry permits. The permits grant land rights to the farmers for a five-year trial period, with possible extensions to beyond 25 years.

The HKm program in Sumberjaya can be interpreted as a form of payment for environmental services that uses secure tenure rather than cash payments as a reward for providing environmental services. The permits represent a major success for these farmers, who are no longer at risk of eviction, but the permits may have an even broader impact. In places where the government owns major forest tracts, community forestry permits, based on conditional land use tenure, can offer a path to improved livelihoods and protection of forest services. This approach works for both production forests and protection forests recovering from deforestation. RUPES learned that the key to using these permits to achieve real watershed function protection lies in strengthening the capacity of both farmer groups and government institutions.

In Indonesia, forestry laws, combined with a decree from the Ministry of Forestry, have authorized community forestry permits (HKm) since 2000. The permits guarantee proper practice by granting the farmers conditional land tenure, if they contribute to watershed health by using good coffee management practices and protect remaining areas of natural forest, they will retain the right to use the land for their livelihoods. However, in 2004 when RUPES first started working in Sumberjaya, only five farmer groups had been awarded such permits and these were for only five-year periods. Covering only seven percent of the protection forest, the area with conditional land use permits was too small to bring measurable improvements to watershed functions.

The RUPES project started working in Sumberjaya with 18 farm groups of about 40 farmers each in their quest for community forestry permits in 2004. The project ensured that all stakeholders were heard, creating essential goodwill among change agents in local and national governments, as well as assisting the farmer groups. Research from the World Agroforestry Center (ICRAF) shows that, without a trusted partner, local people have great difficulty in forming essential relationships with the government and in promoting the dialogue needed for policy change.

On the technical side, ICRAF analyses on river flows and land use cover change kept the technical experts and powerful interest groups from disregarding farmers’



*Farmer group leader receives his Community Forestry permit (Photo credit: RUPES Sumberjaya Team).*





perspectives. RUPES has also empowered farmer groups and local collaborators through participatory mapping, developing working plans and nursery techniques, strengthening farmer groups, and communicating the emerging reward mechanisms to members of farmers groups. Another key factor enabling the authorization of permits was the development of forest management plans for the area in which the farmers worked, which was agreed upon by both the farmer groups and the district government.

At the July 2006 award ceremony, all 18 farmer groups received community forestry permits. This increased the area covered by the permits from 1,367 hectares to 11,633 hectares. Nearly 6,400 farmers now have permits.

With 70 percent of the protection forest now covered by conditional land use permits, Sumberjaya should start to see measurable improvements in watershed functions. While these improvements have yet to be verified, the permits have already brought about tangible benefits for the farmers.<sup>4</sup>

Recently, RUPES completed a study of the impact of land tenure in Sumberjaya with researchers from Michigan State University and the International Food Policy Research Institute. The study found that the community forestry permits:

- increased land tenure security;
- doubled the local land value;
- reduced corruption;
- increased income, mostly due to a reduction in bribes;
- increased equity, relative to the in-village resources farmers have;
- promoted tree planting/agroforestry;
- promoted soil and water conservation; and
- gave farmers good reasons to protect the remaining natural forest.<sup>5</sup>

### RiverCare program: payment for outcomes

The second RUPES project also involves watershed functions. In Sumberjaya, the National Electricity Company (PLN), owner of a hydropower dam (PLTA), is worried about the often high sediment load and supposedly high siltation of the reservoir. The solution for the hydropower electricity company is to keep sediment from reaching the reservoir in the first place. To this end, a community partnership scheme is under development with PLN through a payment for environmental services (PES) mechanism. In response to this, RUPES set up a pilot project within one community



*Community action: reduce runoff speed and trap sediment on path road  
(Photo credits: RUPES Sumberjaya Team)*

and one sub-catchment area to develop a mechanism of payment for reducing sediment through the “RiverCare” program.

RiverCare is a community group based around the hydropower reservoir that is responsible for all activities related to water conservation. For the past year, members of the community have worked with RUPES to learn principles related to water conservation, including sediment reduction. They have also constructed and maintained necessary check dams, drainage along pathways and terraces. With RUPES’ help, the members organized themselves into the RiverCare group, taking on responsibility for producing clean water for electrical generation. RUPES supplied the capacity building assistance as well as “seed capital,” paying the group for their work so both the researchers and RiverCare could gain needed experience before approaching real buyers.

In the current experimental learning phase, RUPES as the stand-in buyer and RiverCare as the seller have crafted an agreement that clearly spells out the level of measurable sediment reduction required for specified payment amounts. At the end of the commitment period in 2007, RiverCare will receive US\$ 1,000 for a reduction of 30 percent or more, US\$ 700 for a 20 to 30 percent reduction, US\$ 500 for a 10 to 20 percent reduction, and US\$ 250 for a less than 10 percent reduction.

By the end of the commitment, RiverCare should have a proven product to offer the hydroelectricity company, one that can not only improve the environment, but also lessen the electricity crisis while enhancing community welfare, and that can assess the watershed conservation impacts through monitoring.<sup>6</sup>

## Monitoring Activities

The monitoring activities for the conditional land tenure scheme are based on a guideline for monitoring HKm performance, consisting of a scoring system of up to 100 points. The scoring system incorporates concerns relating to institutional criteria (development of a farmer group to manage the permit area), conservation performances (planting trees and conservation practices in coffee gardens), and the overall impact as measured by various social, economic, and ecological indicators. An assessment team will give each HKm area a score which will determine whether and for how long the HKm permit is extended, as follows:

- 35 HKm permit is revoked
- 36-45 HKm permit extended for one year and then re-evaluated
- 46-65 HKm permit extended for five years and then re-evaluated
- 66 HKm permit is extended for 25 years

Regarding the RiverCare pilot project, three aspects of the program are monitored: infrastructural issues, institutional issues, and actual sediment reduction in the river. Infrastructure monitoring relates to the quantity and quality of the new river protection structures. The institutional aspects evaluate the functioning of the RiverCare group and the active participation of its members. The third aspect, monitoring sedi-

ment levels in the river, is of crucial importance, as it is expected that the hydropower dam will only be of interest to a prospective buyer if a meaningful reduction in sediment yield is achieved.

In the pilot project, baseline data were collected in order to quantify current sediment levels before project activities. A sediment rating curve was developed, relating sediment load with discharge. Sampling was also done at various sites along the river to identify the largest sediment contributing areas and erosion hot spots.<sup>ii</sup> Here, river water samples are taken using a depth integrated method and dried, after which the sediment is weighed in a field lab. Direct readings of visual clarity are made with self-constructed “transparency tubes”, based on the so-called Secchi disc principle. This visual clarity (or Secchi disc visibility), is converted to sediment concentration after calibration with the field lab results. With these methods, the community can monitor the sediment by themselves with assistance from researchers.



*Community Water Monitoring  
(Photo credits: RUPES Sumberjaya Team)*

### **Future challenges and opportunities**

Sites exist throughout Asia where the exclusion of local people from forest livelihoods condemns them to poverty. The mechanism of conditional land tenure for improved livelihood and watershed functions is working in Sumberjaya because the head of the district and the head of the Forestry Office for Lampung Barat strongly support this approach. But to make this a long-term mechanism, land use tenure should be made conditional on multistrata coffee farming, as persuasive research has indicated the watershed function provided by this type of management.

<sup>ii</sup> *In the future, samples will be taken approximately every two weeks during a rainfall event from September 2006 to October 2007 to assess changes in sediment load.*

RUPES project partners are eager to find stronger conditional mechanisms that tie land tenure not merely to activities, but to actual success in achieving environmental outcomes. With such mechanisms, there would be an opportunity to convince other government officials to embrace conditional land tenure and to give millions of squatter families a chance at improved livelihoods.

Some PES schemes have been set up on the basis of perceived environmental services rather than actual monitored services. The RiverCare program addresses fundamental issues of transparency and conditionality in PES, resulting in payment mechanisms based on clear and measurable environmental services that we expect will be attractive to the real buyer. The goal of these pilot projects is to show the electricity company that buying environmental services can be a cost-effective way for them to reduce the sediment load of the river. We have an ongoing dialogue with the electricity company where we can share what we learn. In a year's time, our objective will be put to the test when the electricity company faces a decision about whether to continue and expand the scheme. Adoption of this mechanism by the hydroelectricity company would not only improve the environment, and probably be more sustainable and cost less than current envisaged measures like dredging, but would also reduce the risk of an electricity crisis and enhance community welfare.

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An aerial photograph of a mountainous watershed. The terrain is rugged and hilly, with a central valley containing a river. The colors are muted, showing shades of brown, tan, and blue. The image is framed by a white border.

## **Characteristics of Environmental Service Providers:**

Implications for the  
development of PES  
mechanism in  
Kulekhani watershed,  
Nepal

*By Shyam K. Upadhyaya*

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### **Implications for the development of PES mechanism in Kulekhani watershed, Nepal**

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#### **Summary**

The community of suppliers of environmental services in the Kulekhani watershed includes a large number of poor small-holder farmers, with farming as their main source of livelihood. About 53 percent of watershed area is covered by forest and most are community-managed. By replanting degraded land and imposing self-restrictions in the use of forests, upland communities have greatly improved the quality of watershed forests in the past decade. Although suppliers have held the perception that forest conservation leads to increased water supply and reduced land slides, they were previously unaware that their conservation activities were benefiting some other party, like the downstream hydropower developer. Suppliers were divided and not organized for collective action. These conditions had implications for the kinds of activities needed to implement a PES project and the nature of the PES mechanism. The main strategy of the RUPES program in Kulekhani has included activities to develop awareness of the PES concept among suppliers and mobilize them for collective action and development of an appropriate PES mechanism.

#### **Background**

Kulekhani watershed is the source of water for two hydropower plants located downstream. The construction of these plants in the late 1970s and early 1980s led to massive deforestation in the watershed, in turn posing risks to the continued operation of the hydropower plants. However, due to participatory conservation programs in the 1980s



and 1990s by the government and donor agencies, forest cover that had declined from 5,884 to 5,211 hectares between 1978 and 1992 increased to 6,730 hectares in 2001.<sup>1</sup> There is evidence that the increase in forest cover and other conservation activities led to reduced sedimentation and increased dry-season waterflow to Kulekhani reservoir.<sup>1</sup> These environmental services benefited the Nepal Electricity Authority (NEA), the owner of Kulekhani I and II hydropower plants, by increasing its electricity revenue and decreasing maintenance costs due to sedimentation. Upland communities did not receive any portion of this revenue for providing these environmental services.

#### Box 1. Kulekhani watershed at a glance

The watershed is approximately 50 km southwest of Kathmandu. Current land uses include about 53 percent forest, 45 percent agricultural land, and two percent water body. Rivers and streams originating from the watershed feed into a reservoir, used to power a 60 MW Kulekhani I hydropower plant. Water coming out of Kulekhani I is further used to power a 32 MW Kulekhani II hydropower plant. Kulekhani I and II together generate about 17 percent of Nepal's total hydroelectricity



Figure 1. Map of Nepal and Kulekhani Watershed

With the termination of government and donors' programs in 2003, the risk that upland people would again resort to activities leading to deforestation gave rise to a need for alternative mechanisms that would offer such communities incentives to maintain and enhance the level of environmental services. Payments for Environmental Services (PES) appeared to be a promising option.

Hydrological studies have indicated that land-use practices of people in Kulekhani watershed have the potential to increase or decrease water supply to the hydro-power reservoir and to regulate water-flow across seasons. Research has also shown that the amount of sediments per hectare of agricultural land is much higher than that from forested land.<sup>2</sup> Land-use practices in Kulehani therefore have the potential to impact the level of sedimentation to the hydropower reservoirs.

<sup>1</sup> Other conservation activities of upland people such as terracing of their private agricultural land have also helped to enhance environmental services.

The 1992 Electricity Act requires hydropower developers to pay a certain percentage of their electricity revenue as royalty to the central government. The Local Self-Governance Act (1999) requires the central government to share 12 percent of this royalty with the District Development Committee (DDC)<sup>ii</sup> housing hydropower plants, which is Makwanpur DDC in this case.<sup>3</sup> Thus, the central government of Nepal and Makwanpur DDC are other beneficiaries of environmental services provided by upland communities of Kulekhani watershed.

This study paper presents an attempt by RUPES to develop a mechanism to pay (reward) upland communities of the Kulekhani watershed for providing environmental services, with a focus on characteristics of ES suppliers and their implications for the development of a PES mechanism.

## Characteristics of suppliers of environmental services

### Large number of suppliers

Kulekhani watershed covers parts of eight Village Development Committees (VDCs) of Makwanpur DDC.<sup>iii</sup> All households residing within the watershed area are regarded as suppliers of environmental services, even though households living in certain parts of the watershed may have a greater impact on the supply of environmental services. About 8,600 households with an estimated population of 46,000 live in eight VDCs of the watershed.<sup>4</sup> Caste/ethnicity distribution of population is as follows: Tamang, 46 percent; Brahmin/Chhetri, 27 percent; Newar, 23 percent; Dalits, three percent; and others, six percent.<sup>iv</sup>

### A farming community

Farming is the main source of livelihood for the majority of households and land remains the principal productive asset. Most farmers are smallholders with less than 0.5 hectare agricultural land per household. Only about 30 percent of agricultural land has access to irrigation. Lately, farmers have increased production by switching to commercial vegetable production. Given their small landholdings, most farmers depend on common property resources such as forests for their livelihood.

### High level of poverty

The Nepal Living Standard Survey indicates that about 36 percent of people in the hills of Nepal, which include the Kulekhani watershed, are living below the national poverty line. According to a participatory poverty assessment conducted earlier this year, this number would be much higher if it were based on the criteria defined by the communities themselves. Less than half of the population is literate. The people

<sup>ii</sup> DDCs are local governance bodies. For administrative purpose, Nepal is divided into 75 DDCs.

<sup>iii</sup> VDCs are the lowest level governance bodies in Nepal. Each of the 75 DDCs of Nepal is divided into VDCs and municipalities. Makwanpur DDC has 43 VDCs and one municipality.

<sup>iv</sup> Most parts of Fakhel, Kulekhani, and Tistung Deurali VDCs lie outside the boundary of the watershed area. For political reasons, these parts of watershed VDCs could not be excluded from receiving rewards. However, if the proposed PES mechanism is implemented as designed, projects from those areas would have less chance of being funded as these projects need to demonstrate how they contribute to enhancement of environmental services.





live in poor sanitary conditions, with inadequate access to physical infrastructure such as roads and markets.

### **Community management of forest**

More than 95 percent of forests in Kulekhani watershed are community forests (CF). Under the concept of CF, the government has granted limited management and use rights of forests to local communities, although the state still owns the forests legally. Groups of local people join together to form Community Forestry User Groups (CFUG) to manage patches of forests in their vicinity that they had been using traditionally. A CFUG prepares a forest management plan and submits it to the government forest office for approval. The Forest Act has put some restrictions on what a CFUG can and cannot do in their forest. In particular, a CFUG cannot sell their forest land or cut down certain restricted tree species. It is also required to spend a certain portion of income from its forest in forest conservation activities. However, a CFUG has the right to exclude non-members from using its forest. It can also charge members for the use of forest products, and decide to ban or open forest area for grazing as long as it maintains minimum forest cover. Perhaps the most important aspect of the community forestry concept is that it has helped develop a perception that forests belong to local communities. This sense of ownership has been very effective in regenerating degraded hills of Nepal. It has also given a basis for upland communities to negotiate with buyers of environmental services. About 70 CFUGs have already been formed in the Kulekhani watershed area.

### **Lack of awareness of environmental services**

People of Kulekhani watershed held the perception that forest cover reduces soil erosion and sedimentation and increases dry-season water flow, but did not really understand the concept of “environmental services.” They were also unaware of the fact that their conservation activities were benefiting someone other than themselves and that they could potentially be rewarded for providing those services.

### **Low level of trust**

When RUPES started working in the area in late 2003, people from different VDCs were divided and suspicious of each other. In the past, some VDCs in the watershed had disproportionately secured more of the development budget than others in unfair ways, such as officials of those VDCs having better connections to budgetary authorities in the district. Consequently, other VDCs feared that the same VDCs would grab a larger share of rewards for environmental services. People were also divided into different political groups, and were reluctant to work together for a common cause out of fear that some political party would take the credit at their expense. Though some concerns remain, RUPES was able to persuade all VDCs to set aside their fears and work together.

### **Exploring alternatives for PES**

As mentioned earlier, the Nepal Electricity Authority (NEA), the owner of the two hydropower plants in Kulekhani watershed, was paying royalty to the central govern-

ment, but was not willing to make any additional payments to the upland communities for their environmental services. The RUPES Kulekhani program explored whether some of this royalty could be allocated as rewards to the upland people instead. Various potential mechanisms of how these rewards could be transferred were explored. One potential mechanism was a transfer from NEA (hydropower developer) directly to the upland people (suppliers of environmental services). Another potential mechanism was for the reward to go from NEA to the central government as royalty and then on to the upland people. A third option for the reward was a payment from NEA to the central government as above, which would then be transferred to the Makwanpur DDC (local government) before reaching the upland people. During negotiations, the last alternative appeared to be the most feasible.

### **Implications of characteristics for the development of PES mechanism**

#### **Cash reward not attractive**

Given the large numbers of sellers and relatively small size of reward, cash payments to individual sellers did not appear to be an attractive option. Instead, the sellers of ES opted for a reward in the form of conservation and development projects. They preferred projects that would benefit residents of all watershed VDCs, but agreed that, depending on the nature of projects proposed, the money allocated wouldn't be equally distributed but could vary between VDCs and between years. Also, projects proposed from areas in the vicinity of the reservoir that may have a stronger impact on environmental services would receive higher priority than projects from remote parts.

#### **Capacity building**

It was impossible for the RUPES Kulekhani program to work with individual households in the watershed. There were many community-based organizations existing in Kulekhani watershed, but these were working at settlement or village level. In order to effectively raise awareness of PES and mobilize collective action, RUPES helped form a watershed-level local organization. In a general meeting held in May 2004, representatives from seven VDCs of the watershed decided to form a watershed level forum, the Kulekhani Watershed Conservation and Development Forum (KUWACODEF). They also elected 10 representatives, including two women, for the ad hoc committee of KUWACODEF.<sup>v</sup>

The main tasks of the ad hoc committee were to draft a constitution of KUWACODEF, discuss it in a mass meeting of upland people, help to register the organization legally, and work with RUPES to achieve its goal until a new committee was formed (to be formed within six months of its legal registration).<sup>vi</sup>

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<sup>v</sup>An additional member was added later from Kulekhani VDC which was not represented in the general meeting.

<sup>vi</sup> The organization has yet to hold its general election. It was registered in December 2006.



*KUWACODEF Executive Member Kanchi Gole explains objectives of RUPES to community members (Photo credits: Shyam K Upadhyaya).*

The program shared the findings of the hydrological studies with the members of the KUWACODEF and trained the members on laws and regulations regarding benefit sharing from hydropower in Nepal and other countries.

### **Awareness raising**

In the context of scattered settlements and ongoing conflicts in Nepal, the RUPES Kulekhani program had to find innovative ways to spread the PES concept among supplier communities. Since more than 80 percent of households own radios, RUPES worked with a community FM, Palung FM, to reach individual households. With active participation by members of KUWACODEF, RUPES prepared and, in less than two years, aired 51 episodes of 30-minute programs on environmental services. Other means to raise awareness included wall paintings, billboards with RUPES messages and a newsletter in Nepali language. In addition, the program worked with KUWACODEF to develop several community level meetings.

### **Pro-poor PES mechanism**

Considering the high level of poverty among the upland people, the PES mechanism needed to be pro-poor to be sustainable. Even though the rewards would be used for conservation and development projects, some safeguard mechanism was needed to ensure that PES would benefit poor members of the community. As discussed in the following section, a guideline has been developed for the PES reward mechanism in Kulekhani which explicitly states that projects to be supported by ES reward money should be pro-poor.

### **Establishing the PES mechanism**

As mentioned earlier, the most feasible option for setting up a reward mechanism was found to be an allocation of the royalty payment from the hydropower company via the central and local government (Makwanpur DDC) to the Kulekhani upland people. The RUPES program was able to convince Makwanpur DDC to earmark a

portion of the hydropower royalty it receives from Kulekhani hydropower plants through the central government for upland people of Kulekhani watershed, in recognition of the hydrological services they provide. Makwanpur DDC has established an Environmental Services Management Special Fund (EMSF) in accordance to this, into which they will deposit 20 percent of their US\$ 273,975 per year hydropower royalty from the Kulekhani hydropower plants. This implies that, if Makwanpur DDC holds to this practice, about US\$ 54,000 will be available every year for the upland people.

The program also prepared a guideline specifying that EMSF should be used to support conservation and development projects proposed by the upland communities and that these projects must meet two conditions. First, projects should enhance or at least not hinder the delivery of environmental services, as well as not cause the loss of forests. For example, if upland people propose a project for building roads, they should make sure that it does not lead to more sedimentation to the hydropower reservoir. Secondly, projects should demonstrate how they help improve livelihoods of poor and marginalized people. The VDCs, CFUGs and any other community organizations in the watershed will be able to propose projects for EMSF. Though the current local governance law does not allow individuals to propose projects, a number of individuals can form a users' committee and apply for projects.

A multi-stakeholder committee including three representatives from Kulekhani watershed has been formed to evaluate the EMSF projects. Other members of this committee include technical officers from district forest, soil conservation, agriculture, and livestock offices. Makwanpur DDC acts as the secretariat of this committee, and can hire independent consultants for the monitoring and evaluation of EMSF projects.

Makwanpur DDC has already deposited about US\$ 7,500 in the EMSF. The multi-stakeholder committee has approved two small projects (of about US\$ 4,300) – one on awareness building on environmental services and one on improved goat farming for the very poor, proposed by KUWACODEF. These projects are already under implementation. The DDC council, apex body of the DDC, has also decided to deposit 20 percent of hydropower royalty in EMSF in the next fiscal year.

## Lessons and opportunities

- Very often, a well-defined property right is considered as a pre-requisite for the markets for environmental services to work. However, the Kulekhani case suggests that it is possible to develop a PES mechanism as long as communities have some users' rights over natural resources. The growing perception in Nepal that local communities have primary rights over natural resources in their area, has also given the Kulekhani some bargaining power while negotiating with buyers.
- The development of a PES mechanism requires that both buyers and suppliers of environmental services are well aware of the value of such services, which is often not the case. In order to secure a better price for their environmental services, the suppliers need to be organized around a common goal and have the capacity to

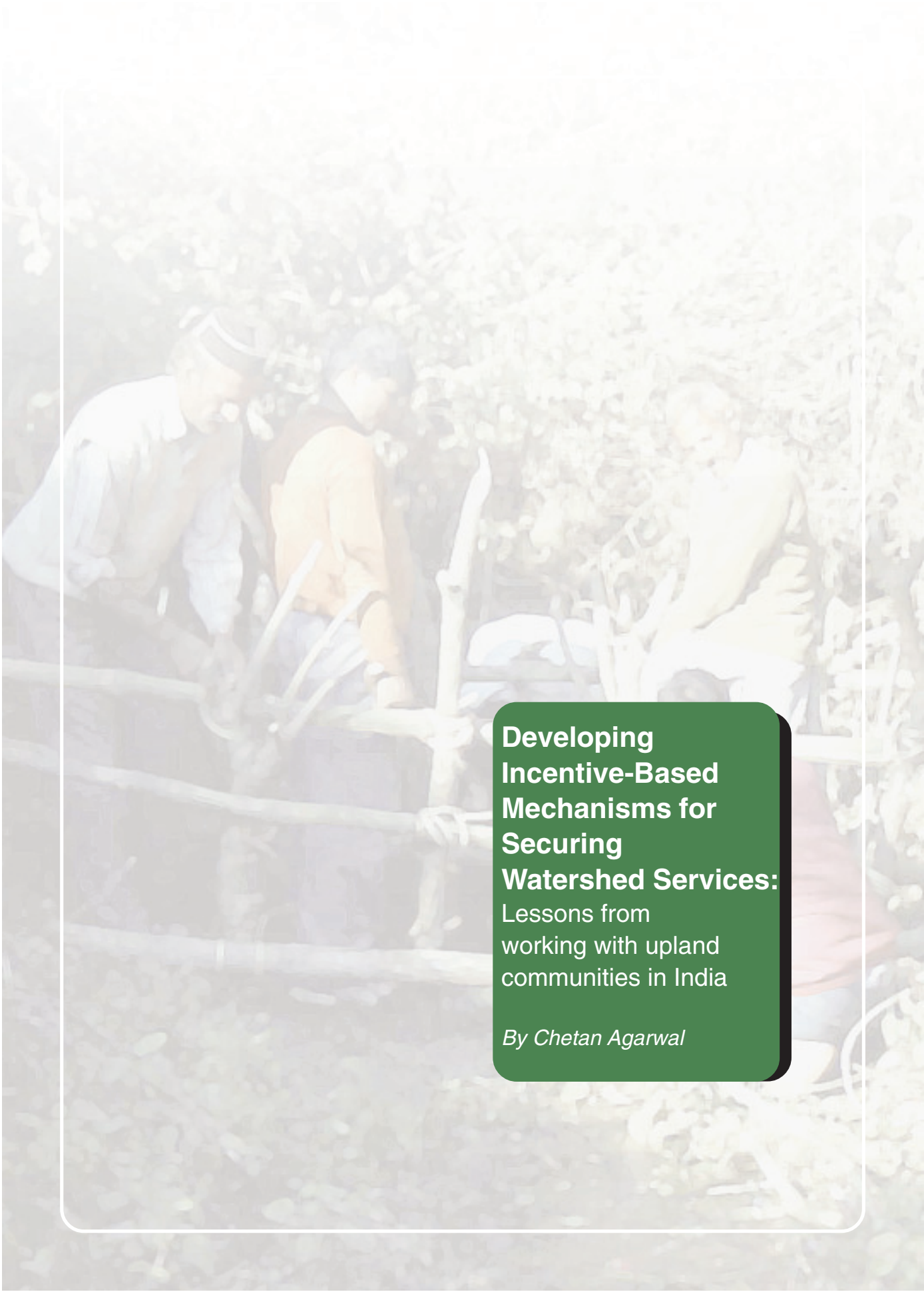


negotiate with buyers. When there are many suppliers dispersed over a watershed, the cost of raising this awareness could be high. Caste/ethnicity, political ideology, and other factors could also divide suppliers and increase the time and resources needed to raise awareness and help mobilization. The Kulekhani experience indicates that, when suppliers see the rewards clearly, they will be ready to mobilize collective action.

- When there are many small landholders, individual contracts and cash rewards become difficult. However, it could still be possible to devise a collective PES mechanism, like support for conservation and development projects as rewards for delivery of environmental services.
- Suppliers and buyers (beneficiaries) of environmental services are rarely able to devise a PES mechanism by themselves. Buyers and suppliers would be reluctant to bear the costs of research needed to establish a relation between conservation behavior and environmental services, as well as costs associated with awareness building, social mobilization for collective action, etc. Even when they are ready to bear some of these costs, they may not have skills to do so, and intermediary organizations may be needed to undertake these activities.

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**Developing  
Incentive-Based  
Mechanisms for  
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Watershed Services:**  
Lessons from  
working with upland  
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*By Chetan Agarwal*

### Summary

This paper shares field experience and lessons in developing Incentive-Based Mechanisms (IBMs) for watershed services and improved livelihoods at micro and macro scales from an action-learning project in India.<sup>1</sup> Incentive-Based Mechanisms (IBMs) (see Box 1), a broader form of PES, were tested in pilot projects for watershed services and improving livelihoods at three locations in the two states of Himachal Pradesh (HP) and Madhya Pradesh (MP) in India. An inter-village transaction was facilitated at one site (the Kuhan micro-catchment), while at the second site (Bhodi micro-catchment site), despite initial interest, a transaction failed to materialize due to various factors. At the third site, there is interest in undertaking a transaction (between the city of Bhopal and its lake catchment, Bhoj catchment) and a mechanism is in the process of being set up. This paper focuses on the process of developing an IBM in the Kuhan site, and gives additional lessons from the Bhoj and Bhodi sites. It highlights the nature of stakeholders, especially the watershed service providers, and how it influences the facilitation and negotiation activities, options for pro-poor transactions, the nature of the contracts and the incentives provided, and the role of the facilitating organizations.

<sup>1</sup> Winrock International India (WII) and their field partners, in collaboration with the International Institute for Environment and Development (IIED), have undertaken this action-learning research project. A copy of the synthesis report and further details are available at the project websites: <http://www.environmental-incentives.org> and [www.iied.org/NR/forestry/projects/water.html](http://www.iied.org/NR/forestry/projects/water.html). The primary field partners were the GTZ supported Himachal Pradesh Eco-Development Society (HPEDS), for Kuhan and Bhodi sites, and the Lake Conservation Authority (LCA) for the Bhoj wetlands in the state of Madhya Pradesh.

## Introduction to the three sites

A basic introduction to the sites, current land-use, and the specific watershed service is provided in Table 1 below.

**Table 1.** Summary of the three sites and proposed Incentive-Based Mechanisms

Watershed	Watershed Service	Proposed Land use practice change	Payment (Realized/Potential)	Buyer	Sellers
Kuhan (HP) 210 ha	Silt load reduction in stream	Grazing control to reduce erosion	Cash for purchasing and transporting saplings	Downstream village - Kuhan	Upstream village- Oach Kalan
Suan (HP) 699 ha	Increased infiltration for improved water quantity downstream; fire control	Fire lines, timely harvesting to control fire	Access to grass	Upstream village	Downstream village
Bhoj (MP) 361 km <sup>2</sup>	Reduced nutrient runoff for improved water quality downstream	Multiple options - organic farming, riparian buffers, composting	Technical advice, market access, and input cost reduction	City of Bhopal (Bhopal Municipal Corporation)	Catchment farmers

## The Kuhan micro-catchment

The Kuhan micro-catchment in Kangra district of Himachal Pradesh, India, includes lands of five villages, all part of the Kuhan Panchayat. There are about 1,600 people in the Kuhan Panchayat. The upstream and downstream villages in the catchment are quite similar socio-economically. Nearly half of the population is defined as poor or very poor (incomes under Rs 40,000, about US \$ 964).<sup>ii</sup> The literacy rates are 92 (male) and 75 (female) percent, which compares favorably with the state and national average.

The watershed service providers are residents of the upstream villages. The primary occupation of people of the five villages is within the service sector. Agriculture, which is primarily rain-fed, is a secondary occupation with a small contribution to income, but is the primary activity within the catchment itself, along with animal husbandry.

<sup>ii</sup> About 10 percent are below the government defined poverty line (income under Rs 18,000 (or US\$ 434, when US\$ 1=Rs 41.5) for a family of five, per year) and about 34 percent are in the next category classified by the project as "poor" (incomes between Rs 18,000-40,000).<sup>1</sup>





## Overview of the development of the IBM

Villages, concerned with the rapid silting of their small dam, have devised an innovative Incentive-Based Mechanism (IBM) to control soil erosion. The downstream village Kuhan has signed an eight-year agreement with the upstream village Oach Kalan to protect an erosion-prone hillside by having Oach Kalan halt their grazing activities there. In return for the environmental service of reducing erosion, Kuhan has paid for saplings planted upstream in the protected patch. Additional activities have included developing vegetative check dams where material and labor were provided by upstream and downstream residents respectively.

The local implementing team collaborated with the local Village Development Committees<sup>iii</sup> (VDCs) to develop the IBM between the two VDCs. Key facilitation steps included the following:

**Hydrological input.** A local geo-hydrologist presented study findings and suggested management measures at negotiation meetings from walking the catchment and mapping the high erosion and infiltration potential zones.

**Expanding the downstream institutional users to finance the protection.** The Kuhan VDC set up a dam protection fund to finance silt control activities, the revenues to which were raised by increasing pumping charges from the stream. In addition, VDC members liberalized access to water, with four different water rates for households based on the extent of their contribution towards VDC membership and towards the capital cost of building the dam and pumping system. Even non-VDC members were allowed to access irrigation water by paying higher rates. These changes increased the number of users from eight to about 50.

**Negotiations: Decision making in women-headed households and other concerns.** After protracted preparations within the VDCs and several rounds of negotiations, the area to be closed to grazing was identified and a written agreement was prepared. It was critical for finalization to address a number of specific concerns

<sup>iii</sup> Village Development Committees (VDCs) are informal bodies constituted by the local partner, Himachal Pradesh EcoDevelopment Society (HPEDS) at the village level to undertake various environmental and development activities. Membership is open to all adults of the village and usually includes 40-80 percent of households. An elected executive committee and President represent their members and undertake activities with support of their members

### Box 1. What are Incentive-Based Mechanisms (IBMs)?

Incentive-Based Mechanisms focus on building a relationship between the stakeholders and transferring of resources from the service provider to the service recipient. This is broader than a market-based mechanism that typically involves a willing buyer and willing seller of a commodity. In this case, the commodity is the watershed service (e.g. reduced sedimentation or water purification). Where it is difficult to directly ascertain the watershed service, or link inputs with outputs, the transaction may be around a proxy indicator. Payments may be in cash or in-kind, including labor and other inputs.



*Discussing hydro-geology during the eco-walk  
(Photo credits: Kirsten Henninger)*

raised by upstream families. One key concern was about decision-making regarding the agreement by households that had men working outside, and were therefore functionally women-headed for most of the year. The families concluded that women could also make decisions regarding this issue in the absence of men. Other concerns raised by the landowners included: threats to ownership of the land, grass and trees, length of time that they would have to protect, and choice of species.

***Involving children and other catchment residents.*** After the agreement was signed, an eco-walk and a catchment level camp were organized for local students. These activities helped to announce the agreement across the villages, led to increased use of irrigation water in Kuhan, and also started the process of engaging the panchayat.<sup>iv</sup> Spreading the message through the parents was particularly effective. Children also formed eco-clubs and made brushwood check dams, etc.

### **Terms of the contract**

In return for the Oach Kalan VDC closing a hillside to open grazing for eight years, the Kuhan VDC paid the Oach Kalan VDC Rs 1,150 (about US\$ 28) for purchasing and transporting 330 saplings to be planted by landowners in the closed area. Oach Kalan VDC provided the labor to plant the saplings on their private lands. Oach Kalan VDC will enforce the agreement to restrict grazing and allow limited harvest of fuel wood. If the agreement is broken, 50 percent of the cost of saplings will be payable as a fine. The agreement may only be revised through a joint meeting of both VDCs. The Kuhan VDC can visit the closed area. The produce of the area will belong to the landowners. After eight years, both VDCs are free to consider a new agreement.

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<sup>iv</sup> *Panchayats are constitutionally mandated local governance bodies that typically operate at multi-village level and are involved in most development related activities*



### Nature of contract

The agreement is a collective one, signed by the VDC representatives of both villages. Both VDCs have local legitimacy in their villages, but are informal and not registered under any formal legislation. As the agreement mostly pertains to private land, there is no need for any government intervention. A copy of the agreement has, however, been provided to the Panchayat. In more formal settings, the agreement may have taken the form of a short-term conservation easement.

Finally, the contract or agreement is perceived locally as one involving a payment and a change in land use upstream for the provision of an environmental service, but being based more on local cooperation rather than being a strictly market based arrangement.

### Benefits

Downstream, the Kuhan VDC members hope that the erosion levels will stabilize the riparian hillside protection in Oach Kalan and the vegetative check dams they are building, though broader processes also affect silt loads. For example, a silt spike in the stream from a road building site just upstream of the dam had recently filled the dam.

A significant spin-off has been the expansion in irrigation in downstream Kuhan, which has been important in increasing their returns from cultivation, expanding their interest in the VDC, and supporting catchment protection upstream.

Upstream, the good growth of grass in the closed area in Oach Kalan now allows for up to two grass harvests. Timber and non-timber forest product benefits from saplings will be available in the longer term. Another benefit is that student members of the newly formed local eco-clubs are also contributing to the effort.

### Suan micro-catchment

The second site, Suan micro-catchment in Kangra district, Himachal Pradesh, has a decade old history of upstream-downstream collaboration.<sup>v</sup> Here, there is a need to maintain and enhance summer flows in the main stream, the Suan *nala*, to make viable a planned investment in a small irrigation scheme. While downstream users had initial interest in financially supporting the protection of additional areas upstream, a variety of factors contributed to their eventual reluctance, despite considerable facilitation by the project team. These factors included: a need to first fence the cropped area to reduce losses from wild animal crop raiding, a lack of initial success in securing government funds for the irrigation project, conflict in the lower village, and mixed messages from the geo-hydrological assessment in terms of land use changes to make and their likely impacts.

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<sup>v</sup> The lower Suan village diverted a project investment for planting tree saplings from their village to the upstream Bhodi area, and also contributed labor. Bhodi had since protected the planted area against considerable odds. This background of collaboration was an important criterion in selecting the village.



*Farmer meeting in catchment, discussing wetland friendly farming practices  
(Photo credits: Lake Conservation Authority)*

## **Bhoj Catchment**

Bhopal city, which has developed around the Upper Lake of the Bhoj wetlands, is interested in reducing agricultural runoff from the lake catchment into the wetlands and hence improve the water quality of the Upper Lake. A change in agricultural practices in farms upstream, from chemical to organic wetland friendly practices, was identified as a cost-effective and sustainable solution.<sup>vi</sup> The focus at this site was therefore on orienting the upstream and downstream stakeholders to appreciate their respective roles in lake water quality management, especially in relation to the rural catchment. Although no payment has been made as of yet, the foundation for setting up contributions to catchment protection in the near future has been established.

## **Service providers**

The catchment of about 360 km<sup>2</sup> has land from about 85 villages spread over two districts. In the pilot phase, eight villages along two streams were selected, and about 150 riparian farmers with farms adjacent to the streams or to lakeshore were identified as the primary watershed service providers; other farmers were treated as secondary providers. Farm size varies from a fraction of a hectare to tens of hectares, with 75 percent of the population engaged in farming on their own farms or as tenants on leased land. Literacy rates are around 68 percent. Proximity to the city affords employment opportunities, and farmers have little time to devote to labor-

<sup>vi</sup> Literature on impacts of organic farming practices on water quantity and quality is limited. A report entitled “Protecting Water Quality on Organic Farms” emphasizes benefits of organic farming practices to reduce nutrient leaching, water runoff, and soil erosion, when implemented as a systems approach.<sup>2</sup> Long term trials at the Rodale Institute on corn and wheat have shown water quality benefits from use of compost (rather than manure or fertilizers).<sup>3</sup> A review of several studies concludes that organic farming has less negative environmental impacts on the quality and quantity of water.<sup>4</sup>



intensive agricultural practice; labor costs are also high. Cattle dung – a key input for preparing compost for wetland friendly farming – is mostly collected by women, and at least a third is used for cooking purposes. Additionally, city residents are buying lakeside land as well. Thus, preparing ground for a transaction has required working with both men and women, small and large farmers, landowners and tenants, as well as riparian and non-riparian stakeholders in the upstream.

### **Nature of land use change and potential contracts**

Identifying the proportion of the nutrient load coming to the lake from the urban versus the rural catchment was important in determining the scale of the problem from rural areas. As appropriate datasets were not available, this figure had to be estimated. The next activity was identifying wetland friendly farming practices that reduce agriculture runoff. Finally, incentives for the adoption of wetland friendly activities in the catchment were proposed; key ones are to finance (1) regular/on-call technical support for organic farming practices, (2) supply-side options for reducing costs and associated risks during the transitional phase, and (3) demand-side options to increase farmer income. These incentives were to be routed through a committee of upstream stakeholders that would be supported by the Lake Conservation Authority, a government supported body in MP.

### **Lessons from the three sites**

This action learning project has yielded insights into the role of hydrological information, types of incentive mechanisms, the importance of institutions and the negotiation of IBMs. A few key lessons are provided below.

***The nature of payments, role of stakeholders, duration of payments, and contingency varies according to local conditions.*** Transactions can take a range of forms including cash and in-kind. Sometimes, both upstream and downstream stakeholders have contributed to the land-use change. Under certain conditions, payments are one-time, or for a short finite period, with a specific purpose of aiding a difficult transition from a current land use to a more optimal one. Finally, even if payments are made upfront, contingency can be built into the contract through performance clauses (as in Kuhan).

***An IBM process that respects and adapts to the needs of various stakeholders upstream is more likely to be sustainable.*** In Kuhan, payments were offered in cash, but ultimately given in-kind, as requested by those upstream. Also, in the Kuhan catchment, a brushwood check dam was destroyed by a household located adjacently, but was rebuilt elsewhere after re-consultation.

***Positive impacts on livelihoods are more likely where poorer stakeholders are involved.*** IBMs, depending on the nature of the incentive, are more likely to provide complementary sources of income to service providers, rather than substantially address poverty. There is a risk of negative impacts on livelihoods if poorer stakeholders' voices are ignored. However, this risk can be minimized if agreements are

carefully negotiated, fully involving all stakeholders, and are truly voluntary.

***The process of developing an IBM can lead to greater voice for the marginalized, whether or not an agreement for a mechanism is reached.*** By definition, a transaction or an IBM involves two parties that interact and negotiate with each other – in the case of Kuhan, two VDCs. Given this, the decision-making processes within VDCs and their engagement of marginal users are crucial. For example, addressing the numerous concerns of women-headed households in the Kuhan catchment led to an agreement, while unwillingness of upstream stakeholders to shift grazing led to a collapse of negotiations in Suan.

***Moral authority of local level payments.*** Simply put, the lesson is that the source of the payment matters. Payments (cash or in-kind) generated locally carry the perception that the payer has diverted their own money (or effort), which could have been used gainfully by the payer. The implication is that these agreements with local payments are treated seriously and there is a collective will to ensure that agreements are adhered to and maintained.

***Locally generated land use change options which benefit both upstream and downstream stakeholders are more likely to work.*** Experimenting and adapting to local conditions can generate land use options that have greater ownership and chance of success. For example, protection in Kuhan has increased grass yields for those upstream, and also reduced silt in the dam and benefited those downstream.

***Functional local institutions reduce transaction costs.*** Functional local level institutions representing watershed service suppliers and receivers play a key role in developing and sustaining an agreement and reducing transaction costs. The presence of institutions (VDCs) in Kuhan has helped overcome hurdles, while lack of institutions in Bhopal at the farmer level, and multiple stakeholders downstream has increased the costs of interaction.

***Transparency is both required and created by IBMs.*** For voluntary transactions to work, transparency in the transaction process is a must. This transparency can influence the working of the local institutions and make them more transparent in other spheres as well. In Kuhan, the transaction discussions prompted the election of a new VDC executive body and encouraged more transparent accounting which in turn boosted confidence in the VDC.



## References

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A woman wearing a blue and green sari is sitting on a large, light-colored rock in a forest. She is looking towards the camera with a slight smile. The background is filled with green foliage and trees, creating a natural, outdoor setting. The image is framed by a thin white border.

## **Trading carbon from forests in India:**

Opportunities and  
constraints for the  
poor

*By Rohit Jindal and  
John Kerr*





## Trading carbon from forests in India: Opportunities and constraints for the poor

*By Rohit Jindal and John Kerr<sup>i</sup>*

### Summary

This paper looks at how community forestry projects can sell carbon sequestration credits<sup>ii</sup> in international markets as a potential mechanism for improving rural incomes. Although the focus of the paper is on India, the discussion here is also relevant for community forestry projects in other developing countries. It is based on our field research with three prominent organizations in India - Seva Mandir (SM), Foundation for Ecological Security (FES), and the International Small Group and Tree Planting Program (TIST). We compare and contrast these experiences to draw lessons for organizations that wish to enter carbon markets. What kinds of forestry projects are eligible to sell carbon credits? What important rules govern such sales? We also focus on economic benefits from carbon trading by estimating additional income that local farmers can make from selling carbon credits. Finally, we look at important issues such as leakage, permanence, and transaction costs that affect the sustainability of carbon sequestration projects.

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<sup>i</sup> Acknowledgements to the Michigan Agricultural Experiment Station for funding this study. Thanks are also due to respective staff at FES, SM, and TIST for their field support.

<sup>ii</sup> Carbon credits are units of carbon dioxide (CO<sub>2</sub>) that forests absorb (or sequester) from the atmosphere.

## Introduction

Seva Mandir (SM) and the International Small Group and Tree Planting Program (TIST) work in selected areas in India. SM mainly works in rural parts of Udaipur district (southern Rajasthan)<sup>iii</sup> and TIST near Chennai in the Southern part of the country.<sup>iv</sup> The Foundation for Ecological Security (FES) works in ecologically fragile areas across seven states in India<sup>v</sup> (see Figure 1). These organizations provide diverse institutional backdrop for the study. SM and FES are grassroots NGOs that implement forestry activities but haven't traded any carbon credits. TIST, on the other hand, is one of the few organizations in India (and even elsewhere) to already sell forest-based sequestration credits.

## Carbon trading and Chicago Climate Exchange (CCX)

The biggest and most important carbon markets operate through the Kyoto Protocol.<sup>vi</sup> Under its Clean Development Mechanism (CDM), forestry projects in developing countries are eligible to sell carbon sequestration credits to industrialized countries in need of reducing their carbon emissions.<sup>1</sup> However, due to strict eligibility criteria, the rate of approval for such projects has been very slow and the Kyoto-based market for carbon sequestration credits has hardly taken off.<sup>2</sup> Instead, a new opportunity has been created by the growth of voluntary carbon markets. The biggest of these is the Chicago Climate Exchange (CCX).



**Figure 1.** Work areas of the three organizations.

CCX is a voluntary emission reduction program whose members include big companies such as Ford, DuPont, IBM, and Motorola. These members reduce their carbon emissions by one percent every year and can trade carbon credits similar to Kyoto-based markets. Since its inception in 2003, CCX has traded more than 14 million tons of carbon dioxide (tCO<sub>2</sub>), including 10 million tCO<sub>2</sub> worth US\$ 30 million in 2006 alone.<sup>vii</sup>

CCX members can also buy carbon sequestration credits directly from forestry projects (called CCX forest carbon emission offsets). Farmers and local communities can thus make money from their conservation efforts by selling carbon credits

<sup>iii</sup> For more details, see <http://www.sevamandir.org>

<sup>iv</sup> For more details, see <http://www.tist.org>

<sup>v</sup> Gujarat, Rajasthan, Orissa, Madhya Pradesh, Andhra Pradesh, Karnataka and Uttaranchal. For details, see <http://www.fes.org.in>

<sup>vi</sup> The Protocol came into force in 2005 and requires industrialized countries to reduce their carbon emissions by an average of five percent by 2012. Countries that reduce more than their target can sell credits to others through carbon markets, such as the European Union Emission Trading Scheme.

<sup>vii</sup> <http://www.chicagoclimatex.com>



through CCX. To be eligible to sell carbon credits on CCX, forestry projects should have been initiated after 1 January 1990 on un-forested or degraded lands. These projects should also be able to demonstrate long-term commitment to maintain carbon stocks in forestry and should be open to third party verification.

### Pro-poor forestry initiatives in India

All three organizations – Seva Mandir, Foundation for Ecological Security, and the International Small Group and Tree Planting Program – implement several kinds of forestry activities. For SM and FES, these include pastureland development on village common lands, Joint Forest Management on forestlands, and farm forestry on privately owned lands. The common objective behind these activities is to help increase farm incomes for the rural poor.<sup>3,4</sup> It is important to note that most of these forestry projects are presently funded through donor support rather than through payments for environmental services. Carbon trading will thus help both these organizations to field test the concept of PES.

TIST, on the other hand, already finances its forestry activities through PES. It buys carbon sequestration credits from local farmers and then sells these credits to international buyers. Its parent organizations – US-based Clean Air Action Corporation and the Institute for Environmental Innovation – help it to locate these international buyers. Local farmers are organized in small groups and receive quarterly payments from TIST based on the number of live trees on their farms.<sup>viii</sup> TIST works out the actual number of sequestration credits before selling them abroad. The program is extended to about 260 farmers' groups, which manage more than 600,000 live trees, with many more being planted each year. Together, these groups receive a total carbon payment of Rs. 880,000 (about US\$ 20,000) per year, which provides them with a regular source of income.



*Forests can sell carbon through CCX  
(Photo credits: Rohit Jindal)*

### Estimating carbon credits

Forestry projects need to estimate their annual sequestration potential in order to know the number of carbon credits they can sell in international markets such as the CCX. Although forests sequester CO<sub>2</sub> both as above-ground biomass and below-ground soil carbon, current CCX rules allow for trading in only above-ground biomass contained in live trees. And, as mentioned above, only post-1990 plantations are eligible to sell carbon credits. The carbon sequestration is usually taken as 1.84 times the average annual increase in above-ground biomass for these plantations and is represented in tons of CO<sub>2</sub> per year.

<sup>viii</sup> <http://www.tist.org>

**Table 1.** Carbon sequestration from selected forestry projects in India

	Seva Mandir	FES	Total
Area under post-1990 plantations (ha)	7,878	33,415	41,293
Annual above-ground biomass growth (tons)	8,950	42,096	51,046
Carbon sequestration (tCO <sub>2</sub> /year)	16,468	77,457	93,925
Potential annual market value at CCX <sup>ix</sup> at US\$ 4/tCO <sub>2</sub>	US\$ 65,872	US\$ 309,828	US\$ 375,700

**Table 2.** Carbon Sequestration potential of TIST-India

Total Number of live trees	> 600,000
Carbon sequestration - tCO <sub>2</sub> /year	15,000
Potential annual market value at CCX at US\$ 4/tCO <sub>2</sub>	US\$ 60,000

As per the above specifications, the total carbon sequestration potential of the three organizations works out to 108,925 tCO<sub>2</sub>/year. These figures are based on recent estimates of mean annual carbon growth rates in India and the monitoring reports received from these organizations.<sup>5,6,7</sup>

## Sustainable development from carbon trading

Carbon credits generated by SM and FES are worth about US\$ 375,000 per year on the CCX (Table 1), all of which would be additional income for local farmers. Since TIST already sells sequestration credits to international buyers, US\$ 60,000 per year may not represent additional income (Table 2), but it does indicate an increase in benefits for local farmers from the US\$ 20,000 per year that they currently make from non-CCX carbon sales.

These additional incomes have the potential to extend local conservation efforts, reduce livelihood pressure on forests, and provide sustenance needs of many poor families. TIST's experience demonstrates that, for many farmers, carbon sales are the primary source of cash income. Farmers often reinvest these incomes in agriculture or use them to pay for important household expenses (Box 1). Similarly, many community members from FES and SM's work area say that carbon payments will give them a direct incentive to conserve local forests. For instance, in village Chitravas (Rajasthan), Joint Forest Management activities over 276 hectares of forestland, have mainly yielded benefits for the local villagers in the form of non-timber forest products and some employment opportunities from FES. However, the sale of 1,266 tCO<sub>2</sub> per year of carbon credits from these forests could generate an additional

<sup>ix</sup> Price as on 19 January 2007.



income of US\$ 5,064 per year (Rs. 227,907). This would be a significant sum of money for the village, especially for many of the poorer households.

### Reducing transaction costs

Transaction costs include costs of negotiating, contracting, implementing, and monitoring any carbon sequestration project. These costs are usually high when new projects are being set up, thus reducing the proportion of carbon revenue that ultimately reaches local farmers. One way to reduce these costs is by aggregating carbon credits from individual farmers and then selling them in one lot. The aggregator thus avoids the cost of setting multiple contracts by establishing a single contract with CCX on behalf of all the local participants. TIST already plays this role by purchasing carbon offsets from local farmers and then selling them to international buyers in a single lot. Since FES and SM will be new to carbon trading, they can consider forming a federation that can act as a common aggregator for their target participants. This federation will also be able to ensure that poor households can participate in the sequestration program and that there is an equitable sharing of carbon benefits amongst the community members.

A major transaction cost is monitoring and verification costs. These costs are substantial for SM and FES where individual carbon sites are located far away from each other. One possible solution is to introduce site-specific monitoring through handheld GPS (geographical positioning system). These GPS devices are relatively inexpensive, easy to use, and can help in more rigorous tracking of carbon plantations. For instance, TIST has trained village-based volunteers to take field measurements through GPS. A single carbon expert in the central office then uses these field measurements to calculate sequestration credits for each site.

#### Box 1. Economic gains from carbon sequestration

TIST formed a group called “Salsa” in 2003 when 12 local farmers expressed their willingness to take up farm forestry. Since then, they have planted 28,923 Neem and Casuarina trees and have encouraged many neighboring farmers to form groups and grow trees. Over the last three years, the Salsa group has received US\$ 1,270 (Rs. 57,114) as carbon payments from TIST. This money has improved the economic status of many group members and has helped them to reinvest it in agriculture.



*Carbon monitoring through GPS  
(Photo credits: Rohit Jindal)*

## Food insecurity and land tenure concerns

Many smallholders in India meet their food requirements from their farms and local forests. As the rural population continues to grow, there is a demand for additional agricultural land to grow food crops. If this land is locked in multi-year carbon plantations, local communities will be threatened with food insecurity. Carbon sequestration activities will thus need to be balanced with food security concerns for the local population. TIST addresses this issue by promoting carbon sequestration primarily on marginal and low-productivity lands. These lands have a low substitutability for agriculture and are thus well suited for long gestation carbon plantations.

Another related concern is that many poor households often depend on lands over which they have limited tenure rights. As carbon sequestration services become more valuable, powerful landowners may grab these lands and drive the poor away, further threatening their livelihoods.<sup>8</sup> In this regard, taking up carbon sequestration through farmers' cooperatives can be a viable alternative. FES has worked extensively with such cooperatives to develop local pastures across several states in India. These cooperatives obtain long-term lease from local governments to regenerate pastures and to share benefits amongst their members. As a result, these cooperatives are not only successful in improving the productivity of local resources but also in securing tenure rights for their members.

## Carbon sequestration on common lands

A large proportion of the land in rural India exists as common land, including revenue lands (owned by the government Revenue Department), forestlands (owned by the state Forest Department), and panchayat grazing lands (owned by the Revenue Department, but the village *panchayats*<sup>x</sup> are the custodians). Although village communities can obtain permission from respective authorities to manage these lands for a fixed period of time, there is no provision to carry out carbon sequestration projects on them. As carbon payments become more significant, there is a possibility that the Forest Department and local panchayats may in fact stop transferring management rights to local communities.

For example, Nayakheda village in Rajasthan obtained permission from the local panchayat to take up plantations on 29 hectares of common pastureland. The villagers also planted trees on 100 hectares of individually owned lands. These plantations are sequestering 236 tCO<sub>2</sub> per year, worth US\$ 946. However, the panchayat is now threatening to take



*Common pastureland in Nayakheda  
(Photo credits: Rohit Jindal)*

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<sup>x</sup> Elected village councils in India.



over the pastureland. This is a potential area for conflict that needs to be resolved soon. A practical solution may be to share carbon payments between local communities and respective authorities.

### Leakage and permanence

Carbon trading requires sequestration projects to prove there is no “leakage” of carbon dioxide and that all carbon stocks are permanent. No leakage means that project beneficiaries do not cut any trees, even outside the project boundary. This is a contentious issue as local communities often depend on forest resources for their livelihood needs, such as obtaining fodder for livestock, firewood for energy needs, and fruits for selling in nearby markets. Leakage occurs if people simply shift tree-cutting to lands not under contract. Permanence refers to a long-term commitment to protect carbon plantations. For local communities, permanence is thus inextricably linked with leakage. If communities are allowed to harvest a certain percentage of the annual biomass growth in terms of dead and fallen trees, manually harvested grass, and mature bamboo poles, they may be more willing to protect the growing trees. In this case, carbon sequestration credits can be calculated by subtracting annual biomass harvest from total annual biomass growth on a specific project site. The CCX already incorporates this element by paying for only 80 percent of the eligible forestry offsets. The balance 20 percent is saved in a CCX forest carbon reserve pool, to account for any net losses in the carbon stocks. These 20 percent reserves may thus be sufficient to fulfill the annual biomass needs of the local communities.

### Future challenges and opportunities

Kyoto rules for carbon sequestration projects are often perceived as too rigid and difficult to follow.<sup>9</sup> In comparison, rules for carbon sequestration projects on CCX are relatively simple and easy to follow. However, from the perspective of the local communities, some modifications in these rules will make them even more relevant and effective. For instance, CCX only allows trading in aboveground carbon stored in live matter. However, forests often fix substantial amounts of carbon in the soil as organic matter. If trading is allowed for below-ground carbon, it may provide an even higher economic incentive for local communities to participate in carbon sequestration activities.<sup>xi</sup>

All these three organizations, SM, FES, and TIST, can potentially sell carbon sequestration credits on the CCX. Establishing a relationship with CCX may in fact open avenues for carbon trading with other international players. A viable strategy in this regard will be to start with simple payment arrangements on small contiguous sites that are easy to monitor and administer. Experience gained during these pilot projects may be handy in expanding the scale of operations when international demand for carbon sequestration credits raises further. Such performance-based payments may also ensure that local communities have a long-term stake in conserving these plantations. For the global society, this relationship may open ways to achieve a win-win situation between environmental conservation and economic development.

<sup>xi</sup> Although CCX allows for trading in soil carbon, it is restricted to no-till agriculture in the US.

Finally, and most importantly, carbon sequestration programs have the potential to alleviate rural poverty. This potential will, however, remain unfulfilled unless policy makers and various carbon players make conscious efforts to elicit participation from the poor. This also requires changes in carbon accounting as well as innovations that can reduce transaction costs. Institutions such as farmers' cooperatives and NGO-led federations can further ensure that carbon payments are channeled to the poor. Only then can carbon sequestration truly lead to sustainable development at the local level.

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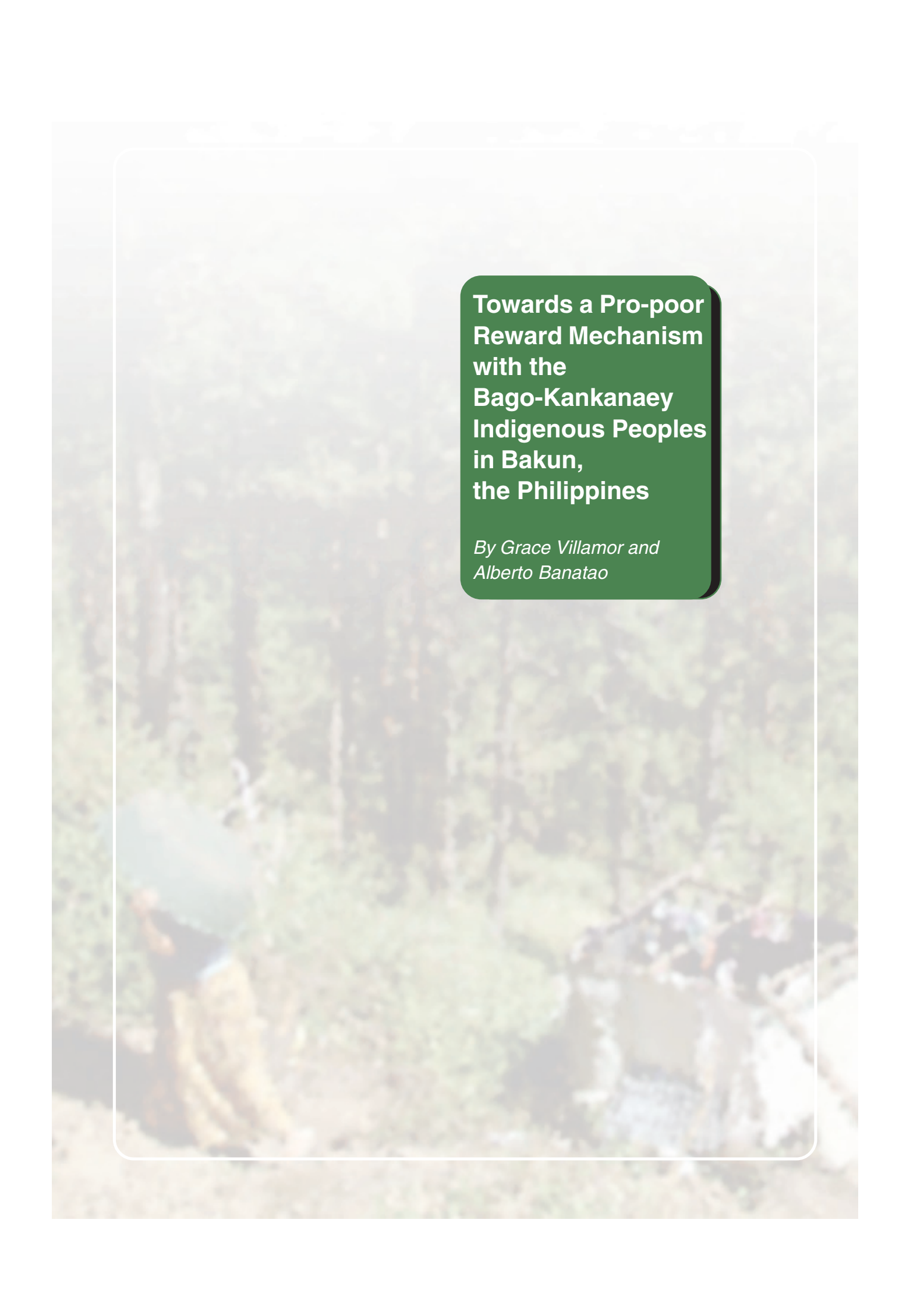
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**Towards a Pro-poor  
Reward Mechanism  
with the  
Bago-Kankanaey  
Indigenous Peoples  
in Bakun,  
the Philippines**

*By Grace Villamor and  
Alberto Banatao*

## Towards a Pro-poor Reward Mechanism with the Bago-Kankanaey Indigenous Peoples in Bakun, the Philippines

By Grace Villamor and Alberto Banatao

### Summary

The Bakun indigenous peoples (IPs) in the municipality of Bakun, a province of Benguet, Philippines, are aiming to develop a pro-poor reward mechanism from their watershed services. In 2002, through the efforts of Bakun Indigenous Tribe Organization (BITO), the IPs were awarded a municipal-wide Certificate of Ancestral Domain Title (CADT) by the national government, enabling them to exercise their traditional rights to their ancestral land. Agreements under the Philippine law and voluntary assistance have given some benefits to Bakun over the years from the hydroelectric companies. Now, development of a conditional, realistic and pro-poor reward mechanism as a new environmental instrument comes as a challenge for the IPs since it entails a major change in the roles they would be playing. This paper presents the struggle of the Bakun IPs and the strategies and actions they have taken towards a pro-poor reward mechanism.

### Introduction

Bakun, situated in the northwestern tip of the Province of Benguet, Cordillera Administrative Region (CAR), Philippines (Figure 1), is the home to a group of IPs collectively known as the *Bago-Kankanaey* tribe. The IPs have been in the area since time immemorial and have been accustomed to its rugged mountainous conditions.



**Figure 1.** Map of Philippines, showing location of Bakun.



The Bago-Kankanaey tribe is also known for their rich socio-cultural heritage. Their indigenous way of life governs how they relate to the land and the forests, and among themselves. They manage and utilize natural resources using indigenous knowledge systems and practices.

### Rights over ancestral land

These people have a history of struggle for rights to their ancestral land. In 2002, this mountain municipality was the first in the country to be awarded the Certificate of Ancestral Domain Title (CADT) by the National Commission for Indigenous People (NCIP). Through the efforts of the BITO, a municipal-wide grassroots people organization, the decades of struggle these people endured paid off. The Bago-Kanka-naey Ancestral Domain covers 29,444 hectares and is formally titled to be the traditional land of this tribe, and an Ancestral Domain Sustainable Development and Management Plan (ADS DPP) was also formulated. The issuance of CADT to the IPs of Bakun was a development that allows them to assert more of their rights over their ancestral domain, including the self-governance of their natural resources as stated in the Indigenous People’s Rights Act (Box 1).

### Bakun’s Treasures

The Bakun communities consider their vegetable terraces and farms as their “green gold.” About 90 percent of IPs (or more than 12,000 people) are engaged in rice, cash crops and vegetable farming as their main livelihood. Major crops such as cabbage, potatoes, carrots and highland vegetables are produced and traded to urban areas. Since they do not have much good flatland to cultivate, most of their farms are found along suitable areas of mountainside and plateaus, and in plains along rivers and streams. The province of Benguet is also famous for their mineral deposits and “gold-panning,” as traditional small-scale mining has been part of their culture.

### Box 1. The Indigenous Peoples Rights Act (Republic Act 8371)

The Indigenous Peoples Rights Act (IPRA) enacted in 1997, is one of the powerful laws for the indigenous people, in that it:

- recognizes, promotes, and protects the rights of the indigenous peoples including the right to ancestral domain and lands; and
- recognizes right to self-governance and empowerment, social justice and human rights, and right to cultural integrity.

To implement the law, the National Commission of Indigenous Peoples (NCIP), the primary government agency responsible, is tasked to convert ancestral land claims in the country into private collective titles called Certificate of Ancestral Domain Title (CADT). The processing of claims involves a number of requirements including geodetic surveys, gathering of anthological records and testimonies and facilitation of community meetings to resolve conflicts.

From 1997 to 2004, the NCIP has granted 24 ancestral domain titles representing 543,000 hectares. NCIP now targets 56 more CADTs covering around 1.7 million hectares.<sup>1</sup>



*Awarding of the CADT to the Bakun IPs (Photo credits: RUPES Bakun).*

Another source of “gold” that local people have yet to realize is the watershed area of Bakun. This provides many environmental services not only to the local community but also to the whole Cordillera region. The watershed area covering 19,000 hectares is the source of domestic water supply downstream, and of irrigation water for the rice fields and the area’s expanding vegetable farms. And, most significantly from an economic perspective, the watershed provides water to the two hydropower plants in the area – HEDCOR Inc. and Luzon Hydro Corporation (LHC).

### **Poverty Traps**

Unfortunately, poverty is pervasive in the area. Bakun has been considered as one of the poverty-stricken municipalities in the province of Benguet with approximately 84 percent of the households living below the poverty line. The poverty level is particularly high in the remote areas of the Bakun watershed, where many of marginalized farmers live.

One of the conditions that trap the upland people in poverty is the rugged terrain, which makes farming, from production to marketing of farm products, quite difficult and more expensive compared to their lowland counterparts. Fluctuating market prices of farm products, the continued rise in the cost of farm inputs, and yearly typhoon occurrences are also factors causing the farmers to experience alternating seasons of gains and losses.

### **Existing financing mechanism and its challenges**

Some benefits are already provided to the local government units (LGUs) of Bakun by the hydroelectric companies, regulated by various laws and policies and defined through Memorandum of Agreements (MoAs) between the companies and the LGUs. The hydroelectric companies have also supported the host communities (at barangay, or village, level) with some voluntary community development and livelihood assistance, such as infrastructure projects. From 2000-2005, it is estimated that the financial



assistance as stipulated in the MoAs including the voluntary community assistance provided by these companies amounted to more than US\$ 3 million.<sup>i</sup> These funds were then integrated in the LGUs' annual budget appropriation for community development. It is the discretion of the LGUs to utilize the funds according to their own municipal development priorities.

The royalties and voluntary livelihood development assistance resulting from this financial mechanism would have been ideal for the upland people, who are living in chronic poverty.<sup>ii</sup> But according to the financial scheme as stipulated in the MoAs, very little or no direct assistance has so far been given to the upstream communities. LGUs have mostly directed the funds to the host communities where power plants are located. Moreover, even though, according to the Free, Prior and Informed Consent (FPIC) of the IPRA, the aspirations of IPs should be recognized and incorporated in any proposed development activity in their domain, this precondition did not exist when the MoAs were developed.

### En Route to Pro-poor Reward Mechanism

The hydroelectric companies are under threat from the quickly accumulating silt loads, due to the expansion of commercial vegetable farming on the uplands as well as road widening, which leads to huge economic losses for the companies. The Rewarding Upland Poor for Environmental Service (RUPES) project in Bakun saw the potential to develop a mechanism of payments for reducing sedimentation in the Bakun River that would fulfill the criteria of being conditional, realistic and pro-poor. While the local community is the main supplier and user of the watershed services, the power generation companies, HEDCOR Inc. and LHC, stand out as the potential primary buyers of the watershed service since the sustained supply of clean water of the two rivers is imperative to the sustainable operation of the power plants.

The idea is for a new MoA to be proposed where IPs would reduce or slow down the sedimentation process and hydroelectric companies would reward them for doing so. Appropriately, BITO with its Council of elders, as the representatives of the IPs, would have the biggest role in the development of the reward mechanism. It would act as the intermediary or broker between the hydroelectric companies and the IPs (particularly the upstream Bakun communities), the decision-making body, and the

#### Box 2. Bakun Indigenous Tribe Organization (BITO)

BITO, established in 1998, is a people's organization that encompasses the whole municipality. The "Papangoan," or the Council of elders, is the highest policy-making body of the organization. This Papangoan recognizes the voices of both men and women in the Domain. The main objective of BITO is to promote: (1) social and human development; (2) economic growth; (3) cultural development; and (4) quality environment and sustainable use of resources in the Ancestral Domain.

<sup>i</sup> Based on the result of the research study on "Testing the Reward Mechanisms that benefit its upland Dwellers for the Watershed Services they Provide" by the RUPES Bakun, 2007.

<sup>ii</sup> Based on the result of the Participatory Poverty Assessment in Bakun, February 2007.

recipient of the rewards (Box 2). BITO would have the technical assistance of an established PES Technical Advisory Group (TAG) as represented by various private and government agencies.

RUPES Bakun team will strive to ensure that the proposed mechanism is pro-poor by incorporating the perceptions of the upland people on how environmental services could improve their conditions. For the upland people, having their voices heard and translated into action is a way to address poverty. In addition, they have indicated that they would like the rewards to be used in projects such as agroforestry plantations of high value fruit trees<sup>iii</sup>. One of the key rewards for the upland people is to ensure that the financial assistance is directed towards maintaining the integrity and suitability of their watersheds.

### Conditionality and local knowledge

An important tool used in the process of developing a pro-poor reward mechanism is the Rapid Hydrological Assessment. The Bakun watersheds were assessed through integrating the different disciplines of participatory social survey, ecological modeling (hydrological-climatological-landscape modeling) and landscape spatial analysis (combined landscape ecology and land use change analysis). Based on this assessment, the environmental conditions in Bakun Watershed reveal that land use and ground cover changes appear to be the most significant change that have taken place in the watershed, which might explain the variations in the streamflow pattern.<sup>2</sup> Land cover changes are the results of forests converted to agriculture land because of the increasing demand for farming. Moreover, the application of RHA identified the perception and ecological knowledge of the local communities and institutional stakeholders on the hydrologic process of the watershed. Local communities raised specific problems and possible recommendations for their watershed, and local communities identified the existing indigenous technologies that conserve and maintain water services. This assessment highly recommended the development of a watershed plan, which is mentioned below.

### Challenges to address on the way

Since RUPES is a new concept and instrument for the IPs, the biggest challenge for them in developing a conditional, realistic and pro-poor PES has been defining and managing their new roles. This requires a great deal of capacity building and technical assistance.

However, the division of roles between BITO and LGUs still needs to be clarified. As mentioned earlier, the LGUs have been managing the benefits, which have been coming from the hydropower companies in the form of royalties and voluntary assistance. In this new financial mechanism, BITO would be the recipient of the rewards. Although the new role of BITO is supported by the IPRA, there is still a risk of conflicting interests, and BITO and LGUs need to refine and settle their specific roles within the domain and municipality, respectively.

<sup>iii</sup> Based on the result of the Participatory Poverty Assessment in Bakun, February 2007.



To address these challenges, RUPES assisted the IPs through BITO in developing the preconditions needed in setting up a fair and equitable reward mechanism. Actions for doing so were the following:

***Increasing the capacity of the Bakun people to produce and market ES, and developing understanding of the environmental functioning that integrates indigenous and scientific knowledge.*** This capacity building and knowledge enhancement is essential for the Bakun people to determine and credibly explain how they will deliver environmental services. Through the application of the RHA, the local knowledge on the relationship of land cover and watershed functions in the major watersheds of Bakun was documented and integrated with the perception and logic used by government agencies and potential buyers of services, as well as for comparison with hydrological models.

***Discussing with the hydropower companies to explain that the Bakun people voluntarily provide a service beyond legal requirements that adds value to the companies' operations.*** Through a series of dialogues and negotiations with the hydroelectric power companies, the companies have expressed willingness to reward the communities provided that there is a marked reduction in the volume of silt and sediments that flow to their facilities (i.e. turbines), especially during the rainy season. If this could be accomplished by the upland dwellers as a result of the municipal-wide adoption of improved land management practices, then the companies would grant more rewards to the communities. With this, conditional and realistic agreement with the Bakun people would be achieved.

***Developing a forum that would bring the IPs, LGUs and other key stakeholders to work together and build partnerships.*** Formulation of the Bakun Integrated Watershed Development and Management Plan (BIWDMP), in which RUPES is one of the main components, is a good venue to exercise IPs' right to have an equitable share of the domain's natural resources. The plan integrates all piecemeal watershed management projects being implemented within the domain, and will serve as the main document to guide all watershed management projects and activities yet to be implemented.<sup>3</sup>

In addition, the plan can get real "buy in" from the hydropower plant companies on the basis of a realistic and conditional reward mechanism. Establishment of agroforestry farms (e.g. using natural vegetative strips) within open and critical portions of the watershed is one of the priorities of the plan, which will improve the water quality that supports the hydroelectric companies while simultaneously providing additional income to the upland farmers.<sup>4</sup> It is envisioned that the hydropower companies would be encouraged to finance the development of more agro-forestry farms. Recently, the BITO has been able to secure financing from HEDCOR, Inc. for three community projects on agroforestry, solid waste management, and forest protection interventions.

Aside from actions described above, RUPES Bakun also assessed the social mobilization activities at the site. Also, as previously mentioned, a technical advisory group (TAG) from different key stakeholders was established and seen as beneficial in supporting the BITO's activities.

### Challenges and opportunities

The IPs as represented by BITO are facing new challenges in realizing the reward mechanism. At this stage, identified capacity building activities necessary for equipping the IPs are vital (e.g. training on water quality monitoring, sustainable agroforestry/NRM systems and management of RUPES mechanisms; training on project development and management). A major question also remains whether the BITO is ready to take on their new role. Full support from the LGU for the BITO to implement RUPES concept is also essential.



*Dialogue with BITO, Hydropower Co., and RUPES Bakun  
(Photo credits: Grace Villamor)*

From all the activities and the dialogues conducted, the hydropower companies now see potential gains both for the Bakun people and the company in rewarding watershed services. A new MoA is under negotiation in which the IPs of the upstream communities that actually supply the watershed services are the direct recipients of the reward.

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is a selection of papers prepared by practitioners working in Community Forestry and Community based Natural Resource Management. The publication aims to create a forum for practitioners to share field level cases and lessons from work to support communities and other key stakeholders to manage natural resources and improve rural livelihoods.



### **RECOFTC**

The Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC) is an international not-for-profit organization based in Bangkok, Thailand, that supports community forestry and community-based natural resource management. RECOFTC receives core funding from the Swedish International Development Cooperation Agency (Sida), the Swiss Agency for Development and Cooperation (SDC) and the Norwegian Ministry of Foreign Affairs. Through strategic partnerships and collaboration with governmental and non-governmental institutions, programs, projects and networks, RECOFTC aims to enhance capacity at all levels and promote constructive multi-stakeholder dialogues and interactions to ensure equitable and sustainable management of forest resources.

Website: <http://www.recoftc.org>

### **RUPES - ICRAF SEA**

Rewarding Upland Poor for Environmental Services (RUPES) is a programme coordinated by ICRAF - The World Agroforestry Centre Southeast Asia (ICRAF SEA). The Program aims at enhancing the livelihoods and reducing poverty of the upland poor while supporting environmental conservation on biodiversity protection, watershed management, carbon sequestration and landscape beauty at local and global levels. RUPES is hosted by ICRAF's South East Asia Office and has research sites in Indonesia, Nepal and Philippines.

Website: <http://www.worldagroforestrycentre.org/sea/Networks/RUPES/Index.htm>

### **SNV**

SNV Netherlands Development Organisation is a Netherlands based international NGO that delivers capacity building advisory services to over 1,800 clients in 33 countries in Africa, Asia, Latin America and the Balkans. In Asia, SNV provides capacity building services to government, non-government and private sector organisations in Nepal, Vietnam, Bhutan, Laos, Cambodia and Bangladesh as well as to a number of regional organisations and networks. SNV aims to achieve development results in two areas: (1) basic services delivery (water sanitation, energy, health and education) and (2) production, income and job creation. Our niche in specific sub sectors (such as pro poor tourism, Non-Timber Forest Products, biogas sector development, clean development mechanism, value chain development and participatory planning) is widely recognised and closely linked to National Development Strategies.

Website: <http://www.snvworld.org>

### **Winrock International India**

Winrock International India (WII) a non-profit organization, registered in India, works in the areas of natural resources management, clean energy and climate change. Its mission is to "develop and implement solutions that balance the need for food, income and environmental quality." In all its areas of work, WII emphasizes the development of local institutions, leadership and human resources.

Website: <http://www.winrockindia.org/>



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