Payments for Ecosystem services in Kulekhani Watershed of Nepal: An institutional analysis of mechanisms for sharing hydroelectricity revenue

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ABSTRACT

This paper examines how the scheme of Payments for Ecosystem services (PES) has been implemented in collaboration with existing local resource management institutions, particularly community forestry, to try to achieve both environmental and developmental goals. Through a case study approach, this paper has analyzed the institutional dynamics of hydroelectricity revenue sharing mechanisms in Kulekhani watershed of Nepal. Results indicate that the performance of the Kulekhsni PES scheme is limited in terms of fostering ecosystem services. The analysis shows that the performance has been determined by the deficiencies in the design of institutions and interaction of the PES with other existing local resource management institutions. Similarly, it has also been affected by weak monitoring and enforcement. Based on this analysis, it is argued that, although the PES in Kulekhani has provided a mechanism for transferring hydroelectricity revenue to the local communities to support rural development, it has not transformed existing resource management structures and institutions to demonstrate the effectiveness of enhancing environmental outcomes. The lessons of this research are that politics are driving the design of PES mechanisms, and that its interplay with local institutions can hinder the performance. Moreover, this research suggests that PES schemes do not necessarily result in cooperation among local institutions or the achievement of both ecological and social outcomes.

Key Words: *Community Forestry, PES, Institutional Analysis, Nepal*

INTRODUCTION

> Finally, we became successful to get about $ 60,000.00 additional budget annually for the development of our community after three years of negotiation with District Development Committee, Makawanpur. With this money, we have managed to provide electricity to most of the families of the watershed area and have tried to reach the road to all hamlets. We have also used some of our budget for other community development activities like education, health and watershed management activities.

This is what Payments for Ecosystem services (PES) meant to a community leader of the Kulekhani watershed, consulted for this study. It is not only the tale of a case of hydroelectricity revenue sharing mechanism in Kulekhani of Nepal but also a representation of what many developing countries are promoting under the banner of PES. However, the concept of PES relies on market logic where the beneficiary of environmental service(s) pays the suppliers in order to provide a direct economic incentive to adopt a more environmentally friendly behaviour. These days, the concept of PES is used not only to denote such 'pure' market-based approaches

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(Wunder et al. 2008). Instead, it has been increasingly used to denote a wide range of schemes for providing direct incentive (both economic and material) to resource managers (Corbera et al 2007, McAfee and Shapiro 2010, Swallow et al. 2007). Development organizations are increasingly using such schemes as a tool to promote the twin goals of conservation and development.

The similar concept has been introduced in Nepal in 2003 as a pilot project of the World Agroforestry Centre (ICRAF) to compensate and reward upstream community of the Kulekhani watershed. The main aim of the PES scheme is to support the livelihoods of upstream communities for ensuring forest conservation and reducing sedimentation in the Kulekhani reservoir. Existing literature about the PES in Kulekhani assert that the mechanisms developed there have been successful in redistributing hydroelectricity revenue to upstream communities for environmental protection and community development (Adhikari, 2009, Hung et al. 2009, Leimona et al 2009, Upadhyaya 2005). These studies take a straightforward logic that the newly introduced mechanisms will simply integrate with the existing resource management institutions, for example community forest and watershed management, and provide financial incentives to the resource managers, mostly the poor people, for better management of the resources. However, such logic has been contested by many scholars who argue that PES is complex mechanisms that do not necessarily accommodate existing resource management institutions (Corbera et al. 2007, McAfee and Shapiro 2010). A review of the institutional literature also reveals that devising resource management institutions like PES involves complex processes that do not always produce the expected outcomes for various reasons, as stated below.

Given the associated complexities with the PES which is conceived here as a set of institutions and the use of straightforward assumptions while analysing PES mechanisms in Kulekhani, it is not well analyzed and understood whether PES mechanisms can fit well within the existing community forest and watershed programs to foster synergetic outcomes. In the first place, it is necessary to analyze whether the PES institutions are effective enough to meet the stated goals of environmental conservation and livelihoods improvement. Such an analysis requires an understanding of the underlying complexities associated with the design and implementation of a PES.

In this connection this paper seeks to answer the research question that: *How have Payments for Ecosystem services mechanisms been designed and implemented in Kulekhani, Nepal and how has it transformed existing resource management structures and institutions?* The following sub-questions were used to analyze the main research question.

- What are the historical and institutional contexts of introducing the PES in Kulekhani?
- How have the PES mechanisms been designed and what were the roles of different actors involved in the process?
- How are the PES mechanisms interacting with other existing institutions, especially community forestry, watershed management and community development ones?
- How effectively are the rules of the PES mechanism enforced?

- What are the implications of these institutional dynamics on performance of the PES mechanisms in terms of generating the desired ecosystem services and supporting community development?

Taking the case of the Kulekhani watershed, this research strives to comprehend to what extent the PES can collaborate with existing resource management and other related institutions to foster both objectives. In doing so, paper attempts to understand how institutional dimensions play a role in the effectiveness of the PES. The paper is organized as follows. Section two sets out the theoretical background and analytical framework for this study. It first outlines the concept and debates about PES and then discusses the institutional framework for analysis. Section three sets the historical and contextual background of the PES in Kulekhani. Section four presents the main findings of this study related to the institutional design and interplay of PES. In doing so, it examines actions and actors involved in the design process, the rules crafted through negotiation among the actors, and the interactions of PES institutions with other existing institutional arrangements. Section five consolidates the findings by presenting an analysis of the performance of the PES. Finally, the paper concludes by drawing policy implications and exploring the scope for further research in the field.

CONCEPTUAL BACKGROUND AND THEORETICAL FRAMEWORK

Payments for Ecosystem Services: Definition, concept and debate

PES has become an increasingly popular policy instrument for environmental conservation in recent years in both developed and developing countries. The concept of PES relies on the idea of assigning property rights and monetary value to the ES so as to internalize these positive externalities. This concept operates according to the logic of the 'free market' (Engel et al. 2008, Wunder 2005) which says that if ecosystem services are given economic values and assigned property rights, the rational behaviour of buyers and sellers in the market environment will produce efficient environmental outcomes. Following this logic, Wunder (2005, 3) defined a PES mechanism as '(1) a voluntary transaction; (2) in which a well defined environmental service or land use likely to secure that service; (3) is bought by at least one buyer; (4) from at least one provider; (5) if and only if the service provider secures service provision (conditionality)'.

These five criteria constituting the definition have been used to qualify a program as a market-based mechanism often called 'true PES' to produce efficient environmental outcomes (Engel et al. 2008, Wunder 2005). Therefore, proponents praise the PES as an innovative policy instrument (Engel et al. 2008, Engel and Palmer 2008, Pagiola et al. 2005, Wunder and Albán 2008, Wunder et al. 2008) and do not want to compromise efficiency for social goals. However, there is ongoing debate regarding such pro-market arguments. The idealized notion of a 'pure' market-based approach has been contested by various scholars and development professionals arguing that too much focus on efficiency can compromise equity outcomes (Corbera et al. 2007, Corbera et al 2007).

On the other side, a few scholars have positioning themselves against the market-based approach, arguing that the 'commodification of nature' and marketing under neo-liberal logic does not necessarily benefit poor people (Proctor et al. 2008, McAfee and Shapiro 2010). This group of scholars argues that: '[…] equity outcomes

have rarely been considered in the implementation of [PES]. Neoliberal economic analysis does not explicitly take such equity considerations into account with efficiency concerns being the overriding goal' (Proctor et al. 2008, 1).

Amidst such debate and discrepancies, in recent years, there has been a growing tendency to use PES as a development tool to achieve both conservation and poverty reduction goals. It has been conceived as a tool for redistribution of resources to the local level, especially to rural areas in the form of financial transfers (Gutman 2007, Kumar and Managi 2009). The project at Kulekhani, one of the pilot sites of the Rewarding Upland Poor for Ecosystem services (RUPES) project of the World Agroforestry Centre, follows a similar concept. It has used the concept of rewarding contributions and compensating foregone benefits of upland poor for resource management. Therefore, the PES model adopted in Kulekhani departs conceptually from Wunder's definition in that it involves complex interactions among actors and institutions to balance conflicting interests over community development vis-à-vis environmental conservation. So, an institutional approach would be a useful tool for studying such dynamics.

Institutional Framework for Analysing PES

The PES is conceptualized here as a set of institutions designed to enhance environmental conservation and foster community development. The institutions here mean rules which determine dos and don'ts in a given situation. In other words, the institutions shape outcomes in terms of environmental change by affecting behaviour of actors (Dietz et al. 2003, Gibson et al. 2000). Following this concept, Young (2002b, 30) defined institutions as '… sets of rules, decision–making procedures, and programs that give rise to recognized practices, assign roles to participants in these practices, and govern interactions among occupants of specific roles'. Such rules might be both formal (rules in paper) and informal (customary rules or rules in practice) (Leach et al. 1999, Young 2002b).

Unlike the concept of PES which follows the logic of self self-regulated market mechanisms (Landell-Mills and Porras 2002, Pagiola et al. 2002), PES in practice consists of various form of interaction between actors and institutions exist which are beyond the remit of the market (Corbera and Brown 2008, de Groot and Hermans 2009, Kosoy et al. 2008). The payments for the services in the PES schemes consists of rules directing the behaviour of people—for example, agreement mechanisms between providers and beneficiaries of the ecosystem services, conditions to be followed by the resource managers, and decision making procedures. In this way the PES resembles to the concept of institutions understanding of which needs to go beyond the market remit to include institutional dynamics.

So, this paper uses the institutional analysis framework to analyse the PES institutions developed by Corbera et al. (2009) and Corbera and Brown (2008) who borrowed the basic conceptual elements from different institutional scholars. The framework consists of the concept of institutional design drawn from the Institutional Analysis and Development Framework of Ostrom (2005); the concept of institutional interplay of Young (2002b); and the concept of institutional performance of Mitchell (2008).

First, the concept of institutional design helps to explain why and how PES has been designed in a particular socio-economic context. It tries to define drivers of the institutional design (Ostrom 2005, Young 2002a) and understand the process and outcome of the design, which includes the actions and steps involved, interaction among actors and procedural rules (Corbera and Brown 2008). As explained by Dolsak and Ostrom (2003) the design consists of rules for resource use, monitoring and enforcement which guide the behaviour of actors. The rules as defined by Ostrom (2005, 18) are '... shared understanding by participants about *enforced* prescriptions concerning what actions (or outcomes) are *required, prohibited or permitted*' (emphasis in original text).

The design process involves negotiation among actors (Corbera and Brown 2008, Corbera et al. 2009, Lebel and Daniel 2009). Such negotiation takes place among actors having differential interests and power who tend to reflect their interests in the institutions. Therefore, it is likely that the interests of less powerful actors are marginalized. Very often there are roles of external actors to facilitate the negotiation process (Swallow et al. 2007, Tiwari and Amezaga 2009). The facilitators, who might be both governmental and non-governmental actors, can facilitate to voice the concern of less powerful actors in the negotiation table.

Second, the resource management institutions do not operate in a vacuum; rather they interact with other existing institutional arrangements (Young 2002a, Young 2002b) which impinge on the effectiveness of the institutions in question. These interactions have been conceptualized as 'institutional interplay' (Young 2002b). The assumption behind the idea of interplay is that '... the interaction between two or more institutions can influence their respective outcomes' (Corbera et al. 2009, 746). The outcomes might be positive or negative depending on the nature of the interplay: coordination or conflict. The coordination of PES with existing institutions may enhance the outcomes whereas conflicting relations may inhibit them. According to Young (2002a, 2002b) there are two different categories of institutional interplay: symmetrical versus unidirectional, and vertical versus horizontal. In symmetrical interactions, both institutions affect each other in a similar manner, whereas in unidirectional interactions one institution affects the other more. Similarly, in vertical interplay, institutions at different scales interact with each other, for example, an international regime like the Kyoto Protocol may affect national or local carbon-related programs. However, such cross-scale interplay is not the focus of this study.

Considering the case of Kulekhani watershed, community forest management and watershed management program have been practiced for a long time which are reported to have been successful for ensuring both effective forest management and erosion control. Similarly, there are DDC and Village Development Committees (VDCs) [2] which are responsible for development activities at local level. In this case the newly introduced PES is thus likely to interact with these existing institutional arrangements. So, the concept of interplay is used in this study to understand interactions of PES institutions with those existing institutions. Such analysis helps to examine to what extent PES institutions cooperate with other institutions as claimed in the literature (Adhikari 2009, Matta and Kerr 2006, Smith and Scherr 2002) to foster conservation as well as development.

[2] VDCs are the lowest administrative bodies in Nepal. Makawanpur DDC has 43 VDCs and one municipality.

Third, the concept of institutional performance (Mitchell 2008) analyzes whether institutional mechanisms meet the stated goals. In other words, it is an assessment of the extent to which PES institutions are effective in meeting both environmental and social goals. Therefore, this is a tool to evaluate the collective benefits and negative outcomes of the mechanisms (Corbera et al. 2009). Such evaluation needs comparison between the states of the world due to PES institutions against what would happen if there were no such mechanisms in place (Mitchell 2008).

The overall performance of the institutional mechanisms is determined by a number of factors like the strength of the institutional design, and the effect of interplay and compliance of rules in practice. Therefore, in this study, these three factors are considered to examine the performance of the institutional design. Since, PES mechanisms in Kulekhani do not have a very long history, and there is no base line data available to examine the outcomes, only compliance with the rules and behavioural change is considered for assessing the institutional performance.

METHODOLOGICAL APPROACH

This paper is based on a qualitative research constituting both primary and secondary data. It has adopted a case study approach where case of Kulekhani was used to analyse the institutional dynamics of PES in Nepal. The Kulekhani watershed was purposively basically due to: Firstly, the Kulekhani is the pioneer site for PES piloting in Nepal and it is one of seven sites globally for the pilot program of RUPES, which aims to introduce payment mechanisms for watershed services with the objective of conserving the environment and supporting poverty reduction. Secondly, though there are a number of other initiatives in Nepal that have been recently implemented, the Kulekhani has been practicing the payments over three years.

The primary data was collected between mid-July and early August 2009 using different data collection methods. First, key informants were consulted get an overview of the study area, to identify major actors involved in the PES process and to identify the respondents to be interviewed during the second phase. Second, in-depth interviews were conducted with different actors including representatives of community forest user groups, local leaders, district level actors and experts involved while implementing the PES project. A total of 11 interviews were carried out so far. Third, focused group discussions were conducted with community forest user groups and a national secretariat Federation of Community Forest Users, Nepal.

Similarly, secondary information was collected from various sources. One of the main sources was documents prepared by the RUPES-Kulekhani program, including the project profile, newsletters, workshop proceedings, and field notes. Another source was the Makawanpur DDC, which provided records of the expenditure under PES scheme, procedural rules and meeting minutes. Previous studies on Kulekhani and existing literature on PES were also consulted.

As this research is qualitative in nature, qualitative data analysis techniques were used. The field notes, including transcriptions of the focus group discussions and interviews and essences of the documents were coded and analyzed using ATLAS-Ti, software for qualitative data analysis. The final output has been presented in this

paper primarily in the form of rich and thick texts including direct quotes from the respondents. The texts and descriptions are supplemented with relevant figures, maps and pictures.

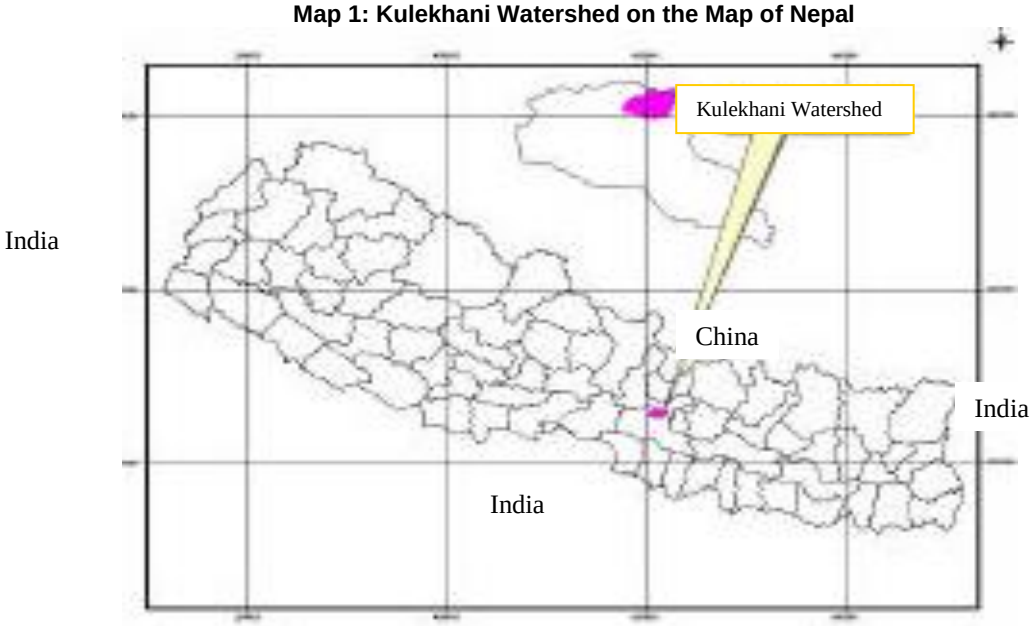
However, since the findings of this research are drawn based on a one particular case dealing only with watershed services, it has limitations for wider scale generalizations. Nevertheless, the research findings could have wider policy and conceptual implications for other ecosystem services like carbon sequestration and biodiversity conservation, provided the context of the research is taken into consideration. Furthermore, since PES has been looked at from an institutional perspective, this study has an analytical bias towards an institutional approach.

HISTORICAL AND CONTEXTUAL BACKGROUND OF PES IN KULEKHANI

Overview of Kulekhani Watershed

The Kulekhani watershed, a catchment area of the Indrasarobar was constructed in the early 1980s (Sim, Pakhel and Chitlang) (See Map 2 and picture next to it) (Sthapit 1996). The 2.2 square kilometre reservoir provides water to the Kulekhani hydropower project of 92 Megawatt (MW) capacities (Schreier and Shah 1996). The Kulekhani is about 30 Kilometres south-west of Kathmandu, the capital city of Nepal (see map 1). It is distributed over 12,492 hectares and encompasses a portion of 8 VDCs of Makawanpur district, namely Dama, Palung, Tistung, Deurali, Bajrabarahi, Markhu, Kulekhani and Fakhel. The total watershed area is comprised of about 53 percent forests and shrub-land, 42 percent agricultural land, 2 percent grazing land and 3 percent wasteland (Sthapit 1996).

Map 1: Kulekhani Watershed on the Map of Nepal

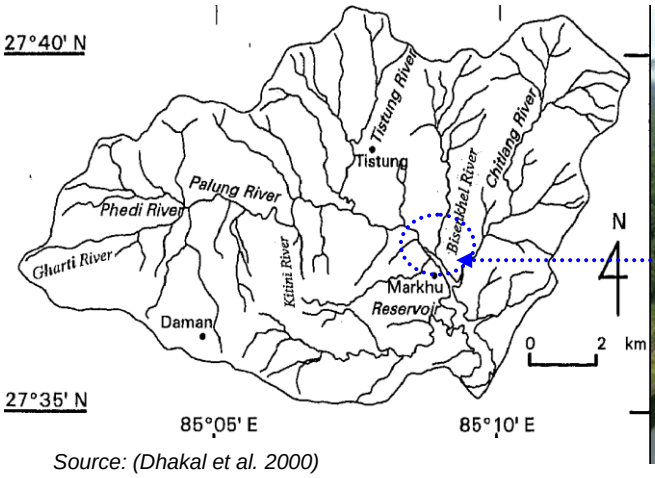


Source: Upadhyaya 2005

This watershed is home to about 46,000 people, including 8,600 households of diverse ethnic groups (Upadhyaya 2007). The majority of the population consists of small farmers with subsistence farming as their main source of livelihoods, of which forests form an integral part. In recent years, the subsistence farming is being

gradually switched to commercial vegetable cultivation. Nevertheless, the forest is still a major source of livelihoods.

Map 2: Kulekhani Watershed and Indrasarobar (Reservoir)



Source: (Dhakal et al. 2000)

Picture: Kulekhani Reservoir (Source: Author)

Forest and Watershed Management and introduction of PES

The Watershed is not only a source of water but also a source of sedimentation affecting the reservoir's operation and longevity. Though the designed life span of the reservoir was 50 years, it was expected to function for 100 years with the anticipated annual sedimentation rate of 7 m^3 per hectare (Sthapit 1996). However, the observed annual sedimentation rate to the reservoir was much higher than anticipated (*ibid*). This was due to an alarming rate of sedimentation right after the construction of reservoir as a consequence of heavy deforestation and degradation of the watershed area in the 1970s and early 1980s (Schreier and Shah 1996, Sthapit 1996).

To tackle such devastating effects, the government selected the Kulekhani as a watershed of strategic importance and initiated integrated watershed management program with the help from different donor agencies in the early 1980s which went till 2003. Among the different programs under the integrated watershed management initiative, the community forestry program was the most important one. As a result, more than 95% of the forests have been handed over to about 75 CFUGs. These efforts were said to be beneficial for improving the conditions of the forests and reducing sedimentation in the reservoir. A study of the land use status of the Kulekhani watershed shows that the forest area has increased from 5210.67 hectare to 6370 hectare from 1992 to 2001, which was 5884.30 hectare in 1978 (Upadhyaya 20050. Though, there is no well-documented information to prove improved forest condition, Upadhyaya (*ibid*), comparing conditions in photographs over different time intervals, suggests that the condition of the forests have improved significantly (see picture below).

Biruwa Ban of Chitlang in 1985

Biruwa Ban Community Forest in 2004

The improvement in forest conditions combined with other conservation efforts are argued to have positive consequences on reducing sedimentation in the reservoir. A sedimentation survey conducted in Kulekhani watershed by the Department of Soil Conservation and Watershed Management and the Nepal Electricity Authority (NEA) at different points in time shows that the sedimentation rate has declined significantly since 1996 (Sthapit 1996, Upadhyaya 2005). Similarly, evidence also shows that dry season water flow has also increased over the years. 'Between 1991 to 1995 and 1999 to 2003, the average annual water inflow to the reservoir increased by 31 percent and the dry season water inflow increased by 55 percent (Upadhyaya 2005, 16).'

These two positive impacts of forest conservation and watershed management—decreases in the sedimentation rate and an improvement in dry season water flow—are considered to be valuable ecosystem services. Decreased sedimentation has twofold benefits: first, it increases the life of the reservoir and second, it reduces the cost of powerhouse maintenance. Similarly, the increased water flow directly contributes to increased hydroelectricity production. Therefore, these two ecosystem services provide direct economic benefits to the NEA, the owner of the Kulekhani hydropower projects.

On the other hand, the Nepal Electricity Authority has been paying a certain portion of revenue generated from hydroelectricity to the central government since 1992 as required by Nepal Hydroelectricity Act (1992). The central government has also been allocating 12% of the revenue to the local government, Makawanpur DDC[3], according to the provisions of the Local Self Governance Act (1999). However, the DDC was using this money on its own without any consideration for the watershed area (Upadhyaya 2005).

Winrock-Nepal has facilitated the PES initiatives under the RUPES Program to actualize the potential that the electricity revenue being received by DDC can be provided to the Kulekhani watershed for enhancing forest and watershed management in the context that donor funded interrogated watershed management programs was terminated in 2003. The initiative facilitated a mechanism to transfer a portion of the hydroelectricity revenue being received by Makawanpur DDC to the upstream communities as a compensation and reward scheme. It was

[3] For administrative purposes, Nepal is divided into 75 districts. DDCs are the district level local governance body; responsible for the overall development of the district.

conceptualized to provide economic incentives to the upstream communities to foster the conservation for sustainable generation of ES following the concept of PES (Upadhyaya 2005).

The PES mechanism in Kulekhani has been set up under the policy provision of Local Self Governance Act and Local Self Governance Regulations in 1999. The Local Self Governance Act requires that the central government provide 12 percent of its total electricity royalty to the DDC housing hydroelectricity project and 38 percent to all districts of the respective development region (Adhikari 2009, Upadhyaya 2005). However there is no specific policy dealing with PES in Nepal. This gap has direct implication to the PES scheme in Kukekhani in terms of definition of buyers and providers of the services, payment mechanisms and monitoring system.

FINDINGS AND DISCUSSION

Institutional Design: Actions, Actors and Procedural Rules

As discussed in section two, the introduction of PES in Kulekhani was basically driven by the intention of reducing possible threats to reservoir and increasing revenue from Kulekhani hydroelectricity project. However, initiations were not taken by the Nepal Electricity Authority, the principal beneficiary of ecosystem services realizing immediate 'credible threats' to the reservoir as discussed in the PES literatures (Engel et al. 2008, Wunder 2007). Rather, the PES mechanism resulted after lobbying of local communities to receive a stake of the hydroelectricity revenue provided by the central government to Makawanpur DDC. Negotiations took place among different actors, including local communities and DDC Makawanpur, with the support from intermediary organization, the RUPES-Kulekhani program.

The Process of designing the PES mechanism involved different activities conducted by RUPES-Kulekhani project. The process started with identifying and defining watershed services, providers of those services and the ultimate beneficiaries. The quick assessment of the economic value of the sedimentation reduction was determined using a 'production function approach' (Upadhyaya 2005, 18) which shows increases in revenue of hydroelectricity by $39,933 annually. The two ES determined based on such tentative valuation became the basis for negotiation (Resp. 2)[4]. Similarly, RUPES Kulekhani also conducted a socio-economic study of the catchment area to understand the characteristics of the providers of ES. Realizing gaps in knowledge and the capacity of the local communities, the RUPES Kulekhani program adopted the strategy of 'mobilizing upland communities to see themselves as seller of ecosystem services and enhancing their capacity to negotiate with buyers' (ICRAF 2009, 3). For this the project used the approaches of raising awareness, providing training and exposure visit to local leaders and DDC representatives. Having developed the capacity of local actors, the RUPES Program facilitated a process of negotiation among actors to craft procedural rules.

[4] Respondent 2 was the team leader of the RUPES-Kulekhani program who had involved throughout the PES design process.

Negotiation of the PES mechanisms

The PES institutions in Kulekhani are merely the outcomes of the interaction and negotiation among the broader set of actors directly associated with it. The major actors involved in the process were: local communities represented by Kulekhani Watershed Conservation and Development Forum and local leaders, local government representatives, including DDC and VDCs, political parties, Kulekhani hydropower project management and other district-level line agencies. Despite involvement by this range of actors, the principal actors of the negotiation were DDC Makawanpur and the local communities.

The DDC, which also includes 8 VDCs of the watershed area, was the most important and powerful actor in the negotiation process. Firstly, the Local Self Governance Act provided authority to the DDC for collecting taxes and revenues of natural resources. According to such provisions, the DDC receives revenue from the electricity generated from the Kulekhani projects. Moreover, the act also authorizes the DDC to coordinate all development activities in the district. Secondly, since there are no separate policies to deal with the PES process, the Local Self Governance Act and its subsidiary regulations provided the policy framework for the development of the PES mechanism. On the other hand, the local communities were represented by two principal actors: the Kulekhani Watershed Conservation and Development Forum (KWCDF) and local leaders, including political leaders.

Hence the negotiation basically took place between the local communities and the Makawanpur DDC. In this process, political parties represented both the DDC and local communities. The roles of other actors—including managers of Kulekhani hydroelectricity projects, district level government organizations like District Forest Office and District Soil Conservation Office, representatives of the private sector and few others—were very negligible. More importantly, contrary to the PES principles, the Nepal Electricity Authority has no direct involvement in the mechanism.

In the negotiation process, the actors easily decided on the amount and form of payments. The tentative valuation of two major ES by RUPES-Kulekhani program and socio-economic information of the watershed area helped the actors to come to this conclusion. However, an agreement about the mechanisms of implementing such projects was not easily reached. The KWCDF, representing local communities and backed by RUPES-Kulekhani program, presented itself as a provider of the ES. The idea was to provide compensation to the forum which was then expected to coordinate all other community-based organizations including CFUGs for executing the projects. The negotiation process, dominated by government officials especially from the DDC, rejected the proposal. One of the respondents described the negotiation process as follows:

> Though various stakeholders participated in the negotiation meetings and workshops organized at the district level, the compensation mechanisms have been finalized according to the interests of the DDC. Referring to the Local Self Governance Act, the proposal to provide funds to local community-based organizations was denied and DDC and VDCs were given a central role in

implementation. The government officials wanted to keep exercising their authority for executing the projects (Resp.1)[5].

Eventually, the negotiation ended up with the establishment of a separate fund to manage PES called the Environmental Management Special Fund. The provision was made to follow the Local Self Governance Act and its subsidiary regulations to implement the fund. These policies require following specific planning and implementation procedures practiced by the DDC to conduct other local development projects.

These politics of negotiation have determined the procedural rules of the PES scheme which were formally passed by the DDC council[6] in 2006 (annex 1). The two document containing the rules (see annex 1) provide formal rules to guide behaviour of the actors to implement the PES mechanism. All residents of the watershed area were recognized as the providers of the ES. However, there is confusion regarding the beneficiaries of the ES. The DDC Makawanpur is understood as the main beneficiary in the current mechanism. However, as discussed already, it is the Nepal Electricity Authority that receives direct benefits from the ES. This confusion has created complexities in the mechanism which have also affected the monitoring and compliance of the rules.

Payment mechanism

The PES policy documents made provision to provide 20% of the total revenue being received by Makawanpur DDC to Kulekhani watershed area for conservation and development programs. As shown in figure 1, such money is managed under a separate fund Environmental Management Special Fund created especially for this purpose. The fund is governed by a subcommittee comprising representatives from all actors involved in the negotiation process and led by the DDC. This sub-committee, which has very little representation from the local communities, is responsible for making all decisions of executing the projects and monitoring and evaluation.

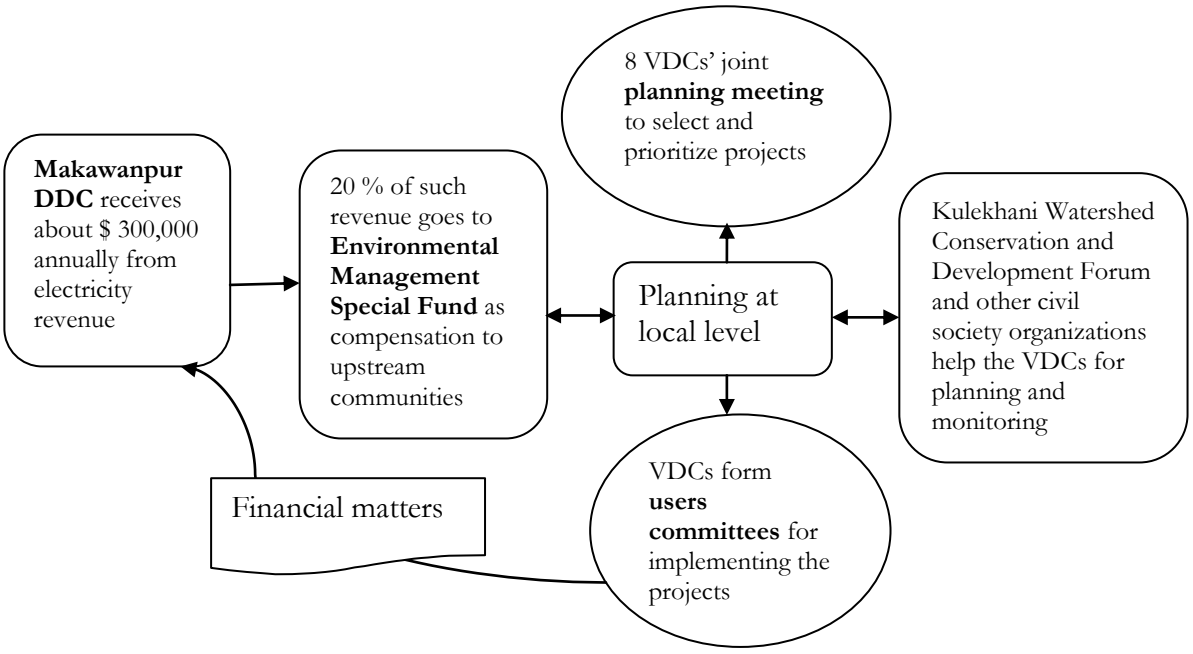
As shown in figure 1, the 8 VDCs of Kulekhani watershed hold an annual meeting of VDC secretaries[7] and representatives of local political parties to select and prioritize projects. Local level civil society organizations like the KWCDF are also invited in such meetings as facilitators. The projects selected and prioritized by such meeting are submitted to steering committee of the Environmental Management Special Fund for final approval. Once the programs are agreed upon, the VDCs formulate users' committees for the implementation of the plans. The financial administration of these projects is done through the DDC administration as in the case of other development projects.

[5] The respondent 1 is secretary of the KWCDF and was also local facilitator for RUPES-Kulekhani program.

[6] DDC council is an apex body of DDC.

[7] VDC secretaries are government staff responsible for VDC administration.

Figure 1: Mechanisms for planning and implementation of projects under PES



Source: Developed by author for this report based on field information

This suggests that the procedure for planning and implementation of such projects are heavily drawn from the Local Self Governance Act and regulations. Though it has made a provision to involve other actors including local communities, the central role lies with the DDC and its subsidiary bodies.

Conditionality and monitoring mechanism

Seemingly, the mechanism has two major conditions to ensure generation of the ES. First, it is expected to support the livelihoods of the local communities aimed at reducing the dependency on forests. Second, local communities are expected to improve, or at least maintain, the current level of forest conditions and soil erosion which are directly liked to the ES. However, these conditions are not clearly defined as conceptualized in the PES literature (Huang et al. 2009, Wunder 2005).

Responsibilities of developing monitoring mechanisms and execute the periodic monitoring and evaluation of PES projects has been assigned to 'the sub-committee responsible for steering the Environmental Management Special Fund (DDC 2006b). However, the detail monitoring mechanisms is yet to be developed. In principle, the Nepal Electricity Authority should be concerned with the monitoring to ensure whether the ES are being generated. However, since the Nepal Electricity Authority has no direct connection to PES mechanism and simply pays a fixed royalty to the government, it has no incentive for this.

To sum up, PES institutions in Kulekhani are the outcomes of both interaction among actors and the politics behind it, and the influence of existing policies and institutional mechanisms. While this section has focused on the process and politics of institutional formation, the following section analyses how current policies and institutional mechanisms have shaped the PES institutions.

Institutional Interplay

Referring back to section two, the environmental institutions are not implemented in a vacuum; rather they interact with existing resource management and other related institutions (Arifin 2005, Corbera et al. 2007, Corbera et al. 2009). Such interactions create synergetic outcomes if complimented with local institutions, whereas the conflicting relations deteriorate the overall performance of PES. As discussed in section three, there are three important existing institutional arrangements that have direct interactions with the PES mechanism.

First, since the Local Self Governance Act and its subsidiary regulations are the main policy framework under which the PES program was instituted, the Local Governance Program of DDC has a huge influence on PES institutions. The procedural rules of PES institutions are heavily drawn from these policies. According to Young's concept of institutional interplay (Corbera et al. 2009, Young 2002b), this can be characterized as unilateral asymmetric interplay. It means that the PES institutions are affected by the Local Governance Program of DDC.

Second, conceptually the PES is supposed to provide economic incentives to the resource managers to adopt conservation friendly behaviours to ensure the generation of the ES (Engel et al. 2008). However, these conceptual underpinnings have not yet been realized in Kulekhani because of poor coordination with community forest management institutions while crafting the PES institutions. Despite the fact that more than 95% of the forests of Kulekhani watershed have been handed over to over 75 CFUGs and they have made a huge contribution in generating the ES (Adhikari 2009, Upadhyaya 2005), the entire CFUGs have been excluded from the mechanism. The chairperson of one of the CFUGs during focus group discussion reported that:

> We have been making an painstaking efforts to improve the conditions of the forest. We have also sacrificed a lot by giving up grazing and reducing our number of cattle. We work hard to protect the forest by regular patrolling and fighting against illicit use of forest products. If it was not the case, the condition of the forest would be much worse and there would be severe problems for the reservoir too.

Such exclusion has not only raised the question of motivation of CFUGs for forest management but also limited the effectiveness of community development activities carried out under the PES. The CFUG leaders claim that they could implement the conservation and development program better than what has been done to date. One of the CFUG leaders argues: 'the plantation program carried out last year under PES scheme failed because the user committee formed for that purpose was temporary and thus was not responsible for taking care of it. It would have been far better if that money had been provided to the CFUGs' (Resp. 3).

Third, like community forestry, PES has also poor coordination with integrated watershed management programs. The integrated watershed management activities have made a significant contribution to the reduction of sedimentation in the reservoir. However, the PES scheme has not involved local organizations carrying out such activities. The procedural rules have a provision to spend part of their PES funds for environmental activities, including watershed management. However, evidence shows that only 7% of the PES money has gone for watershed management activities so far.

The District Soil Conservation Office also made a significant contribution for watershed management in the Kulekhani watershed in the past. It even had a district-level office in the watershed area until 2003. However, its roles have been squeezed these days due to lack of sufficient financial and human resources. As argued by one representative of this office, they could provide technical support to implement the watershed management activities being funded under the PES schemes. It could also help to minimize the negative consequences of construction projects under the PES schemes. Nevertheless, very little attention has been paid to such coordination. This suggests that the current PES schemes ignored the potential for synergetic outcomes in watershed management.

This analysis reveals that the influence of the Local Governance Program of the DDC and exclusion of the local institutions responsible for community forest and watershed management is not only because the DDC had a stronger position during the PES design, but is also due to the lack of a separate policy for PES. The deficiencies in PES institutions due to interplay among actors and institutions, which gave the DDC the central role in PES implementation, have affected the overall performance of PES.

Institutional Performance

Effectiveness of PES institutions is examined against two major gaols: supporting community development and generating ES. The analysis in the preceding chapters has shown that PES institutions in Kulekhani have fundamental deficiencies in terms of providing incentives to the resource managers and direct involvement of the main beneficiary of the ES. Taking these findings as a point of departure, this section analyses how PES institutions have been put into practice and how effective they are in terms of meeting the stated goals.

PES in Practice

Though the process of setting up PES mechanisms in Kulekhani began in 2003 with the initiation of the RUPES Kulekhani project, it took almost three years to come into practice. Upstream communities received $ 2,712.00[8] for the first time in 2006. The amount was provided to the KWCDF to carryout out income-generation and conservation awareness programs. The negotiation of the PES institutions in the same year finalized the mechanisms as discussed in the preceding chapter. From the following year (fiscal year 2006/07), the DDC began providing money to the Environmental Management Special Fund to implement conservation and development projects.

Under the Special Fund, the local communities received $ 52,130 and $63,963 in fiscal year 2007/08 and 2008/09 respectively. In total, $ 118, 802 (including initial budget provided to the KWCDF) has been provided to the local communities under the PES scheme. The breakdown of expenditures (see figure 2) suggests that they have gone to rural infrastructure projects like electrification, construction and maintenance of roads and structures to protect the settlements and very little money has been spent on environmental activities.

[8] Here 1 $ is equivalent to 78.15 Nepalese Rupees.

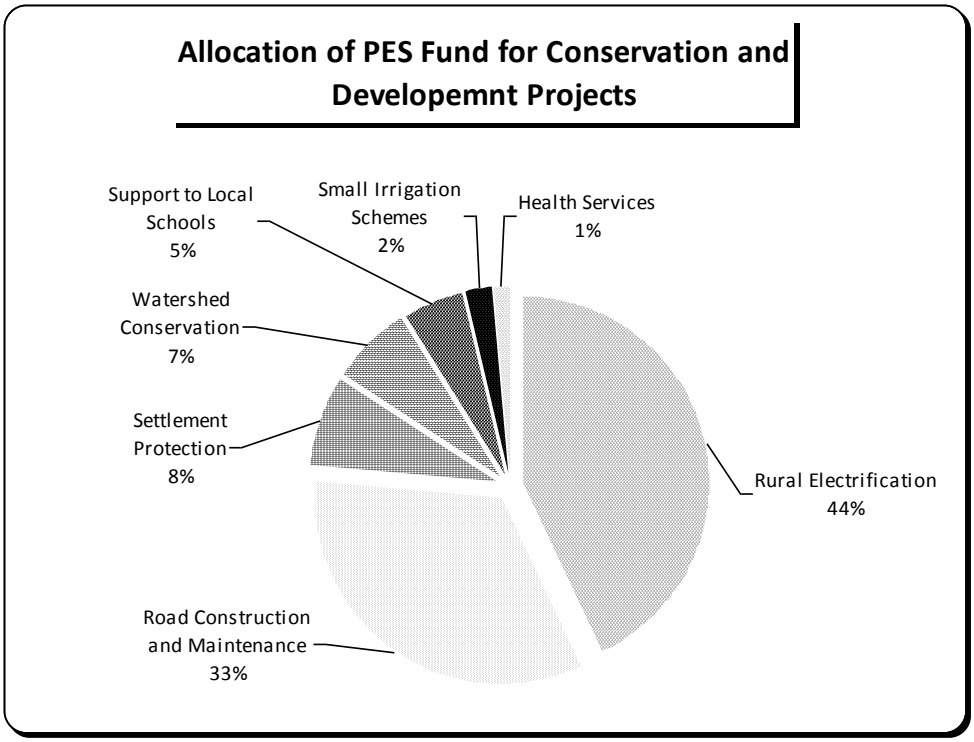
Preliminary Outcomes

As implementation of the PES is still in its initial stages, it is too early to assess outcomes in terms of maintaining environmental conditions and improving the livelihoods of the people. Therefore, this study is not intended to draw outcomes in depth. However, a general assessment has been made to understand to what extent the institutions are heading towards meeting these outcomes. The local communities are receiving about $63,963.00 annually, which is an additional budget for community development. As shown in Figure 2, this money has been used for different community development activities. Local communities are quite happy with this initiative. One of the local leaders reported that:

> We are receiving additional money for our development through this compensation scheme. Though we had a hard time before, now we are more privileged than other VDCs of the district. We have electricity facilities and road access to almost all villages which would have been impossible without the PES. We are grateful to the RUPES-Kulekhani and our local leaders who have contributed for this (Resp.4).

Most of the respondents from the watershed area share this opinion. Nevertheless, they are still not satisfied with the way the PES mechanism has been developed. They are looking forward to improving the current mechanisms to ensure a better role for local communities.

Figure 2: Use of PES funds for conservation and development projects



Source: Records from DDC Makawanpur

However, the analysis reveals that the current mechanism is not sufficient to ensure the generation of the ES—reduction of sedimentation and increase dry season water flow to the Indrasarobar. The expenditure pattern as shown in figure 2 shows that the investments in infrastructure projects, particularly rural road construction, often have negative environmental consequences. As shown in figure 2, about 33 percent of

total money received under PES mechanisms has been invested in the construction and maintenance of the road. Moreover, there is a general trend in recent years to put a huge portion of the local development budget (budget of VDCs and DDCs) into this sector. One of the respondents reported that:

> Regardless of the sources of the local development budget, priority goes for road construction. For cost effectiveness and time reasons, using a bulldozer has been the preferred method of construction. They could use other environmentally friendly technologies or do soil stabilization works after construction, but, proper attention is lacking. It is obvious that such activities accelerate soil erosion and increase sedimentation to the reservoir…(Resp.11).

Therefore, the current PES mechanisms do not provide any incentives to existing local resource management organizations including CFUGs and other groups. This has affected the motivation of these institutions towards better resource management.

This evidence reveals that the current institutional mechanism in Kulekhani falls short of meeting environmental outcomes despite some positive outcomes for rural development. The analysis reveals three striking results: a) negative consequences of development projects particularly road construction using bulldozer; b) exclusion of the main resource management institutions from the PES mechanism and C) undermining of the role of the principal beneficiary of the ES. The following section substantiates such results shaped by the institutional factors.

Institutional Performance in Question

As discussed in section two, the performance of institutions are determined by design process, interplay of institutions and compliance and monitoring of rules. The analysis in this section substantiates how politics of negotiation of institutions, institutional interplay and poor compliance of the rules have shaped the poor performance of PES institutions in Kulekhani.

Design deficiencies and the effect of interplay

The politics surrounding the design of the PES mechanism and its interplay with other existing institutions have huge implications for three striking but rather disappointing outcomes. First and foremost the negative consequences of road construction using bulldozers are alarming. Due to cost and time considerations, the bulldozer is the preferred means of road construction in recent years. This is not only contradictory to the PES principle but also against the objective of PES mechanisms in Kulekhani. The basic objectives of the PES in Kulekhani are to improve livelihoods of local communities as well as to conserve the watershed. However, this study found quite the opposite results; use of PES money for road construction has negative consequences in terms of soil erosion.

Analysis shows that such negative consequences are outcomes of different institutional factors including design and interplay. Going back to the institutional design, the negotiation among the actors opted for using PES money for conservation and development programs. For this, they have agreed on five broader themes as discussed in section four (see annex 1). Rural infrastructure development is one of them. However, the mechanism lacks clear guidelines and comprehensive

long-term planning which would guide the implementation of projects by maintaining a balance among those themes. Such weaknesses in the institutional design have allowed the local leaders to manipulate the rules and allocate more funds for community development activities, including road construction, as shown in figure 2. Similarly, mechanisms have not been developed to safeguard against such negative consequences.

Second, PES in Kulekhani has fundamental flaws in terms of involving principal actors. The CFUGs and other local community based organizations were excluded from the design process. One of the respondents pointed out that:

> The current PES has sidelined the local organizations from decision making as well as from benefit sharing. Now, these organizations, especially the CFUGs, which have made a huge contribution in forest management, are running short of financial resources. More than 50% of CFUGs in the watershed are not able to renew their plans. The District Forest Office cannot provide support because they lack their own financial resources. Therefore, users are not motivated; they are not interested in leading groups and conducting forest management activities. Therefore, I am afraid that the condition of the forest will deteriorate (Resp. 3).

Such exclusion has to do with both the politics of negotiation of PES institutions and the interplay of PES with existing local institutions. The Makawanpur DDC represented by government officials has resisted the devolution of authority below their own subsidiary body. Therefore, they denied the proposal of providing PES money to local organizations like CFUGs. Instead, they made a weak provision that these organizations can be involved in planning and implementation of the projects. However, this provision has never been complied with. Such power asymmetry in the negotiation process was reinforced by the lack of separate policy for PES mechanisms. Such exclusion has serious implications in terms of providing incentives to the resource managers, which is the most important aspect of PES mechanisms. Thus the current PES mechanism is not likely to motivate the resource managers to change their behaviour which has serious implications for the performance of the PES institution.

Finally, the current mechanism has undermined the role of the Nepal Electricity Authority, the direct beneficiary of the ES. One respondent reported:

> I think it should be the Nepal Electricity Authority's interest and responsibility to do monitoring so as to ensure that the PES activities are contributing at least to maintain the current level of ecosystem services. But, I doubt the role of the authority because being a government body, it is not proactive and the officials do not have willingness to do so. (Resp.2)

As a consequence, the monitoring mechanisms and level of compliances have been seriously affected.

Weak compliance and monitoring mechanisms

Besides design deficiencies and institutional interplay, the PES mechanism in Kulekhani has also fallen short in terms of putting its rules into practice. First, one of the main reasons behind negative environmental consequences of road construction in the watershed area is poor compliance with the rules. Local communities see road construction as the core of rural development and want cost-effective way carrying it

out. Though the use of bulldozers for road construction is not allowed, there is no compliance mechanism to stop such destructive works.

Second, the current PES rules have mentioned that local-level, community-based organizations can be involved in planning and implementation of projects. However, this has not been considered at all. One of the respondents pointed out that:

> Though there are provisions of involving local organizations including CFUGs in the planning and implementation of the projects under PES, it has not been followed in practice. The political parties and local leaders have a tendency to distribute the money based on political negotiation (Resp. 8).

This suggests that the power asymmetry has also played a role in implementation of the projects.

These weaknesses in compliance of the rules are also due to weak monitoring mechanisms. The role of the monitoring has been given to the sub-committee of the DDC which looks after the Environmental Management Special Fund (DDC, 2006b). However, it has not put enough efforts in this respect. There is no single evidence of monitoring of the PES projects conducted during the past three years. Such poor monitoring and compliance with the rules have further impacted the overall performance of the PES mechanism in Kulekhani.

The above analysis has revealed that the PES mechanism in Kulekhani has raised the hopes of upstream communities by offering additional budget for community development, which is expected to contribute to the livelihoods of the people. However, effectiveness of the mechanisms for meeting environmental outcomes has been seriously questioned. An analysis of institutional dimensions has shown three striking results: negative consequences of road construction in the watershed area; exclusion of resource managers from PES mechanism and the undermining of the role of direct beneficiary of the ES. Such disappointing outcomes are due to the combined effect of institutional factors: the politics behind negotiation of the institutions; and the institutional interplay and poor compliance with the rules. First, the PES design falls short of providing enforceable and pragmatic rules. Weak definition of the project themes under PES and lack of a comprehensive plan for execution has allowed actors to manipulate the rules and hence allocate exceptionally big portions of the fund to rural infrastructure, thereby undermining the environmental aspects. Second, the PES has failed to include the resource managers as key institutional partners, including the CFUGs and other local organizations. This exclusion has affected their motivation for resource management. This has happened not only because of the influence of the DDC in PES rule-making, but also because of the use of the Local Self Governance Act as a guiding policy. Finally, the role of the Nepal Electricity Authority, the direct beneficiary of the ES, has not been properly recognized. This has affected the compliance with the rules and the monitoring of PES projects. Such findings not only raised questions about the effectiveness of the PES mechanisms to ensure sustainable generation of the ES in Kulekhani, but have also challenged the argument of some scholars and development professionals that PES can cooperate with local institutions and contribute to both environmental conservation and poverty reduction.

CONCLUSION

My argument in this paper was that, although the PES in Kulekhani has provided a mechanism for transferring hydroelectricity revenue to the local communities to support rural development, it has not transformed existing resource management structures and institutions to demonstrate the effectiveness of enhancing environmental outcomes. The work of Corbera et al. (2009) and Corbera and Brown (2008) provided a framework for analyzing institutional dynamics of PES, which allowed me to understand how PES institutions are: (a) shaped by interaction and interplay among actors through the process of negotiation; (b) interacting with other related institutions; and (c) performing in practice. The empirical findings of this analysis are combined with wider debates surrounding PES to substantiate my argument.

The empirical findings suggest that the PES mechanisms designed and implemented in Kulekhani, although given the typology of 'PES', cannot be compared against five criteria of a 'true PES' mechanism given by Wunder (2005, 3). Since the ecosystem management was not a primary goal, it has not followed the basic premises of the PES as advocated by its proponents (Engel et al. 2008, Pagiola et al. 2002, Wunder 2007). The mechanism has tried to define the ES, but faced limitations in terms of clearly identifying buyers and sellers. Similarly, since the mechanism has been devised through negotiation of multiple actors, the criterion of voluntary participation is also not applicable. This supports the prevailing argument of many scholars that there are diversified schemes of PES and it is very hard to find ones that fulfil all of these five institutional requirements (Shallow et al. 2007, Wunder 2008). However, since this paper took the institutional approach of analysis, it is worth examining the PES from an institutional standpoint. This analysis has revealed that the PES mechanism in Kulekhani is plagued by design deficiencies and the effects of interplay. As a result, it could not provide an incentive to the resource managers; and thus was not likely to change their behaviour toward the environment (Dolsak and Ostrom 2003, Ostrom 1990, Mitchell 2008, Young 2008). Similarly, instead of bringing new policies to support the PES, it relied on an existing policy and bureaucracy which has hampered the performance of the mechanism itself.

Based on such arguments, one lesson for policy makers is that improvement in institutional dimensions can enhance the overall effectiveness of a PES regime. The institutional design can be reviewed considering institutional requirements for PES as discussed by Wunder (2005) and design principles as discussed in Dolsak et al. (2003). For this, attention needs to be paid to include the most important actors in the design process and institutional arrangements, crafting pragmatic rules and developing systems for effective enforcement and monitoring. For this, as found in this study, a separate policy for PES might overcome the influence of the Local Self Governance Act and the dominance of the DDC and its officials. As argued by institutional scholars, careful design and minimization of influence of institutional interplay can enhance the effectiveness of the institutional mechanisms to meet the stated goals. If so, the PES would be an alternative source of financing the community based forest management as argued by some of scholars (Matta and Kerr 2006) and expected by many development professionals (Pokharel et al. 2009).

The community based approaches are based on the logic that social fabric and collective action motivate community for conservation (Kosoy et al 2008). Whereas

the market based approaches use the direct economic incentives to pursue the resource manager to adopt conservation friendly behaviour. Therefore it would be worth understanding whether such different incentive systems can cooperate to enhance both conservation and livelihood improvement outcomes.

Finally, it is hoped that this paper will help policy makers and development professionals to reflect and ultimately make more informed decisions when formulating policies and programs for PES. The institutional analysis framework used in this study proved useful for understanding the effectiveness of PES institutions which will not only help the policy-makers and development professionals but also researchers in the field. Moreover, this study has opened up new debates in the PES discourse. It has provoked the need for understanding incentive systems of different policy instruments and assessing their interaction for synergetic outcomes.

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Annex-1

Guidelines and procedural rules for distribution and use of hydroelectricity revenue

Guidelines for Distribution and Use of Hydroelectricity Revenue

The guidelines prepared through the negotiation among actors and endorsed in DDC council aiming at distribution and use of the hydroelectricity royalty being received by DDC include the following guidelines.

- *Local Self Governance Act will be the principal guiding policy. The planning and implementation of the activities will be according to the provisions made in these policies. The financial matters will be handled according to the Local Government Fiscal Administration Regulations (2001).*
- *50% of the electricity revenue will be allocated to the hydropower affected communities. Out of this, 20% will go to upstream communities, 15% to downstream and 15% to VDCs hosting hydropower infrastructures including powerhouse and reservoir.*
- *Such revenue will be used for environmental and development activities under five major headings: social mobilization and poverty reduction; environment conservation; rural electrification; local infrastructure development and human resources and institutional development.*
- *The money will not be used for DDC's administrative purpose.*
- *The revenue allocated for the upstream communities will be managed under the Environmental Management Special Fund created for this purpose which will be coordinated by a sub-committee under the DDC comprising major actors.*
- *Local level organizations like CFUGs, village level units of other line agencies, and other community based organizations can be involved in planning and monitoring of the projects.*

Source: Extract from DDC 2006a

Operational Procedure for Mobilizing Environment Management Special Fund

The operational procedure to use the Environment Management Special Fund agreed among the actors and endorsed by DDC councils includes the following rules.

- *The fund will be used for: a) improving livelihoods of the local communities and b) improving forest conditions and reducing soil erosion.*
- *Various conservation and development activities will be implemented under the five headings identified by hydroelectricity revenue use guidelines.*
- *The DDC planning and fiscal administrative procedure will be followed when implementing the projects under this fund.*
- *Local level organizations like CFUGs and other, community based can also propose projects under this fund.*

Source: Extract from DDC 2006b