

**INSTITUTIONAL CONSTRAINTS AND
OPPORTUNITIES IN DEVELOPING
ENVIRONMENTAL SERVICE MARKETS:**

**Lessons from Institutional Studies
on RUPES in Indonesia**

Bustanul Arifin



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

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World Agroforestry Centre (ICRAF)

Southeast Asia Regional Office

PO Box 161, Bogor 16001, Indonesia

Tel: +62 251 625415, 625417; fax: +62 251 625416, email: icraf-indonesia@cgiar.org

ICRAF SEA website: <http://www.worldagroforestrycentre.org/sea>

Edited by: Claire Miller

Layout by: Aunul Fauzi

Cover design by: Dwiati Novita Rini

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1 INTRODUCTION

1.1 Rationale

This report examines institutional constraints and opportunities in developing environmental service markets. It primarily draws from institutional studies on RUPES programs (Rewarding Upland Poor for Environmental Services they provide) in Indonesia. The studies combined desk reviews, field observations at RUPES sites in Sumber Jaya (Lampung), Bungo (Jambi) and Singkarak (West Sumatra), and in-depth interviews with key people in the field, relevant stakeholders and policy makers. The analysis mostly uses an institutional economic approach, combined with some quantitative analysis of transaction costs associated with existing and potential collective actions for reward transfers. The policy implications for institutional reforms were further enriched through discussion with fellow researchers, consultation with RUPES management, a review of literature related to environmental services, and comparison with similar cases in other parts of the world.

The RUPES program is developing best-practice working models for successful environmental transfer agreements adapted to the Asian context in general and the Indonesian context in particular. Targeted research is being conducted at sites across the nation, to identify environmental services and consider how they can be measured. The program also prepares mechanisms to anticipate changes (internally within the study sites and in response to external factors). Environmental services include clean and abundant water from watersheds, biodiversity protection, carbon stocks that may alleviate global warming, and beautiful landscapes for recreation and tourism.

However, upland communities — primarily the poor and most marginalised of people — are not sharing in the benefits that these services provide. National and local investment in economic development often bypasses these people and in many cases they bear a large share of the negative aspects of development. Self-empowerment processes are urgently needed so that upland communities can make the decisions necessary to build a sustainable future based on their resources, improved technology and centuries of accumulated wisdom. Therefore, rewarding upland communities for providing environmental services would enhance their livelihoods and reduce poverty.

In order to systematically transfer rewards to upland communities for the environmental services they provide, constraints inhibiting such transfers must be identified and addressed. These constraints can include a lack of political will, poor institutional capacity, lack of a supportive legal framework and financial resources, and even limited community interest and commitment. Institutional constraints also need to be examined, such as conflicting and competing government agency jurisdiction over the regulation of upland environmental services.

Environmental service agreements involving rural communities are most likely to succeed when they are created and administered at the supra-village level. This is due to the presumed high transaction costs of implementing many separate agreements with individual villages. Bodies set up at the supra-local or even national level may be effective in bundling investments from national or global stakeholders, and distributing them to communities under the terms of the agreements. Such an approach is being implemented in Costa Rica. Under the leadership of the World Agroforestry Centre (ICRAF), the RUPES program in Asia is building awareness among Asian nations of these institutional innovations, and is working with the relevant organisations in interested countries to develop appropriate institutions to promote and effectively implement agreements.

Watershed management in Indonesia involves several government agencies responsible for maintaining or regaining environmental services; this potentially complicates negotiations on rewards for those watershed services. Opportunity costs could arise under the current institutional arrangements, as staff commonly engage in rent-seeking activities. In many circumstances private sector entities and non-government organisations (NGOs) associated with these agencies also depend on rent-seeking to supplement incomes. Other questions may concern the lack of capacity among community-based institutions to manage the rewards in a transparent and equitable way, leading to a lack of confidence in the process. In addition, political constraints to smoothly implement the concepts are also numerous, especially once the communities receive rewards for services provided only in exchange for political votes.

For example, the upland area of Northern Lampung is known as the poorest part of Sumatra. Its landscapes are seriously degraded, with forests cleared and soils rapidly exhausted

by intensive cropping, mostly of cassava. The landscape is in the early stages of 'rehabilitation' through tree planting, mostly with timber species such as rubber, oil palm, and fruit trees for more fertile sites or sites with at least a secure water supply. Local communities and local government have been supportive in examining the reward program for poor people in the uplands. More importantly, relevant data and experience exist in this area for further studies, such as Alternative for Slash and Burn (ASB) Phase I and 2; Smallholder Agroforestry Options for Degraded Soils (SAFODS); Tree-Seed Development Project (TSDP); and Below-ground Biodiversity-Global Environmental Facility (BGBD-GEF).

Previous studies have explored and documented related issues, such as benchmark data on carbon stocks, economic analysis of various tree-based cropping systems, marketing analysis of tree-based commodities, and understanding local perspectives. The area's forest cover barely met the Kyoto Protocol's basic requirements for carbon sequestration in 1990, but current stocks are already higher. The area provides opportunities for the RUPES program to test and learn from institutional mechanisms linking local livelihood and environmental improvements to the global benefits that these improvements provide

1.2 Study Objectives

This study's overall objective is to understand and help shape social, political, legal and economic environments that will better support the rewards linked to the environmental services provided by upland communities.

Specifically this study aims to:

- Analyse the institutional mechanisms being tested in RUPES research sites in Indonesia, develop a typology of institutions and describe what appears to work where and under what conditions, as well as the lessons from what does not seem to work.
- Analyse the ways in which the various mechanisms affect the distribution of benefits within the local community, by wealth, gender and age.
- Analyse the risk factors for the various institutional mechanisms, both due to internal changes and dynamics in the research sites and externally (including changes in local government, macro-economic conditions, changes in perceptions of the environmental services provided).

- Provide an understanding of existing supportive institutional environments and frameworks in Indonesia, including an analysis of the recent Indonesian Presidential Decree on environmental service reward mechanism (carbon sequestration).
- Identify the constraints (legal, bureaucratic, political, social and policy) on creating an environment conducive to developing, implementing and replicating environmental reward transfers in the Indonesian context, and recommend activities to reduce or overcome these constraints.
- Identify and facilitate the relevant avenues for providing technical advice from the RUPES consortia on matters regarding the formulation of environmental service reward mechanisms. Avenues include identifying environmental service providers and beneficiaries, monitoring environmental service functions, and institutionalising the rewards.
- Investigate the requirement for and conditions of policy reforms that would facilitate/enable environmental transfer agreements, and propose strategic steps (including funding strategies and proposals) for the RUPES program.

1.3 Report Structure

The scope and meaning of institutions will be discussed in more detail following this introductory section; both old and new institutional economics will be examined in Section 2. This should provide a clear understanding of the recent growth in using this approach to examine policy issues on reward mechanisms for environmental services in general. A subsection on transaction cost principles discusses the costly process of every economic exchange, especially when the market for environmental services is non-existent.

The analytical frameworks to conduct institutional studies are discussed in Section 3. This clarifies the institutional mechanisms identified in the research sites and the institutional environment (opportunities and constraints) for formulating reward mechanisms for RUPES policy options.

Section 4 presents findings, the analysis results, and interpretations of institutional constraints and opportunities for developing environmental service markets in three RUPES pilot locations: Sumber Jaya in the Province of Lampung; Bungo

in the Province of Jambi; and Singkarak in the Province of West Sumatra.

The final section contains concluding remarks focused primarily on the requirements for and conditions of policy reforms that would facilitate environmental transfer agreements at a landscape level and hopefully on a national and global scale.

2 THE STUDY APPROACH

2.1 Scope and Meaning of Institutions

The basic principles in approaching institutional mechanisms in this study rest on the meaning and scope of institutions as a set of rules for going concerns, as viewed by both old and new institutional economics. An institution is here defined as the working rules for going concerns. This is fundamentally distinct from the everyday use of the term 'institution' as being synonymous with an organisation such as the Ministry of Environment or a university. Organisations such as a university or a corporation acquire their meaning from the working rules (institutions) that define them.

However, the explanation of this organisational form would entail listing what it does and does not do, how it does and does not function, and the roles that individuals play within it. In one sense, the working rules are the organisation. Likewise, if one wishes to explain the concept of a corporation, one necessarily defines it in terms of the rules that differentiate it from a sole proprietorship or from a limited partnership. These working rules (institutions) are constitutive of the organisations they describe. By making a connection between the working rules and the apprehended effects to which those rules give rise, the rules (institutions) comprise a set of conditions indicating what individuals can and cannot do, and what they can and cannot expect from the organisation (if they remain members). In this sense, the working rules (the institutions) define the organisation. Therefore, organisations are not institutions (working rules), but are comprised of institutions (working rules).

John R. Commons, a founding father of institutional economics, attempted to take into account the dual nature of social sciences that investigate human behaviours and activities on the one hand, while analysing holistic relationships on the other. The result is a severe criticism of individualism. Institutional economic science thus

becomes a study of the transactions between human beings and groups, making a living with each other by producing and acquiring limited parts of wealth through cooperation, conflict, and working rules (Commons 1931). To consider institutions not as constraints (as in North 1990), but rather as the substance of social life, requires the rejection of *Homo Economicus*, whose existence cannot explain the individual/ society nexus since it rules out various forms of associated and organised action and the inherent imperfection of knowledge and information (Hodgson 1998). The basic units become the group, collective action and social relationships. In this context, institutional economics asserts the need to consider the dual dimension of individual cognition and actions. On the one hand, there is the volitional dimension, the active role of the individual, though rational calculation does not dominate. On the other hand, there is institutional determination: the individual is an institutionalised person and mind, integrated within habitual and collective action.

Bromley (2003) recognises three classes of institutions: (1) norms and conventions; (2) working rules; and, (3) property relations. Norms and conventions are the unwritten behavioural rules that bring order and predictability to human relationships. The enforcement of norms and conventions tends to reside close to the individual so that codes of conduct play a very important role. Norms and conventions must be distinguished from the class of institutions for which there exist formal (codified) enforcement mechanisms. Therefore, the state must set up processes to enforce compliance with an evolved norm, that is, the working rules.

Working rules, the second institutional class, carry an expectation of legal sanction. The rules must be understood in their more formal clothing. Because institutions are collective rules that define socially acceptable individual and group behaviour, they are sets of dual expectations. This is what Commons (1931) means by the working rules that indicate what individuals *must* and *must not* do (compulsion or duty), what they *may do* without interference from other individuals (privilege or liberty), what they *can do* with the aid of collective power (capacity or right), and what they *cannot* expect the collective power to do in their behalf.

Finally, the third set of institutional arrangements concerns the income or benefit streams arising from ownership of valuable objects or circumstances. Property relations are the most

fundamental social constructs among members of a political community. With a clear understanding of the working rules — rights, duties, privilege and no rights — it is straightforward to extend these legal correlates to situations representing the prospect for monetary gain or loss. In this case the concept of property rights is relevant to explain the capacity to compel the state to protect — and perhaps to indemnify if necessary — someone's control over that income stream.

The principles to relate transactions with institutions are also developed based on the notion that transactions operate within and through the various institutions composing society. In this context, the prevalent institutions determine and inform transactions, especially through the working rules they uphold. These rules govern and regulate groups of associated agents and enable collective control over the transactions; they also guarantee the consensus for action and evaluation required for joint actions. Thus, transactions merge institutions, which in turn encompass the other categories. The theoretical status of institutions aims first to explain the mediation between individual and collective action. Second, it tries to understand how routines and value systems are formed. Third, it analyses the structural forms of the economic system as a modality of conflict management, considering institutions as 'collective action in control, liberation and expansion of individual action', as has been advocated by Commons (1931).

2.2 Social Capital: A Basis for Collective Action

Social capital is an old concept whose importance was significantly revived in academic and journalistic debates after the publication of Putnam (1993), Fukuyama (1995), Knack and Keefer (1997), Narayan (1999), Grootaert and Narayan (2001) and many others. In his seminal work on 'Making Democracy Work', Putnam uses the concept to explain differences in the economic and governance performance of northern and southern Italy. Fukuyama (1997) emphasises the importance of 'trust' in economic development and societal prosperity. In the literature, the term social capital covers 'static' definitions such as norms, trusts, resources and groups, as well as 'dynamic' definitions such as individual interaction with others in informal networks and formal civic organisations. Narayan (1999) extends the concept into 'bonding social

capital' and 'bridging social capital'. Bonding refers to network access and forms of participation where people could have more trust in family members, neighbours, friends, alumni associations, groups, colleagues and so forth, while bridging refers to attempts to build trusts and networks between different groups or members of society. This is an important basis for collective actions on a local and national scale, where economic policy should move forward in favour of all stakeholders.

The works of Knack and Keefer (1997) suggest that economic activities requiring some agents to rely on the future actions of others are accomplished at lower cost in higher-trust environments. Trust-sensitive transactions include those in which goods and services are provided in exchange for future payment; employment contracts in which managers rely on employees to accomplish tasks that are difficult to monitor; and investments and savings decisions that rely on assurances by governments or banks that they will not expropriate these assets. Individuals in higher-trust societies spend less to protect themselves from being exploited in economic transactions. Written contracts are less likely to be needed, and they do not have to specify every possible contingency. Individuals in high-trust societies are also likely to divert fewer resources to protecting themselves — through tax payments, bribes, or private security services and equipment — from unlawful (criminal) violations of their property rights. Low trust can also discourage innovation. If entrepreneurs must devote more time to monitoring possible malfeasance by partners, employees, and suppliers, they have less time to devote to developing new products or processes (p1251).

The collective actions relevant to developing an environmental services market would go beyond 'autonomous' process to accumulate trust within the group, but it requires systematic efforts to build long-term relationships and networking systems among different groups (and subgroups) in order to achieve more sustainable natural resource management. This implies that strong bonding social capital without bridging social capital could lead to sustained conflicts. Once the two types of social capital are combined, the level of trust could grow significantly higher and the civil society as a whole would grow healthier and even stronger. Therefore, intermediaries are needed to develop negotiated support systems that strengthen the 'bridge' and accumulate 'trust' in the society.

Societies characterised by high trust levels are also less dependent on formal institutions to enforce agreements. Informal credit markets dependent on strong interpersonal trust can facilitate investment where there is no well-developed formal financial intermediation system, or where lack of assets limits access to bank credit. Interpersonal trust can also provide an imperfect substitute for government-backed property rights or contract enforcement where governments are unable or unwilling to provide them. Government officials in societies with higher trust may be perceived as more trustworthy and their policy pronouncements as thus more credible. To the extent that this is true, trust also triggers greater investment and other economic activity. Trusting societies not only have stronger incentives to innovate and accumulate physical capital, but are also likely to have higher returns in accumulating human capital (Knack and Keefer 1997 p1253).

Woolcock and Narayan (2000) develop four perspectives on social capital and economic development: the communitarian view, the network view, the institutional view, and the synergy view. Each will be briefly described as follows. First, the communitarian view equates social capital with local organisations such as clubs, associations and civic groups. This view holds that social capital is therefore inherently good, more is better, and its presence always has a positive effect on community welfare. This perspective has been applied in helping the poor manage risk and vulnerability. Second, the network view stresses the importance of vertical as well as horizontal associations between people, and of relations within and among such organisational entities as community groups and firms. Therefore, strong intra-community ties give families and communities a sense of identity and common purpose. It also stresses that in cases of weak intercommunity ties — such as those that cross social divides based on religion, class, ethnicity, gender, and socio-economic status — strong horizontal ties can provide a basis for pursuing narrow sectarian interests. Third, the institutional view argues that the vitality of community networks and civil society is largely the product of the political, legal and institutional environment. This is the major difference: whereas the communitarian and network perspectives treat social capital as an independent variable giving rise to various outcomes, good and bad, the institutional perspective treats social capital as a dependent variable, somewhat similar to the new institutional economics. The performance of

states and firms themselves depends on their own internal coherence, credibility and competence, and on their external accountability to civil society. Fourth, the synergy view attempts to integrate the compelling work emerging from the network and institutional perspectives.

The works of Evans (1995, 1996) suggest that synergy between government and citizen action is based on *complementarity* and *embeddedness*. ‘Complementarity’ refers to mutually supportive relations between public and private actors and is exemplified in legal frameworks that protect rights of association, and in more humble measures such as chambers of commerce to facilitate exchanges among community associations and business groups. ‘Embeddedness’ refers to the nature and extent of the ties connecting citizens and public officials. The classic examples come from irrigation, in which the lowest-level officials are from the community being served; they are enmeshed in local social relations and hence under pressure to perform and be responsive to the community. Importantly, this approach works only where public officials are at the same time bound by performance-oriented organisational environments that are competent, coherent, and credible.

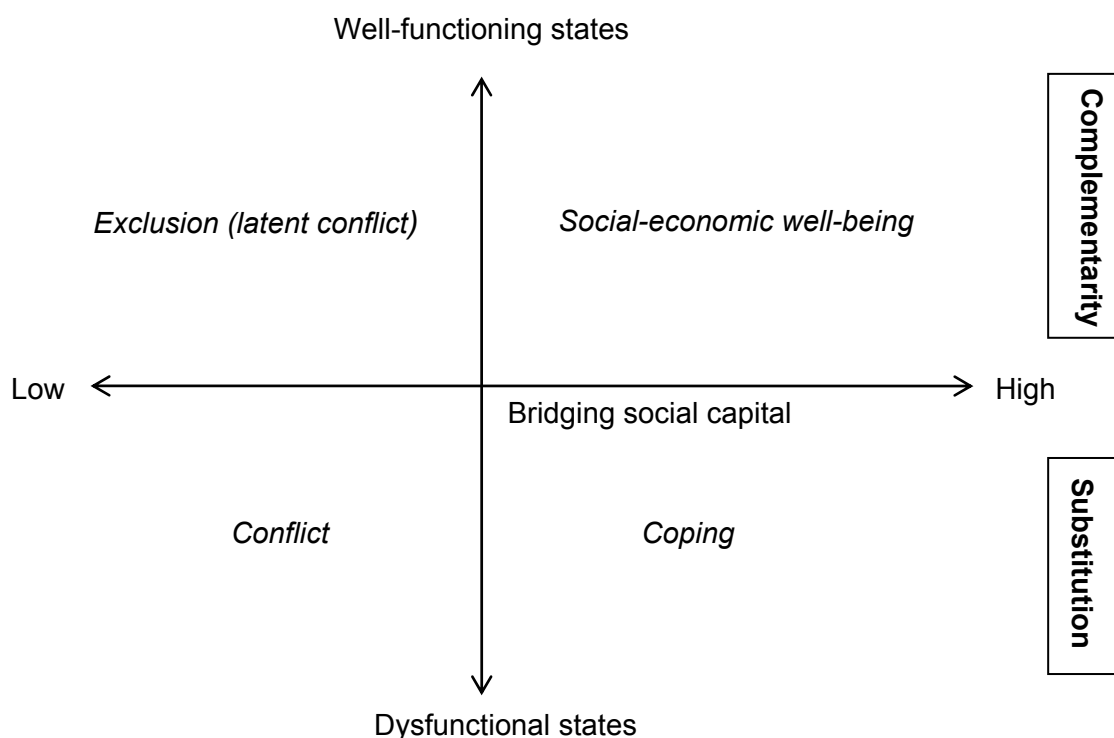
For this purpose, Narayan (1999) integrates the core ideas of bridging social capital and state-society relations, and suggests that different interventions are needed for different combinations of governance and bridging social capital in a group, community or society. The following four-quadrant diagram summarises interaction between state, market and society, particularly how bridging social capital can shape the degree of governance in such a relationship. In societies (or communities) with good governance and high levels of bridging social capital, complementarity exists between state and society, and economic prosperity and social order are the likely result. When social capital inheres mainly in primary social groups disconnected from one another, the more powerful groups dominate to the exclusion of others. Latent conflict characterises such societies. Similarly, a state that opens up and explicitly builds bridges to excluded groups increases the likelihood that the poor can gain access to the resources and services to which they are entitled. Alternatively, state-society relations may degenerate into conflict, violence, war or anarchy — a breakdown that allows warlords, local mafias and guerrilla movements to take over the state’s power and authority.

The relevant intervention necessary for development can be summarised as follows: when representatives of the state, the corporate sector, and civil society establish common forums through which they can pursue common goals, development can proceed. In these circumstances social capital has a role as a mediating variable shaped by public and private institutions. This shaping is an inherently contentious and political process, one in which the state plays a crucial role. Moreover, the fundamental social transformation of economic development — from traditional kinship-based community life to societies organised by formal institutions — alters the calculus of costs and benefits associated with different social capital dimensions and the desirable combinations of these dimensions. Although development struggles are inherently political, they are not always won by the most powerful, nor do challenges to authority always entail violent conflict. Patient efforts by intermediaries to establish partnerships between

associations of the poor and outsiders can reap significant dividends (Woolcock and Narayan 2000).

The social capital concept could be relevant when developing environmental service markets, and formulating the payment mechanism between the buyers, intermediaries and sellers. However, the results of empirical studies on environmental service markets indicate at least four pre-conditions before the payments mechanism can be established (Van Noordwijk 2004, personal communication):

- (1) The governance system must be responsive to the long-term interests and perspectives of the local people, and not lean towards outside extractors/investors.
- (2) The relevance of environmental services to local livelihoods must be articulated along with health and education systems that are provided as 'public services'.



Note: Complementarity refers to the optimal interaction of government and markets in civil society. Substitution is where informal organisations (families, networks, and so on) replace services ordinarily provided by governments and institutions.

Source: Adapted from Narayan (1999).

Figure 2.1: Relationship between bridging social capital and governance

(3) World markets need to link the environmental service consequences for outside stakeholders to the price signals perceived by local actors, at a significant level in relation to the products' direct sale value.

(4) Basic levels of *trust* are needed between local people, governance systems and external stakeholders. Without such trust, payment transactions for environmental services are unlikely to be sustainable, transparent and effective.

2.3 Transaction Cost Principles

This study uses an approach of transaction-cost principles, believing that every economic exchange is costly. These principles are a foundation of institutional economics. Currently, no standard definition explains transaction costs, but the term usually refers to the costs of running an economic system (Arrow 1963); the costs of information, coordination and enforcement (Commons 1931, 1990); the costs associated with the transfer, capture, and protection of rights (Williamson 1985, Barzel 1997); the costs that arise when individuals exchange ownership rights to economic assets and enforce their exclusive rights (Benham and Benham 2000).

Ronald Coase in his seminal article 'The Nature of the Firm' (1937) underlines the important role of transaction costs in organising firms and other contracts. These costs include the costs of information, negotiation, monitoring, coordination and enforcement. A firm basically emerges to economise on the transaction costs of market exchange, and the 'boundary' of a firm or the extent of vertical integration will depend on the magnitude of these transaction costs. In his most recent works, Williamson develops the concept of transaction costs in business management and administration. Williamson (1995) considers the concepts of bounded rationality and opportunistic behaviour — which manifests itself as adverse selection, moral hazard, cheating, shirking, and other forms of strategic behaviour — to explain contractual choice and the ownership structure of firms. In Williamson's framework, a trade-off has to be made between coordination and hierarchy costs within an organisation, and the costs of transacting and forming contracts in the market. This trade-off will depend on the magnitude of transaction costs.

Furubotn and Richter (1997) in their examination of transaction costs include the costs of resources utilised for the creation, maintenance,

use, change, and so on of institutions and organisations. When considered in relation to existing property and contract rights, transaction costs consist of defining and measuring resources or claims, plus the costs of utilising and enforcing specified rights. Applied to the transfer of existing property rights and establishing or transferring contract rights between individuals (or legal entities), transaction costs include the costs of information, negotiation and enforcement. Literature on new institutional economics regards Williamson's hypothesis as the main line of argument, in that 'the economic institutions of capitalism [and hence markets, firms, and relational contracting] have the main purpose and effect of economising on [the sum of ex ante and ex post] transaction costs' (Williamson 1985). In other words, Williamson deems their cost-minimising character to be the predominant factor responsible for — that is, explaining — the actual adoption of specific governance procedures. Williamson perceives a transaction to entail transferring a good or a service across a technologically separable interface; that is, it entails transferring assets across discrete stages of a multistage production process.

In contrast, the old institutional economists usually followed Commons' thought that the transaction is a unit of transfer of legal control; that is, involving the transfer of property rights. An important difference is subsumed in these conceptions, for transferring the right to withhold something from another who needs or wants it need not involve moving a good or service across a technologically separable interface. This becomes evident in Commons' identification of three distinct types of transactions based on the participants' equal or unequal legal status: (1) the bargaining transaction in which ownership is transferred by voluntary agreement between legal equals; (2) the managerial transaction through which wealth is created by command from legal superiors; and, (3) the rationing transaction through which the burdens and benefits of wealth creation are apportioned by dictation from legal superiors (Commons 1931).

Williamson's theory centres on: (1) governance of various types of bargaining transactions via the market (price-mediated transactions) and relational contracting (transactions mediated through a negotiated procedure); and, (2) converting bargaining transactions into managerial transactions (intra-firm, command-mediated transactions). Throughout, the objective is to

show how specific types of arrangements manifest the general rule that governance procedures are efficient solutions to minimise transaction costs. Typical examples are the costs of using the market (market transaction costs) and the costs of exercising the right to give orders within the firm (managerial transaction costs). There is also the array of costs associated with running and adjusting a polity's institutional framework (political transaction costs). For each type of transaction cost, it is possible to recognise two variants: fixed transaction costs — that is, the specific investments made in setting up institutional arrangements — and variable transaction costs, such as the costs that depend on the number or volume of transactions.

Commons, in contrast, understands all costs to be 'instituted' phenomena; that is, to be rooted in or arise from practices dictated, prohibited, or authorised by the sovereign power or its designated representatives, including those authorised to make rationing transactions within the firm. Central to the institutional derivation of costs are the practices established via rationing transactions that bargainers must adhere to in effecting a bargaining or managerial transaction. Hence we can see that Williamson's failure to incorporate rationing transactions into his schema is instrumental to his adherence to the neoclassical custom of treating costs as natural phenomena, just as Commons' inclusion in his schema of rationing transactions is instrumental to his insistence that all costs are fundamentally instituted phenomena.

Estimating transaction costs is problematic because production and transaction costs are jointly determined. Economic theory suggests that changes in transaction costs have a first-order impact on production. Lower transaction costs mean more trade, greater specialisation, changes in production costs and increased output. Changes in production costs also have an impact on transaction costs (Benham and Benham 2000). If transaction costs are very high, many transactions may not take place at all. Hence of all potential transactions, only a small subset will actually occur, and only a subset of these will appear in the market. The reasons why an individual undertakes a particular transaction require knowledge of the opportunity costs of alternatives. To understand the choices made, the cost of transactions that did not actually occur might need to be estimated. Finally, the law of one price does apply here. Individuals and groups within a given society may face very different transaction costs so many estimates may

be needed. All other things being equal, an individual's political connections, ethnic group, and other characteristics affect the opportunity costs of a particular exchange.

For the purpose of developing options for institutional mechanisms, the principles originating in the old institutional economics could be expanded and complemented using the frameworks developed in the new institutional economics. Based on Commons' views, 'the ultimate unit of activity must contain in itself the three principles of conflict, mutuality, and order. The unit is transaction [see Williamson 1998, p6]'. Therefore, transaction cost economics concurs that transaction is the basic unit of analysis and regards governance as the means by which 'order is accomplished in a relation which potential conflict threatens to undo or upset opportunities to realise mutual gains' (Williamson 1998, p6). The degree of interest shapes patterns of internal change, the dynamics within research sites and the external environment of local government. Changes in perceptions about macro-economic conditions also affect governance structures in the overall organisation.

In the language of Williamson (1998), comparative assessments of markets and hierarchies will be applied to examine the risk factors of institutional mechanisms. Once adaptation is the central problem of economic organisation, 'autonomous' and cooperative kinds are distinguished. Markets enjoy the advantage in the 'autonomous' adaptation, while the advantage shifts to hierarchies as the need for cooperative adaptation grows. In these respects, contracts — albeit incomplete — are interpreted in a farsighted manner, with economic actors looking ahead, to perceive potential hazards, and embed transactions in governance structures to mitigate those hazards. Williamson asserts that transaction cost economics relates to all these hazards in the following three respects: (1) all these hazards would vanish but for bounds on rationality and opportunism; (2) the magnitude of the hazard varies systematically with the attribute of transactions; and, (3) ex post governance (as well as ex ante incentive alignment) is an important instrument in mitigating hazards.

3 ANALYTICAL FRAMEWORKS

This section presents the analytical frameworks to implement institutional studies on rewarding

the poor for environmental services they provide (RUPES), particularly in the Indonesian context. Three current RUPES sites — Sumber Jaya (Lampung Province), Bungo (Jambi Province) and Singkarak (West Sumatra Province) — provide examples for examining more comprehensive institutional constraints on, and opportunities for, developing environmental service markets in Indonesia. These sites respectively represent watershed, biodiversity and carbon sequestration environmental services, where necessary action plans would be implemented and policies recommended at local, national and global levels. The study has emphasised three major elements of institutional economic analysis, namely: (1) institutional mechanisms; (2) institutional environments; and, (3) future policy reform directions on environmental service markets. These frameworks might provide useful guidelines to execute the institutional studies in RUPES sites in Indonesia and possibly in other parts of the world having similar environmental service characteristics.

It is not an exaggeration to suggest that previous exposure either to policy issues concerning environmental service markets, or general institutional typology in the study sites, or both, is required to properly formulate analytical frameworks for institutional studies. Researchers are strongly recommended to undertake literature review/desk analysis and short field orientation in the early stages of studies. The benefits include better understanding of environmental service markets and better knowledge of institutional typologies as both constraints and facilitators in formulating reward mechanisms and perceiving policy linkages from landscape to regional and national levels.

For example, previous reports and current work on some activities in the study sites can be used as departure points to formulate the analytical frameworks. In the last decade, ICRAF Southeast Asia has been involved in researching local ecological knowledge, and developing alternatives to 'slash and burn' agriculture as well as other related community-based forestry projects (HKM=*Hutan Kemasyarakatan*) in the Sumber Jaya and Bungo RUPES sites. The University of Lampung coordinates research and experiments with conservation and sustainable management of below-ground biodiversity (BGBD) sites in Sumber Jaya. In Bungo, university-supported activities are focusing on assessing below-ground biodiversity, its relation with carbon stocks, and later economic analysis of the environmental services the biodiversity

might provide. Researchers under the ICRAF and Winrock International tree-seedling development program (TSDP) are working more closely with farmer groups to test tree germ-plasma resources, especially for indigenous and exotic trees.

3.1 Institutional Mechanisms

Institutional mechanisms to develop rewards for poor upland communities for their environmental services were investigated using both desk analysis and field observation in all three study sites. First, the nature of environmental services was assessed to obtain a general picture of the presence, extent and development of services. Priority should be given to places where more than one environmental service is present, using the magnitude of the service and/or the scale, whether local, national, regional or global. Second, the institutional typology was examined more thoroughly in the field using the usual institutional layer or classification such as norms and conventions, working rules and property relations. Each element required to analyse the institutional mechanisms is explained below.

3.1.1 Nature of Environmental Services

Prior knowledge and initial information about the nature of environmental services requires a desktop literature review, but field verification is strongly recommended for better accuracy. For a more-than-adequate, immediate general review, turn to the works of Landell-Mills and Porras (2002) for a global review of markets for environmental services from forests, and the anthology on forest environmental services edited by Pagiola *et al.* (2002) for market-based mechanisms for conservation and development. For more specific thoughts on rewarding the poor, the works by van Noorwijk *et al.* (2003) could serve as a reference on rationale, typology and other important ideas on the frameworks necessary to formulate reward mechanisms and integrated natural resource management in general.

Studies on environmental services markets in Indonesia and possibly some other developing countries are relatively new, so specific analysis on some issues is very scant. The works by Suyanto *et al.* (2004) provide a quite thorough review of available literature on the environmental services market in Indonesia. About 40 percent of 84 case studies deal with biodiversity services provided by the forest, 21

percent with watershed functions, 18 percent with carbon sequestration and 21 percent with landscape or seascape beauty. However, only 17 cases or 20 percent of the total deal with an environmental services market, which also means that about 67 cases or 80 percent have the potential for a market to be developed.

For the action research in RUPES, the International Scientific Committee and the National Technical Committee decided on three environmental services as the pilot programs and entry points for policy reforms. These are watershed services in Sumber Jaya of Lampung,

biodiversity services in Bungo of Jambi, and carbon sequestration services in Singkarak of West Sumatra. Landscape beauty and eco-tourism services are not specifically emphasised in the current RUPES program year, even though the discussion on the environmental services mentioned above has some links with eco-tourism. From available and accessible literature, the important environmental services identified in the Indonesian RUPES study sites can be summarised in Table 3.1.

Table 3.1 clearly shows that the analysis focus in the three RUPES sites differs significantly, both in

Table 3.1 Important Environmental Services in RUPES Study Sites

	Sumber Jaya (Lampung)	Bungo (Jambi)	Singkarak (West Sumatra)
Watershed	Protected forest, agroforestry, and the land's water retention capacity affect the quantity and quality of water for domestic use (drinking, irrigating rice fields), and industrial use (hydro-electric power plant PLTA Besai). The scale is mostly local and national.	Water for domestic use, including drinking, irrigating rice fields, subsistence aquaculture and home industry.	Complex system of lake, river and other hydrological services provide water for domestic use (drinking, irrigated rice, aquaculture), commercial use (livelihood, tourism, water transportation), and industrial use (hydro-electric power plant PLTA Singkarak).
Biodiversity	Protected forest and mixed agroforestry provide livelihoods for local people, biodiverse sources of plants and animals and below-ground biodiversity (BD)	Rubber agroforestry (jungle rubber), river and hydrologic system are a home to exotic and medicinal plants, extinct animal species and below-ground BD. The scale is mostly regional and global.	<i>Ulayat</i> and <i>nagari</i> system of protecting forests, small estate and tree crops and mixed agroforestry systems provide habitat for plants and animals; and aquatic system for 'forbidden' fishes to be preserved.
Carbon sequestration	Protected forest, shaded coffee practices (CBFM) and mixed agroforestry are examples of land use, land-use change and forestry activities related to carbon sequestration.	Rubber agroforestry, protected forest, and mixed gardens of fruits trees have been known to mitigate climate change, in addition to generating income for local people.	Conservation of protected forest, land-use management and local agroforestry initiatives generate significant carbon sequestration benefits. The service scale is mostly global.

Sources: Compiled from previous studies and field observations

terms of the nature of environmental services and the scale of compensation or reward transfer among stakeholders. In Sumber Jaya, the focus is on how protected forests, community-based forestry management (CBFM, or HKM in Indonesian terms), shaded coffee, mixed agroforestry, and the land's general capacity to retain water could influence the amount and quality of water for drinking, irrigating rice fields and generating hydroelectric power (industrial use) by the state-owned Way Besai company. The scale of watershed services is mostly local and the observation is focused on the institutions adapted and practised by the community divided into upstream (providers) and downstream (beneficiaries). However, although the water flows to different provincial districts, the analysis was not extended into the provincial (national) scale; this was due to a desire to simply observe the local nature of watershed services, as well as time and budget constraints. Similar reasons could be given for not analysing watershed services in Bungo and Singkarak, even though further investigation and analysis of falling water tables in Lake Singkarak is ultimately crucial.

Biodiversity services are investigated further in Bungo, where protected forests, smallholder rubber agroforestry (jungle rubber), river and hydrologic systems are assessed in habitat terms for exotic and medicinal plants, rare animal species, and below-ground biodiversity. The complexity of institutional analysis of the communities managing or controlling richly

biodiverse ecosystems is mostly related to issues of stakeholder interests, the positive aspects of maintaining biodiversity and the negative side of conservation efforts. The scale of biodiversity services is mostly regional and global, so that the study also examines the prospective buyers or organisations interested in conserving biodiversity in a specific site such as Bungo. Some issues need to be addressed, including the area under threat and where the conservation activities should be implemented; the stakeholders who can effectively influence conservation uses in the area; and the level of compliance, trust, guarantee and specific outcome from conservation efforts by the sellers or community living in the area.

Finally, carbon sequestration services are examined in Lake Singkarak in West Sumatra, through observing the institutions adapted by sellers or communities practising *ulayat* and *nagari* forest protection systems, small estate and tree crops and mixed agroforestry. The main objective is to conserve protected forests, manage land use and sustain traditional agroforestry so that together they generate significant carbon sequestration benefits. The scale of carbon sequestration services is mostly global so that the buyer perspective could be proxied by observing organisations interested in conserving protected forests, enforcing afforestation and reforestation and influencing practices related to carbon sequestration. International funding agencies interested in supporting conservation practices and carbon

Table 3.2 Classes of Institutions in RUPES Sites, Indonesia

	Sumber Jaya (Lampung)	Bungo (Jambi)	Danau Singkarak (West Sumatra)
<u>Norms-conventions</u>			
Terms and definition	Loosely defined	Well defined	Very well defined
Understandable	Well understood	Well understood	Very well understood
Level of enforcement	Weakly enforced	Strongly enforced	Very strongly enforced
<u>Working Rules</u>			
Terms and definition	Strongly defined	Poorly defined	Well defined
Understandable	Well understood	Poorly understood	Well understood
Level of enforcement	Very well enforced	Quite well enforced	Quite well enforced
<u>Property Relations</u>			
Terms and definition	Quite well defined	Poorly defined	Quite well defined
Understandable	Well understood	Quite well understood	Well understood
Level of enforcement	Quite well enforced	Poorly enforced	Well enforced

Sources: Compiled from previous studies and field observations

sequestration are among the prospective buyers of the services. Land-use change and forestry have been known to mitigate climate change, in addition to generating income for local people, alleviating poverty and conserving the natural environment.

3.1.2 *Typology of Institutions*

Analytical frameworks to identify the typology of institutions may follow the classifications adopted by Bromley (2003): (1) norms and conventions; (2) working rules; and, (3) property relations. First and foremost, information is required to clarify the terms and definitions of the above classifications, before going more in-depth into how well the society members understand them all. A field investigation combining purposive participatory rural appraisal and ground interviews with respondents and/or key informants would be necessary to obtain the required information on enforcing the three institutional classes. Questions should be formulated in such a way that the researchers similarly understand enforcement levels. One or two examples of each classification could be used to obtain satisfactory information on the subjects.

Such frameworks are very useful to collect new information and to verify some information on the institutional mechanisms already available in other research projects. The data collection was focused on the typology of institutions, including the extent to which available institutions (in the three classes mentioned above) govern the arrangements to accommodate collective actions for the control, liberation and expansion of individual action. The origin, historical background, and evolution of institutions and organisations at community level can be used as a starting point to explore further the typology of institutions, such as presented in Table 3.2 below.

Field investigation was conducted in all three RUPES sites using the institutional classes described in Table 3.2 above within three different time frames: in April 2004 for Sumber Jaya (Lampung); in June 2004 for Singkarak (West Sumatra); and July 2004 for Bungo (Jambi). The field trip was designed to conduct in-depth interviews with several prominent informants and competent resource people from different stakeholder groups: local people, leaders, government officials, politicians, non-government organisation (NGO) activists, businesspeople, researchers and university academics. This in-depth interview obviously did not ignore personal opinions or analysis from these stakeholders

regarding reward mechanisms and other issues relevant to economic and ecological considerations in developing markets for environmental services.

Analysis of institutional typology should be very useful in examining further what appears to work where and under what conditions, as well as what we can learn from what does not seem to work. This should combine with a thorough examination of the history of certain social/political driving forces, such as what gives rights to institutions, what is countervailing and what is the social transformation and change. It should be borne in mind that an institutional typology analysis at community level should maintain the proposition that 'community is not homogenous', so that the possible backlash of enforcing rules, regulations and mechanisms can be examined more carefully in the field. An open-ended and well-structured questionnaire should be used to gather more information on community agendas and strategies, and day-to-day informal interaction, both of which have an important bearing on society-based collective actions.

Closed questionnaires should also be used where the interviewers record the respondents' economic activities, land-use patterns, their roles in farmer groups, their participation and other society-based collective actions as well as formal roles in the society at large. Closed questionnaires are also used to compile the estimates of transaction costs, proxied by initiation (information) costs, coordination (organisation) costs and enforcement costs. These will be discussed separately in the following two sections.

3.2 Institutional Environments

The frameworks for examining supportive institutional environments and other community-level arrangements were based on thorough desk analysis, literature review and face-to-face discussions with informants and key people, as explained previously. The analysis focused on: (1) the interplay between individual decisions and collective actions, especially among respondents; and, (2) interaction between institutions and markets. Readers should keep in mind that the approach to institutional environments could differ significantly from one study to another, depending on the comprehensiveness of the institutional typology and the rules governing the going concerns to achieve specific objectives.

3.2.1 *Interplay between Individual Decisions and Collective Actions*

Recall that institutions govern and regulate groups of associated agents, enable collective control over transactions, and guarantee the consensus and evaluation required for joint action. Therefore, the interplay between individual decisions and collective actions is focused on: (1) the mediation between individual and collective action; (2) how routines and value systems are formed; and, (3) an examination of the structural modality of transfer mechanisms and conflict management. This framework is a very useful tool for analysing how to overcome the free-rider problem and come up with cooperative solutions for managing common resources or providing public goods.

In the case of the three RUPES study sites, the examination focused on some important determinants of success in collective action, such as the group's size, homogeneity and purpose (Olson 1965). Determinants also include local institutional arrangements such as customs and social conventions that encourage cooperation in solving problems and help to achieve efficient use

of resources (Ostrom 1990). Local initiatives, trust-funds, labour shares and other related community initiatives were examined more thoroughly during in-depth interviews with key informants and resource people; these collective actions also provide the degree of institutional rights and duties pertaining to individuals and societies. Intensive interactions between society members (providers' perspectives) in most daily activities might of necessity strengthen their bonding social capital. Similarly, from a beneficiaries' perspective, clearly defined norms and rules would strengthen both bonding social capital and bridging social capital as the basis for interaction between groups.

In the larger context, these frameworks can be applied when examining the law recently passed in the Indonesian Parliament on 'Ratifying Kyoto Protocol to the United Nations Framework Convention on Climate Change', more commonly known as the Clean Development Mechanism (CDM) law. The question is how RUPES and policies for similar reward mechanisms for environmental services can be made compatible with such legal frameworks to reduce or overcome constraints found in the field and, more importantly, how these policies can assist environmental transfers in Indonesia.

3.2.2 *Institutions and Markets*

The analytical frameworks to examine institutional constraints and opportunities were complemented by inquiries into the existence of markets, plus written and unwritten rules. Incentive systems were approached using the relationship between contract and institutions. This includes economies of scale in decision-making patterns, such as rational responses from individuals. The relationship between institutions and markets was approached initially by analysing the membership characteristics of institutions in the field. These include respondents' age, gender, ethnicity and wealth. Together, these characteristics strengthen the benchmark for environmental service markets in the three study sites. According to the theory of institutional economics, the rules serve as an 'optimal' contractual arrangement when performances cannot be perfectly monitored.

In this framework, the rules should integrate the incentive schemes and the optimal contractual forms of any economic relations. Theoretically, there are two ways to investigate mechanisms affecting the distribution of benefits within the local community: the emergence of rules, and contractual frameworks that achieve some level of economic activity. First, rules and their durability can be explained within a contractual framework: it is the contractual relationship that gives rise to the rule and that constitutes its medium. The rule does not exist outside the contract. Second, the rules help to build a framework that informs and organises the contractual relationship, giving rise to cognitive collective devices and enabling the organisation to achieve economic activities. In other words, in the first case, the institutional element is neutralised.

The organisation can be conceived as a nexus of contracts. However, in the second case, the organisation is typified by its institutional and cognitive characteristics. Therefore, the organisation manages contractual relationships, but it has its own existence. This concept is not very different from Commons' basic notions of transaction, where contracts are always integrated into a network of non-contractual interactions (rules, standards, habits), so that it is impossible to establish an analytical frontier between the two elements (Commons 1931). Hence, it is the very nature of the institution (and its specific non-contractual elements) that provides relationships and transactions with their

characteristics, and not the reverse (Rutherford 1994, 1995).

However, the case differs greatly from Williamson's basic notions where transactions are not incorporated within a contract (1998), mainly because new institutional economics rests on its central reference to the institutions of capitalism. The aim of this school is to penetrate the 'black box' of the firm, which comprises the wage relationship and work organisation, by using different criteria: the specificity of human assets, bounded rationality, moral hazard, frequency of transactions, and so forth. As this school also considers that the ideal market system, without imperfections, is efficient, it is necessary to draw closer to it by implementing appropriate institutional mechanisms enabling the best possible specification of property rights. In addition, as the concept of voluntary exchange is adopted here, optimal institutional structures are also of interest, even though not considered as decisive for the analysis of economic matters, but to decrease transaction costs.

In the case of watershed services in the Sumber Jaya RUPES site, both providers (upstream communities) and beneficiaries (downstream communities) reside in the same subdistrict but in different villages. For example, interactions between institutions and markets among the providers were observed in terms of farm size, awareness of unsustainable practices, the willingness to sell watershed services and the rewards mechanism. These variables were then analysed more thoroughly according to the characteristics of respondents as individuals or as members of community-based forestry management organisations. A similar framework was also applied for the beneficiaries, with the focus on water consumption, the roles of water-user associations and willingness to pay. It examines the interaction between endogenous factors, or the characteristics of respondents, and exogenous factors such as the environment or circumstances shaping the institutional typology. However, some difficulties and conflicting interests were also found in the study sites, particularly because many respondents were both providers and beneficiaries.

In the case of carbon sequestration in Singkarak (West Sumatra) and biodiversity services in Bungo (Jambi), the interaction between institution and markets was not observed using the sampling method techniques. Instead, more in-depth interviews were conducted to investigate the interaction between institutions and markets, particularly with respect to the norms and

conventions of service provider organisations — the *adat* system in Jambi and *nagari* system in West Sumatra — where *adat* or *ulayat* land, forests, small estate, tree crops and mixed agroforestry systems govern the interactions. Similarly, in-depth interviews were also conducted with the prospective beneficiaries or buyers of environmental services for carbon sequestration and biodiversity. These include institutions (as in government, non-government or multinational donors, and creditor organisations) interested in conserving protected forests, enforcing afforestation and reforestation and influencing conservation uses related to carbon sequestration in Singkarak and biodiversity conservation in Bungo.

In addition, interactions between institutions and markets were examined based on various options for payment mechanisms, whether direct payment to individuals through the groups, NGOs or local governments, or in-kind payments to improve the quality of social services such as education, health services and other village facilities. Further analysis was also focused on the interactions between institutions and markets or the mechanism options affecting 'the distribution of benefits' once third parties mediated the reward transfer for environmental services.

3.3 Policy Reform Directions

Analytical frameworks to direct policy reforms or, more precisely, contribute to the action plan, were formulated based on desk studies, qualitative analysis and quantitative methods to identify and facilitate transfer mechanisms in future. Concerns centre on how workable are the frameworks in reducing or overcoming institutional constraints in the field, and, more importantly, creating more opportunities to develop environmental service markets in general.

The following frameworks were employed to quantify transaction costs and estimate factors affecting their magnitude. However, one should note that qualitative institutional analysis and quantitative techniques in the transaction costs analysis should be interpreted with caution, primarily because of the unique environmental services concerned. This includes the steps on identifying providers and beneficiaries, and the process of monitoring environmental service functions and institutionalising the rewards. These are very important avenues in light of the examination of possible constraints on transfer payment agreements in the field.

3.3.1 Quantifying Transaction Costs

Quantifying transaction costs in an institutional analysis is not easy, mainly because the analysis aims to measure the basic mechanism of interaction between institutional factors, and market and non-market exchange under positive transaction costs. Quantifying transaction costs would not mean much without being supported by a comprehensive analysis of governance structure. In each RUPES study site where unique environmental services are being observed, the transaction costs analysis could be complemented with the comparative framework of alternative governance structures, in order to examine the risk factors for the various institutional mechanisms.

For empirical and quantification purposes, transaction cost analysis in the three RUPES study sites could be proxied by 'participating costs' to initiate, coordinate and enforce community-based (agro)forestry management in Sumber Jaya and Singkarak, after some modification because of the different nature of the settings. In these cases, researchers should be aware of problems in estimating transaction costs, primarily because the production and transaction costs are jointly determined. Lower transaction costs mean more trade and greater specialisation, changes in production costs and increased output. Changes in production costs also have an impact on transaction costs. If transaction costs are very high, many transactions may not take place at all. The reasons behind why an individual undertakes a particular transaction requires knowledge of the opportunity costs of alternatives. To understand the choices made, the cost of transactions that did not actually occur might need to be estimated. Individuals and groups within a given society may face very different transaction costs, so many estimates might be needed to develop more accurate measures.

The following quantitative technique is increasingly important and appears more frequently in the literature. For the relatively more tangible benefits and costs of watershed services in Sumber Jaya and in Singkarak — as an entry point for carbon sequestration services — the well-known concepts of willingness-to-pay (WTP) and willingness-to-sell (WTS) can be easily estimated. The sample size for analysing transaction costs should be high enough to avoid unnecessary bias. For more non-tangible benefits and costs such as biodiversity services in Bungo, WTP and WTS could be used, but with caution primarily because the 'market' for the services is not yet developed.

Field surveys and ground interviews on the relative importance of transaction costs in community-based agroforestry were conducted in two major villages in Sumber Jaya: Simpang Sari and Gunung Terang. Each village represents the buyers (providers) and sellers (beneficiaries) of the watershed services. Therefore, the transaction cost components should consist of:

For Service Providers

1. Costs of initiation, search and information, including group establishment, lobbying and obtaining permits.
2. Costs of organisation and coordination, including overheads, maintaining regular meetings, bargaining and decision or contracting costs, and opportunity cost forgone to attend the meeting.
3. Costs of monitoring and enforcement, including guarding the crops, maintaining crops or the land parcel and dispute settlement.

For Beneficiaries

1. Costs of initiation, search and information, including group establishment, lobbying and obtaining permits.
2. Costs of organisation and coordination, including overheads, maintaining regular meetings, bargaining and decision or contracting cost, and opportunity cost forgone to attend the meeting.
3. Costs of monitoring and enforcement, including guarding the water flow, canal maintenance and dispute settlement.

The first two components apply before the institutional arrangements for HKM take place, or before the formal permit is given to the community. The third category applies after the HKM is operational, and in some cases even the community is not given the formal permit. These are sometimes referred as *ex ante* costs (investment costs) and *ex post* costs (operational costs). Therefore, the analysis of factors influencing transaction costs should be the central theme of transaction cost economics, since the costs are crucial in identifying appropriate governance structures. These estimates could be used as a basis for establishing the reward mechanism from the beneficiaries to the providers of environmental services, both at landscape and national levels. However, the same analysis cannot be performed in Singkarak and in Bungo, mostly because there is no clear definition and progress in implementing HKM, and the farmers' organisation is rather unsophisticated.

3.3.2 Determinants of Transaction Costs

Conventionally, one can distinguish between influencing factors directly affecting the transactions and the broader, contextual factors. In theory, there are at least four key transaction attributes in natural resource management, involving mostly collective action and organisational structures (see for example Shelanski and Klein 1995, Birner and Wittmer 2000, Mburu *et al.* 2003). The empirical study will make it possible to discuss the relevance of these factors in a qualitative way. Theoretically, a quantitative assessment of these following factors would require a larger observation sample. The four attributes are:

1. Uncertainty arising from an uncertain environment and complex activities, usually leading to incomplete contracts.
2. Asset-specificity, which leads to the generation of appropriable quasi-rents.
3. Frequency with which transactions occur such as decision-making and meetings.
4. Complexity of the co-management arrangements, which mainly arise from the diversity of stakeholder interests, poor social cohesion and the number of resource users or landowners.

At a community level, researchers should consider that transaction costs arise from: (1) coordination activities among community members; and, (2) interaction (lobbying, bargaining) between local communities and state agencies (Mburu *et al.* 2003). The transaction costs may differ between households due to household characteristics and differences in willingness or the incentives created for households to bear the transaction costs involved in collectively managing natural resources. Previous studies on the subject suggest that the transaction costs arising from coordination activities are influenced by the social cohesion or social capital of the community members (Ostrom 1994, 2000). The transaction costs arising from interaction with state agencies probably depend on their perceived relationships with community members. The incentives for households to bear transaction costs in community-based, agroforestry management — the costs being an important proxy for providing environmental services — obviously depend on the benefits that the household expects in return. This includes the household's capacity to spend time and resources such as financial capital, and the availability of its labour.

4 FINDINGS AND INTERPRETATIONS

This section presents findings and interpretations of the institutional studies of RUPES, focusing on constraints and opportunities to develop environmental service markets in Indonesia. First, brief descriptions of study sites help to explain the general conditions of the three environmental services: watersheds in Sumber Jaya of Lampung; biodiversity in Bungo of Jambi; and carbon sequestration represented by watershed and hydrologic functions in Singkarak of West Sumatra. Findings on institutional mechanisms are presented using institutional typology based on the four classes of norms, conventions, working rules and property relations.

The analysis focuses on the interplay between individuals, institutions and markets. Societal collective actions and formal collective actions in the form of law and government regulations and decrees are also analysed, to provide clear guidelines for the interaction between individuals, institutions, and markets. Finally, estimated transaction cost analysis is presented in such a way as to provide avenues for policy reforms that will formulate action plans for community empowerment, advocacy at the field and policy levels, and develop environmental services markets in Indonesia in general.

4.1 Site Descriptions

4.1.1 Watershed Services in Sumber Jaya, West Lampung

The Sumber Jaya subdistrict was first officially inaugurated by President Soekarno in 1952, as a destination for transmigrants from West Java. The transmigration program was managed by the Administration of National Reconciliation Bureau (BRN, *Biro Rekonsiliasi Nasional*), which was also responsible for regional development. In only few decades, Sumber Jaya has developed rapidly into a well-known coffee producing area in North Lampung. As a new growth centre, the subdistrict attracts migrants, mostly from Java and neighbouring regions, for coffee cultivation, forest-product extraction and other intensified agricultural activities.

Sumber Jaya is hilly and mountainous (700–1700 metres above sea level). Mount Bukit Rigin (1395 metres) is in the centre, with several other mountains surrounding such as Bukit Subhanallah

(1623 m) in the north, Bukit Tangkit Tebak (2115 m) in the east, Bukit Tangkit Begelung (1,213 m) in the southeast and Bukit Sekincau (1718 m) in the southwest. The average rainfall is 2614 mm per year, and the subdistrict is generally classified as a BI zone because it has seven wet months when rainfall is over 2000 mm, and just one dry month. The average temperature is 21.2 °C; the minimum average is 20.3 °C and the maximum average is 21.71 °C. The area is suitable mostly for growing coffee, vegetables and other horticultural products.

The Sumber Jaya boundary coincides with the watershed area of Way Besai, which also includes protected forests, such as: (1) Register 39 Kota Agung Utara, 49 994 hectares; (2) Register 44B Way Tenong Kenali, 14 000 hectares; (3) Register

45B Bukit Rigis, 8295 hectares; and, (4) Register 46B Palakiah, 1800 hectares. Register 45B Bukit Rigis is the most significant for watershed protection because it has 11 rivers and streams feeding agro-ecosystems. More importantly, land-use changes in Sumber Jaya in recent decades and socio-economic interactions with other external factors have revealed several environmental, economic and social issues.

At the time of our study, Sumber Jaya was part of the new district of West Lampung, which was previously administered by the North Lampung district. In 2000, Sumber Jaya was divided into two subdistricts: Sumber Jaya on the east side, managing 15 villages, and Way Tenong on the west side, managing 14 villages. The new Sumber Jaya is only 35 646 hectares, a significant decrease

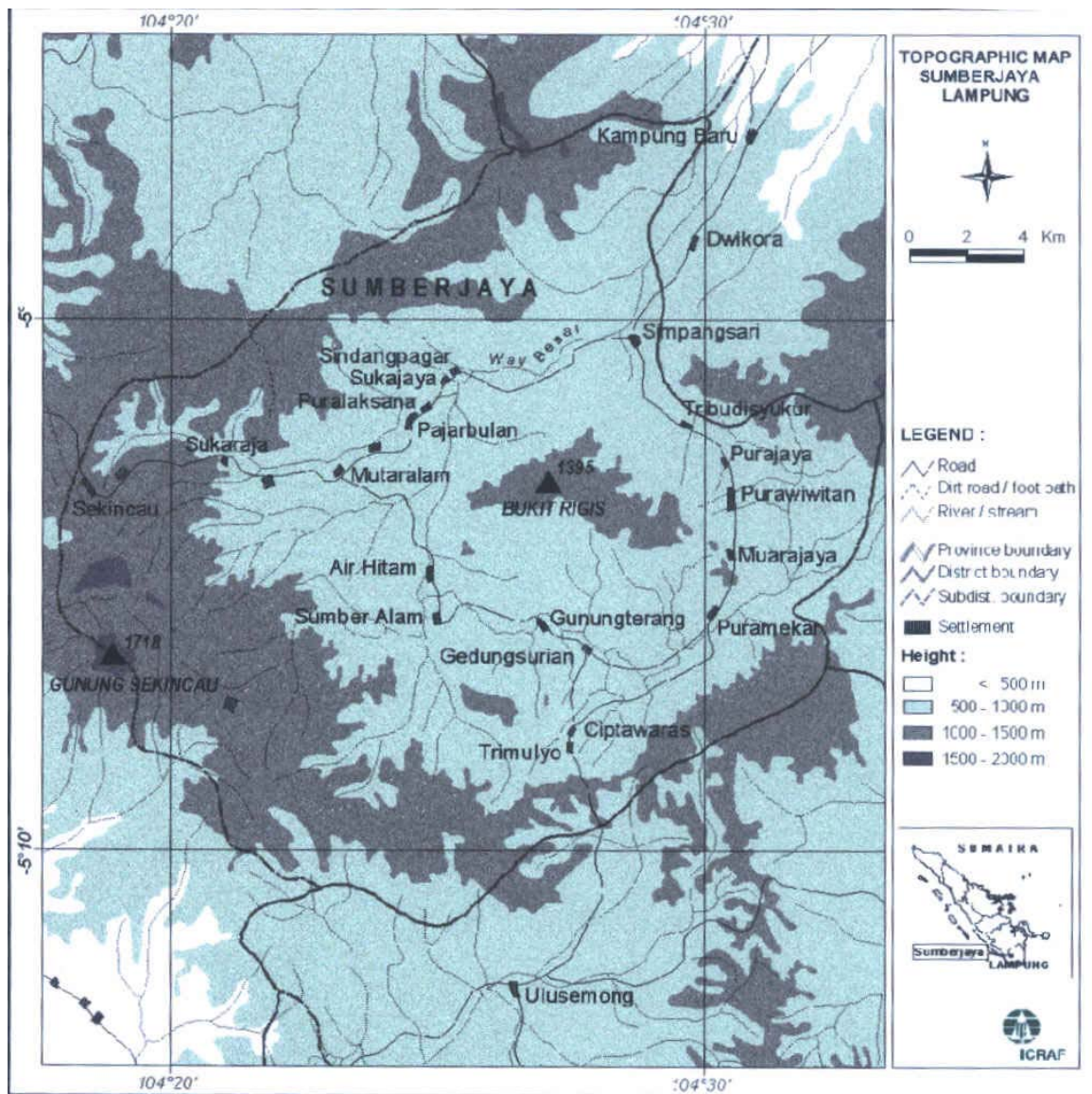


Figure 3.1 Topographic Map of Sumber Jaya, West Lampung

from the old Sumber Jaya of 54 194 hectares. Almost 90 000 people lived in the old, larger Sumber Jaya; the new, smaller subdistrict has perhaps 50 000 people. Coffee plantations are the major land use in the upper watershed (44.6 percent of the total subdistrict), with paddy rice on the lower portions (5.13 percent). The rest of the land is mostly protected forest, the ultimate function of Way Besai sub-watershed. A coffee monoculture is grown on about 20.1 percent of the total watershed area; and coffee-agroforestry — also known as multi-strata or shaded coffee — is grown on about 24.5 percent.

During President Soeharto's administration, Sumber Jaya was notorious for conflicts over land use. The 'security approach' employed by the authorities led to mass evictions of thousands of families living in the area and growing coffee in the protected forests. The government adopted the 'rule of law', in which people were banned from making a living in the protected sub-watershed area, despite the inhabitants arguing that they had been practising coffee agroforestry and monoculture for more than three decades. Meanwhile, in the early 1990s, the government was planning to build the Besai hydro-electric power station (HEPP) using water from the Way Besai catchment, to increase energy supplies to southern Sumatra and surrounding areas. However, as the authority was only accustomed to a linear and command system, this state-owned enterprise used military power to remove people from the protected forest. Participatory planning in the development process was a luxurious approach at that time, so there was no dialogue to resolve the conflict.

After Soeharto fell in 1998, conflict and socio-economic tension between coffee growers and government officers relaxed as processes became more open and there was more interest in participatory planning and involving stakeholders in managing forests and conserving resources. First, Indonesia passed Law 22/1999 and an improved version of Law 32/2004 on regional autonomy, granting local governments more power to manage their own resources. Lampung's local government has announced the provincial decree 7/2000 on local tax and levies on non-timber forest products, including coffee. This arrangement has been seen as formally recognising coffee growers cultivating their crops in the forests. The central government, i.e. the Ministry of Forestry, has also enacted community-based forestry management under Ministerial Decree No. 31/2001. This decree

recognises people who have been practicing agroforestry and tapping other resources in forests. The key word of this decree is participatory forest management and conservation of forest resources and the ecosystem.

Nonetheless, different stakeholder interests in Sumber Jaya's watershed may still lead to sustained conflicts over water resources. Unsustainable coffee farming practices upstream create problems for downstream water users and inhabitants. This includes coffee monocultures, horticultural practices, and secondary food crops with no significant soil conservation techniques to prevent erosion and declining water quality downstream. Recent issues also include declining water supplies, particularly during the dry season. The shortage has become very serious for the state-owned PLTA Besai (PLTA=Pembangkit Listrik Tenaga Air or hydro-electric power plant), which is expected to generate 144 megawatts, and for domestic uses such as drinking-water.

A well-known recent finding suggests that coffee-agroforestry is as effective as the original forest cover in protecting water yield and water quality (van Noordwijk *et al.* 2000). In other words, coffee multi-strata systems could be considered as an environmentally beneficial land use both in terms of agro-ecosystems and socio-economics. Moreover, the practice in protected forests or state-owned land has also been 'widely accepted', with temporary five-year tenures granted to coffee growers as long as they form a farmers' group or organisation and meet the criteria for community-based forestry management or HKM (*Hutan Kemasyarakatan*) according to Ministerial Decree Number 31/2001. After five years, the tenure is reviewed and can be extended to a maximum 25-year right to utilise the state-managed protected forest.

The relevant issue in the future is whether or not this temporary tenure for coffee agroforestry in the Way Besai watershed could also be seen as a preliminary reward mechanism or an incentive system for coffee farmers to actively protect the forest resources and maintain watershed functions. Under a fluctuating world market price for coffee, or where economic incentives have not worked properly, better criteria and clearer guidelines for reward systems in which downstream people transfer payments to poorer upland farmers are ultimately needed to ensure that environmental service payments are equitable and sustainable. This is the main issue with watershed services at a local scale as in Sumber Jaya of West Lampung.

4.1.2 Biodiversity Service in Bungo, Jambi

The former district of Bungo Tebo was split in 2001 to create two new districts, Tebo and Bungo. Bungo now consists of six subdistricts: Pelepat, Jujuhan, Rantau Pandan, Tanah Sepengggal, Tanah Tumbuh, and Muara Bungo, which also serves as the Bungo district capital. Most of the area is relatively flat, 500 metres above sea level or less. The district also includes the Bukit Barisan highland; Mount Kerinci (3800 metres) is the highest peak. Bungo has five consecutive months with an annual average temperature of 26.6 °C, ranging from 22.7 °C in the rainy season up to 31.6 °C in the dry season. Average rainfall is about 3000 mm, ranging from 100 mm per month in the dry season up to 500 mm per month in the wet season.

The study site in Bungo is focused on 455 308 hectares of the Batang Hari watershed, the second largest river in Sumatra. Forest is the dominant land use (37%), followed by rubber plantation or monoculture (31%), and rubber agroforestry (13%). The remaining land is allocated for oil palm (13%) and young oil palm (5%) and other categories such as young rubber (Kuncooro 2004). Rubber plantations and rubber agroforest are grown by smallholders, involving different arrangements between the landlords and

share-tappers. Average rubber yield is only 640 kg dry rubber per hectare per year, a relatively low yield compared with an average of 990 kg dry rubber per hectare per year in special foreign-funded Smallholder Rubber Development Projects (SRDP) using clonal high variety rubber (Wibawa *et al.* 2001).

Biodiversity services are mostly associated with preserving and sustainably managing rubber agroforestry systems, commonly known as 'jungle rubber'. Rubber agroforestry is established either as a relatively short cyclical system or a long-term or 'permanent' system; each has different socio-economic and agro-ecosystem consequences (Joshi *et al.* 2000). The cyclical system involves clearing vegetation across the whole plot often through slashing and burning, followed by replanting rubber seedlings. Annual crops are cultivated along with some weeding and cleaning, normally in the first two to three years until rubber trees start casting significant shade. The plot is then 'abandoned' until rubber trees reach tappable size, generally when the trees are six to 10 years old. Meanwhile, in the near-permanent long-term systems, rubber seedlings are planted as enrichment planting (or gap rejuvenation) whenever sufficiently large enough gaps are formed inside a rubber garden. Management

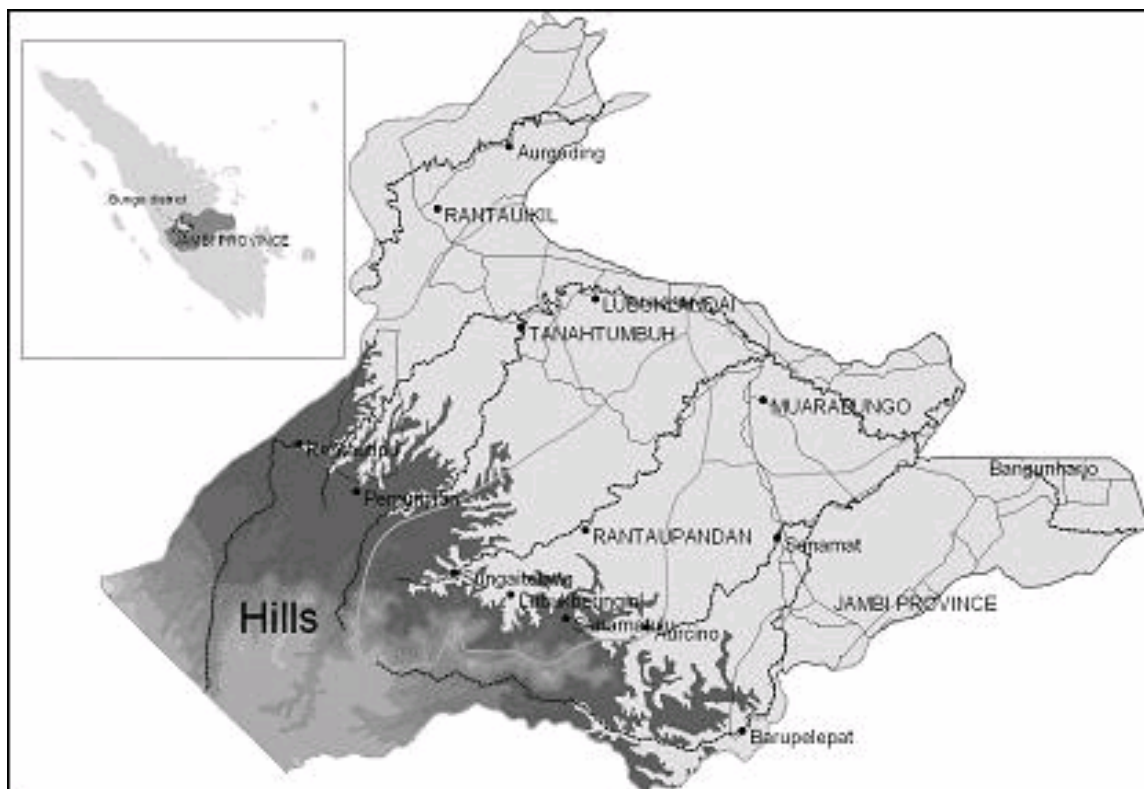


Figure 3.2 Topographic Map of Bungo, Province Jambi

decisions are made at tree or gap level, rather than across the whole plot. Locally, the system is known as *sisipan*. It leads to permanently vegetated plots with mixed-age rubber trees and an ample natural forest canopy. Permanent plots normally include trees in various stages of production, from young seedlings to mature and over-mature trees.

Local smallholders might not be aware that the existing rubber agroforestry system has helped to preserve biodiversity in the humid tropics. The jungle rubber system is an example of complex agroforestry based on producing an economically important commodity — latex — which generates on average 70% of household income in the area (Wibawa *et al.* 2001). This system has been under pressure for change either to more permanent food crop systems or rubber monocultures with higher yields, especially when world rubber prices are high. Equally important with regard to biodiversity conservation is pressure from mining companies and oil-palm investors keen to expand plantations on the very same limited upland areas.

Other concerns over biodiversity services in Bungo are usually related to poor farmers involved only in harvesting or tapping to collect latex. Share-tappers, or *anak kapak*, tap in other people's rubber gardens under a harvest sharing agreement. Share tapping is commonly practised by villagers with few or no tappable rubber trees, but surplus labour. Share tapping is also common for rubber owners with surplus rubber trees they are unable to tap themselves for various reasons. In Jambi and in most places in Indonesia, share tapping occurs without prior written consent, but generally a very strong commitment based on verbal agreements.

Most rubber farmers in Jambi own rubber fields of between two and four hectares. In general, farmers with more than 5 ha of mature rubber require help, either from paid labourers or share-tappers (Joshi *et al.* 2000). Farmers with clonal rubber, due to its higher productivity and tree density, generally require more share-tappers per unit area. An average tapper can tap around 400 trees in a day or about one hectare for a clonal rubber plantation. On the other hand, seedling plantations have a lower tree density; hence a large area may be covered. However, this is also influenced by tree distribution and ground vegetation. The sharing of the yield depends on the rubber garden's productivity, which again may be determined by the stock, whether it is seedling or clonal. In general, where slab productivity is low, one-third (1/3) goes to the owner and the tapper keeps the rest. In fields with higher productivity

as in mature clonal plantations, the ratio can be 1:1 or 50 percent each. In a young clonal plantation where rubber trees have not reached full production, the sharing may be 1/3 and 2/3 in the first few years (Wibawa *et al.*, 1999). In most cases, share-tapping is a form of acquiring cheap labour but with a longer term relationship and this sometimes involves family bonds. However, this bonding may be broken based on alternative opportunities and family relationships.

4.1.3 Carbon Sequestration in Singkarak, West Sumatra

Carbon sequestration in Singkarak of West Sumatra was approached using catchment management around Lake Singkarak. The catchment covers 129 000 hectares and spreads from the Solok District in the south to the District of Tanah Datar in the north. The Singkarak catchments were previously known as the heartland of the Old Minangkabau Kingdom. They are spread over an elevation from 360 to 1500 metres above sea level land. The hills are steep, sloping between 26 and 75 degrees, and serve as the region's food basket. The annual rainfall ranges from 1660 mm to 1860 mm, but with three dry months where rainfall is less than 100 mm per month. The other months receive more than 100 mm each. About 39 000 hectares (31%) of the catchment is considered 'critical land' as a result of non-suitable land-use practices, resulting in either degradation or infestation by wild *imperata* grassland. Remaining land uses include rice paddy (21%), upland crops (17%), and other uses (30%). Most of these critical lands and 9773 ha of uplands belongs to the clan (*Ulayat Kaum*) and local community (*Ulayat Nagari*). Only a small area (less than 2000 ha) belongs to the state (Boer *et al.* 2004).

Lake Singkarak is about 13 665 hectares in size, about 21 km long, 16 km wide and about 160 m deep. The lake's water comes from at least five main rivers (*batang*): (1) Batang Malalo from the west (Tanah Datar District); and from the Solok district in the south: (2) Batang Ondoh, (3) Batang Paninggahan, (4) Batang Saning Bakar, and (5) Batang Sumani. The lake's original outlet is Batang Ombilin to the east, providing water for irrigating rice paddies in four downstream districts: Solok, Padang Pariaman, Tanah Datar and Sawahlunto Sijunjung. In addition, an artificial outlet to the west has been used for generating hydro-electric power for PLTA Singkarak, which serves the provinces of West Sumatra and Riau. PLTA Singkarak has the capacity to generate 175

megawatts, a little higher than PLTA Besai in Lampung.

About 400 000 people live in the Singkarak catchment, with a density around 205 people per square kilometre. About 10 percent live below the poverty line. The majority of people (76.6%) around Lake Singkarak make a living from agriculture and fishery, while 10 percent practise swidden agriculture or shifting cultivation. The famous rice *Bareh Solok* and the exotic fish *Ikan Bilih* are among the agricultural products specific to the Singkarak catchment, although production

has declined significantly in recent years. The decline in fish is mainly blamed on land degradation, deforestation and unsustainable land-use practices. In addition, population pressures have increased, and land rotations have fallen to between two and four years. The institutional arrangements within the clan and community also determine patterns of land-use changes in West Sumatra.

After the fall of President Soeharto's centralised New Order Regime and the beginning of the Reformation Era, Singkarak has also benefited

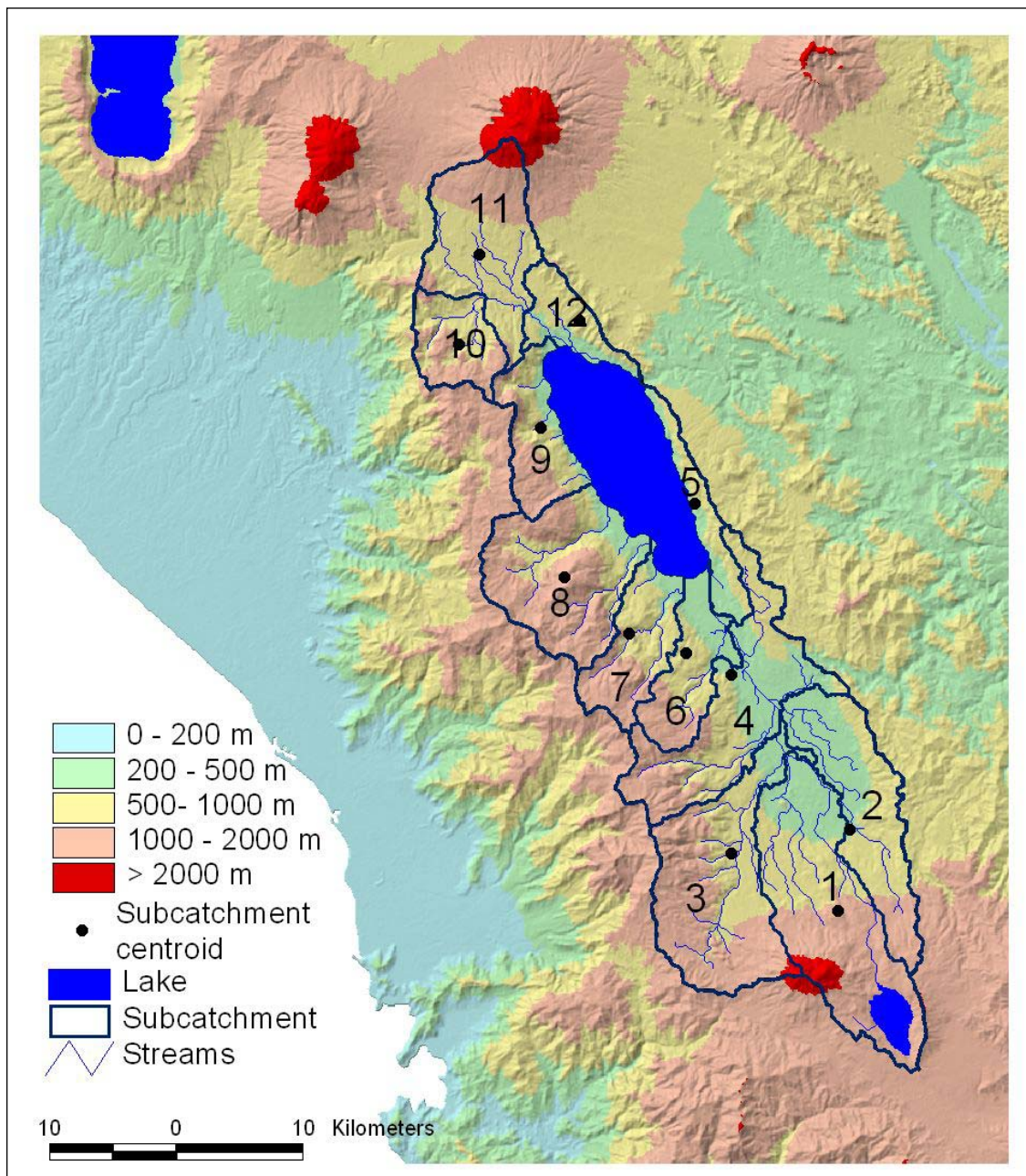


Figure 3.3 Topographic Map of Catchments Area of Singkarak, West Sumatra

from new decentralisation policies which have revived the significant roles played by informal leaders in the governance system. The Provincial Government of West Sumatra issued local regulation Number 9/2000 on *Nagari* Government System. The term '*nagari*' loosely means 'village', but practically consists of several villages under the previous centralised definition of rural government, which was a subordinate of subdistrict (*kecamatan*) government. One should note there are basically no changes in the *kelurahan* (urban village) system, where the urban village head (*Lurah*) is a government-appointed officer, although a recommendation from the society might also be considered.

Nagari government is an autonomous, locally based institution led by a mayor (*wali nagari*) who is directly elected at village level. The village has representatives or a parliamentary body called *Badan Perwakilan Anak Nagari* (BPAN), consisting of *adat* elders (*ninik mamak*), religious leaders (*alim ulama*) and the intellectuals (*cerdik pandai*). Two other categories are also always used: the *adat* women (*bundo kanduang*) and the young (*pemuda*). Sometimes these parliamentary bodies are augmented by local leaders, professionals, farmers' groups and, rarely, migrants. In addition, the *Nagari* is equipped by a supreme body of consultative *adat* agency called the village council or *Kerapatan Adat Nagari* (KAN), and consultative institutions *Badan Musyawarah Adat dan Syarak* (BMAS). The selection process for consultative members varies by *nagari* systems, but does not deviate from the principles of the Council of the Three Pillars (*Majelis Tungku Tigo Sajaringan*, MTTS) which has *adat* elders, religious leaders, and intellectuals (please see Benda-Beckman 2001, for a more complete review of *nagari* systems).

The 'back to *nagari*' movement in Singkarak plays a significant role in expanding participatory planning and development processes in natural resource management. As the community is more aware of the importance of forest cover around Lake Singkarak, they have started to reforest and rehabilitate the critical and degraded lands, although at slow rate. The mayor of *Nagari* Paninggahan is among the local leaders concerned about the forest cover in the catchments and with Lake Singkarak's water quantity and quality. The Million Trees Planting Program (*Penanaman Sejuta Pohon*) is an example of a natural resource management initiative. This program was started in February 2003 in Junung Sirih sub-district, *Nagari* Paninggahan, with the target of rehabilitating about 540 ha of critical land every

year. This program will run for five years to rehabilitate about 2700 ha of critical land, which amounts to somewhat less than 10 percent of total critical lands in the Singkarak catchment. At the time of writing, the community had only rehabilitated 30-40 hectares (Boer *et al.* 2004). Given the local community spirit and the willingness of local leaders, the rehabilitation initiatives shall be continued and supported by external funding sources. Otherwise, the problems of deforestation and declining quality and quantity of lake water will persist and contribute to marginalising rural people, condemning them to live in poverty amid relatively fertile volcanic soils and prosperous resources.

In this case, an afforestation and reforestation movement in the Singkarak catchments could be considered as a prospective and important step towards creating a clean development mechanism (CDM) under the Kyoto Protocol-mandated forest-carbon programs. In the last months of President Megawati's administration, Indonesia passed Law 17/2004 on Ratifying the Kyoto Protocol after more than four years of legislative process and heated public debates, mostly because the United States has not ratified the treaty. The Law should be inseparable from the original version of the 1997 Kyoto Protocol, suggesting that a Designated National Authority (DNA) for Clean Development Mechanisms (CDM) will be established.

The CDM principles can be summarised simply as follows. Carbon benefits generated by carbon sequestration projects through afforestation and reforestation can be traded to developed countries to offset their high carbon emissions. In other words, the communities participating in reforestation and afforestation programs such as in *Nagari* Paninggahan of Singkarak would earn money by selling the sequestered carbon to industrial countries. In addition, a State Ministry of Environment study suggests that the Lake Singkarak catchment has been identified as a potential site for forest-carbon projects (Boer *et al.* 2004). The 'National Strategy Studies on Clean Development Mechanism' suggests that both communities and local government need to be interested in such projects and show commitment through local co-financing and other necessary participation. This CDM project would contribute significantly to the 'bigger picture' on rewarding poor people in local communities for environmental services, by establishing more rational incentives for the providers to maintain sustainable resource management practices.

4.2 Institutional Mechanism: Typology in Different Services

Institutional typologies were identified in relation to the environmental services found in the three RUPES study sites. The typology was examined according to the institutional classes mentioned previously in the methodology and analytical frameworks. Because the boundary is really subtle in the field, and for more practical purposes, classes of institutions on working rules and property relations are combined. However, a more thorough examination of societal-based collective and community level initiatives was also conducted, particularly in relation to trust levels and other social capital to be developed for the reward mechanism.

4.2.1 *Institutions in Sumber Jaya, Lampung* *Norms and Conventions*

The norms and conventions were developed mostly by 'the migrant value', or frontier and forest-pioneer character. One should bear in mind that the society in Sumber Jaya has had bad experiences and gained a poor impression of government policy, notwithstanding Indonesia entering the *reformasi* era in 1998. As mentioned briefly in the previous section, President Soeharto's New Order Government used the military in the 1990s to overcome the misuse of, or encroachment into, protected forests, leading to mass evictions of small farmers growing coffee gardens and engaged in mixed agroforestry. It was really a nightmare and very hard for most people to forget. Villagers give the impression they are very sceptical about outsiders, and this is understandable considering these people do not want to be treated as encroachers or even criminals.

The villagers or providers (and beneficiaries) have understood the norms that if they were united in an organisation, they could obtain the right to use the forest land for 25 years with probationary rights for five years under a CBFM program. These norms are the logical result of recently written government policy rules on CBFM, in the form of the Minister of Forestry Decree No. 31/2001 on *Hutan Kemasyarakatan* (HKM). These temporary 'tenure rights' are not easy to obtain, since only five farmer organisations have been 'officially recognised', from the total of 15 (please see explanation in the subsection on working rules and property relations). The temporary rights to use the protected and production forests can be renewed after some evaluation.

The conventional reason for justifying crops on forest land is based on 'original control' in clearing and tree crop planting. As commonly practised in forest frontier communities, Sumber Jaya villages follow the norms of 'first come, first served', where the individuals who opened up the forest in the 1970s or earlier could legitimately claim 'possession' (not necessarily 'rights' or 'ownership') and could grow any crops necessary to generate economic returns. Transfer of possession or at least 'leased out to the newcomers' was commonly practised prior to the 1980s, even though the land is officially state-owned.

The conservation values strongly adopted by the farmer organisations include members more closely monitoring economic activities within the protected forest block, mainly looking for encroachers and illegal loggers. Based on field observations, each farmers group in Sumber Jaya claimed to capture 2-3 encroachers and illegal loggers within its jurisdiction. The actual number of incidents in the state forest would be higher than what is reported.

Working Rules and Property Relations

Farmers and forest communities in Sumber Jaya have effectively set working rules for collective *kebun* (mixed agroforestry gardens), and, more importantly, these practices are now governed by the Ministerial Decree of Forestry No 31/2001 on CBFM, more commonly known locally as HKM. An HKM group wanting formal recognition and the right to use the state-owned forest land is required to present at least three major documents: (1) the group's working rules and regulations in writing; (2) participatory, community-based maps of village land boundaries; and, (3) sensible working plans for five years. The permit will be evaluated after five years, and groups performing satisfactorily will be granted more permanent tenure for 25 years.

These temporary written rules on 'tenure' upstream are actually an adequate basis for protecting and conserving water resources for downstream users. The process of obtaining HKM tenure is more complicated when the state land boundaries cross more than two autonomous districts. The interpretation of the current regional autonomy rules and regulations (Law 22/1999 and its improved version, Law 32/2004) differ significantly between the autonomous districts, so that preserving and conserving water and natural resources in general face serious challenges in the future.

The underlying institutions — trust and togetherness, a sense of guardianship (bonding social capital) among the villagers — are sensible prerequisites to enforce the law of ‘no trespassing’ on state forest land. Each HKM group has established effective monitoring and control over encroachers and strangers primarily because the future of HKM tenure rights depends very much on the sustainability of forest resources.

4.2.2 Institutions in Bungo, Jambi

Norms and Conventions

Institutions supporting biodiversity services in Bungo were developed based on norms and conventions where land-use rights are generally attainable through forest frontier activities such as the initial planting of cash crops such as rubber, cinnamon, and other tree crops. However, Bungo society strongly enforces that rights will be lost if users are absent from the land for more than 10 years. The forfeit land is then considered common property where everybody can manage, control and enforce its utilisation through *adat* conventions.

Bungo society strongly enforces *tanah batin*, a system where land cannot be owned permanently. This category includes a special designation for upland paddies where the society controls the sustainability of rice fields, as well as land set aside for cemeteries, the river for general purposes and *lubuk*, or aquaculture. Another convention called *tanah nenek* allows for ownership or use rights within social or lineage systems. In theory, this land can be transferred, although in practice it never happens. Villagers still consider this land as heritage to sustain Bungo society as a whole.

According to *adat* conventions, farmers in Bungo are strongly encouraged to cultivate paddy fields either upland or lowland. Shifting cultivation methods, locally known as *ladang gilir* or upland rice rotation, are used in upland areas. Upland rice rotation combined with long-fallow systems was very common in the old days when the population was small. However, as the population has increased in recent years, the long-fallow system is hardly found in Bungo. Once valuable cash crops such as rubber, cinnamon and *jengkol* were grown in rotation, implying ownership or at least control over the specific fields. The room for further fallow becomes very limited, as does spare land for different groups interested in expansion or field rotation. The Bungo society generally regards paddy fields as

having the highest food security value compared with other systems, even though labour costs are increasing substantially. More recently, more attention is being paid to converting land to palm oil, a crop promising attractive future benefits from both small and large-scale plantations.

Pressure for land conversions has grown significantly in recent decades, threatening sustainable land use and forest conservation in the very important piedmont of Kerinci Seblat National Park and the penneplain of Sumatra. Some portions of *adat* or *ulayat* land, where the hotspots for biodiversity richness are found in rubber agroforestry fields, are now threatened with conversion to oil palm plantation with its well-known, high economic returns from crude palm oil exports. National policies in fact have promoted the potential for Indonesia to become one of the largest crude palm oil-producing countries in the world. To implement the policies, local government in Bungo and other districts have approved *ijin prinsip* (initial permission) or investment for oil palm plantation. Coal mining prospects in old forests controlled by the *ulayat* land system pose another significant threat for biodiversity in Bungo’s rubber agroforests.

Working Rules and Property Relations

Bungo society acknowledges self-ownership and open access to land, governed by working rules and formal state rules represented by the local land administration office (*Badan Pertanahan Nasional*). However open access is weak, with multiple interpretations common in recent times. The formal rules are written and enforced by the state, down to village level. The sub-district (*kecamatan*) is the lowest level of formal administration, but at some points the village head (*Kepala Desa*) can represent both the state and the community for administrative purposes. For example, village heads can propose a land boundary, which is then certified by the subdistrict head (*Camat*) and verified by the district Land Administration Office.

Other examples of clearly defined and understood rules include land ownership regulations or land certificates, even though most villagers do not hold the piece of paper. Unlike informal rules, which are well-defined and well-enforced, formal rules are not clearly understood, or, at least, the villagers are not interested in the nitty-gritty arguments over formal land administration issues. Villagers in Bungo also understand the working rules of ‘no

trespassing' on state land, conservation forests and so forth. In practice so far, villagers in Bungo's rural areas are tapping some resources, primarily non-timber forest products such as honey, from protected forests.

4.2.3 Institutions in Singkarak, West Sumatra

Norms and Conventions

The norms and conventions adopted in Singkarak have changed recently according to decentralisation moves under Law 22/1999. After being forced to adopt a uniform *Desa System* (village) under Law 5/1974 during the Soeharto era, the *nagari* system has now been revived. This has changed significantly the dominant roles of informal leaders in village governance. As mentioned previously, *nagari* is a very sophisticated, representative democratic system, similar to Western democratic systems and representing more complex social norms and conventions defining and governing land use, and other aspects of daily life.

The *adat* system in West Sumatra has its own hierarchy. The lowest level is called *kaum*, headed by a local leader, or *datuk* (a representative of *Ninik Mamak*). Between four or five *kaums* could form *sduik*, headed by a top leader *datuak tuo*. Between three and four *sduiks* could form a clan, or *suku*, coordinated by a very senior leader, *datuak pucuk*. Several different *sukus* can form a representative body in a *nagari*, called a village *adat* council or *kerapatan adat nagari* (KAN), and consultative institutions *badan musyawarah adat dan syarak* (BMAS), such as mentioned earlier. Land conflicts are normally settled using traditional *adat* rules of law.

Land ownership (or more precisely the 'right to use') is governed through locally defined conventions within *kerapatan adat nagari*, a decision-making institution preserved since before independence. There are at least three types of land tenure: (i) *tanah ulayat nagari* (*nagari* land) which is under KAN responsibility; (ii) *tanah ulayat suku* (clan land) which is the responsibility of all *datuks* and coordinated by the *datuk pucuk*; and, (iii) *tanah ulayat kaum* (sub-clan land) which the responsibility of the *kaum* members and coordinated by *datuk*. People interested in cultivating these lands could make special arrangements with the local leaders, normally by sharing profits with the land owner (either *nagari*, *suku* or *kaum*).

Lakes and other water bodies in the Singkarak catchment are considered common property for fishing, irrigation, aquaculture and other activities. Therefore, the land-use norms and conventions apply to any common property in West Sumatra. Some resources such as fish in a certain section of a stream are locally protected and cannot be caught at all at some times. The idea is to allow fish stocks to replenish and ensure enough quantity and quality for local people. Those caught using illegal fishing methods such as potassium, calcium carbide, or bombs would be prosecuted locally and severely punished. In this case, each *nagari* governs and enforces the norms and conventions for the sake of society's overall prosperity.

Other norms and conventions include that paddy fields represent a society's food security and prosperity. This leads to paddy fields being generally more valuable than any other land-use types in Singkarak and possibly other areas of West Sumatra. For example 'Bareh Solok' (the rice from Solok) is identified with West Sumatra and probably Indonesia and should be preserved to better benefit West Sumatran people. The falling population of the exotic fish *Ikan Bilih* should also be a concern for natural resource management because the decline is usually associated with deforestation and land degradation upstream in Singkarak's catchments.

Working Rules and Property Relations

In terms of working rules and property relations in Singkarak, the *nagari* system acknowledges self ownership by societal and formal state rules. To implement reward mechanisms for poor upland people to rehabilitate resources, the existing working rules might be used as a reference. For example, Indonesia's Law 34/2000 governs the tax for surface and sub-surface water (*pajak air permukaan dan bawah tanah*). The law has been equipped with Government Regulation (*Peraturan Pemerintah* or PP) 65/2001 on regional taxation (*Pajak Daerah*). Locally, the Provincial Government of West Sumatra has issued Local Government Regulation (*perda*, or *peraturan daerah*) 4/2002 on taxes for using surface and sub-surface water.

These working rules stipulate that the Provincial Government be allocated 30 percent of the taxes collected on surface and sub-surface water, with 35 percent going to the district generating the tax, and 35 percent distributed among other districts in the West Sumatra Province. However, there

are no regulations on how this tax should be used or distributed to the community. In 2004, about 2.2 billion rupiah (US\$250 000) in water taxes was collected from PLTA Singkarak, and about 777 million rupiah (US\$88 300) was distributed to Solok and Tanah Datar districts (Boer *et al.* 2004). Several *nagari* mayors suggest that most of this tax should be given directly to local communities through *nagari*. In other words, these local leaders are calling on local governments, especially around the Singkarak catchment, to formulate working rules on distributing land taxes, implementing the spirit of Law 34/2000, PP 45/2001 and *Perda* 4/2002 at the local level.

As explained previously, informal rules within the *nagari* system are well defined and enforced. Society in Singkarak is generally aware of formal rules enforced by the state. However, the complexity of the *nagari* system in governing land uses in rural areas is discouraging investment, including in forestry, especially if the investors are from outside West Sumatra. These investors are sometimes reluctant to learn and understand the local norms, conventions, working rules and property relations. Therefore, there should be mechanisms to bridge the efforts to improve natural resource management, tap into local wisdom and encourage local economic development based on local resources.

4.2.4 Synthesis of Institutional Mechanisms Relevant for RUPES

Synthesising the institutional mechanisms for watershed services in Sumber Jaya, biodiversity services in Bungo and carbon sequestration services in Singkarak, reveals the importance of initial information on the institutional typology in each site. In this study, classes of institutions on working rules and property relations are combined together in identifying typology, so the mechanisms cover two larger groups: (1) norms and conventions; and, (2) working rules and regulations. This synthesis is developed based on both the results of in-depth interviews with key informants and stakeholders in RUPES programs and a sampling survey of 37 respondents in the villages of Simpang Sari and Gunung Terang in Sumber Jaya, and 47 respondents in several hamlets (*kaums*) of Nagari Paninggahan Of Singkarak.

However, no sampling survey was conducted in Bungo in Jambi, because at the time of field observations, the pilot villages for RUPES were not yet determined. Synthesis of institutional

mechanisms in Bungo was based mainly on in-depth interviews with resource people and key informants, and the available literature on natural resource management, biodiversity, the rubber economy and land-use practices in rubber agroforestry. Later in the year, research to facilitate payment mechanisms and to develop biodiversity service markets in Bungo focused on two different protected forests and respected jungle agroforestry systems. Administratively, the pilot research activities are located in the subdistricts of Rantau Pandan and Tanah Tumbuh. In Rantau Pandan, the pilot villages for RUPES include Karak, Lubuk Beringin and Muara Buat. In Tanah Tumbuh, the pilot village is Renah Jelmu.

Level of Dynamics of Norms and Conventions

The findings from field observations show that the level of norms and conventions adopted by the society living around the watershed is very much determined by the community's characteristics and historical figures. For example, the migrant character of the Sumber Jaya community leads to most people (62%) feeling that everybody can grow crops on forest land. On the other hand, people living in the Lake Singkarak watershed believe that the land — including forest — is controlled by the traditional *ulayat* system, from *kaums* to *nagaris*. Only 5 percent of respondents in Singkarak believe that individuals can have access to grow crops in forest land. According to information from key informants, perceptions in Bungo would fall somewhere in between those in Sumber Jaya and Singkarak. These findings have other implications in that the role of farmer groups in growing crops on forest land is not as important as their function in improving social cohesion and community togetherness.

Most respondents in Sumber Jaya (78%) belong to local organisations such as farmer groups (more precisely CBFM or HKM groups), whereas most respondents in Singkarak (72%) were not members of any local organisations. These seemingly contradictory findings could be explained by the fact that growing crops in forests does not have strong government recognition, even though local authorities are no longer repressing the farming activities. People do want more freedom in growing cash crops such as multi-strata coffee and tree crops in protected forests, assuming more sustainable practices have been adopted. In this case, the Sumber Jaya farmers are mainly interested in joining these

organisations so as to obtain more secure land use and property rights, particularly in view of recent rules and regulations about HKM and/or social forestry policies in general. Regarding the understanding on rights, benefits, and responsibility in joining farmer associations, most respondents in all RUPES study sites are confident about their decision to join at least one organisation.

Table 4.1 also shows that nearly 57 percent of respondents in Sumber Jaya acquired land by purchasing from local government or local leaders. Only 30 percent claim the border of their land is determined by 'original control' in forest clearing and tree planting. In contrast, most respondents in Singkarak (91%) determine the land border by 'original control' forest clearing and only 9 percent of respondents purchased the land from local leaders or other people. A similar picture emerged in Bungo, where local norms and conventions on *ulayat* land are very strong in determining acquisition, or else local wisdom is effectively adopted and enforced.

People in Singkarak and Bungo opened up forests, determining the borders using tree crops such as rubber, cinnamon or *cassia vera*, and then claimed property rights on the *ulayat* land. This implies that their young generations could use forest lands previously cleared for cash crops, including determining the land borders.

This pattern is significantly different from land acquisition in Sumber Jaya, where most respondents are descendants of the first settlers. The norms and conventions adopted by the society also differ from Singkarak and Bungo. People in Sumber Jaya mostly buy the land, even sites in the protected forest, either from local leaders, previous settlers or fellow farmers. In this case, the rights to utilise the protected forest for multi-strata coffee have been transferred to other people. This type of 'land market' is obviously not publicly announced, as it might be considered an illegal transfer. More careful analysis is required as to whether or not these transfers could affect the future of HKM policies.

Table 4.1 Level of Norms/Conventions Adopted in Sumber Jaya and Singkarak

	Variables and Indicators	Sumber Jaya (%)	Singkarak (%)
1	Major norms adopted on natural resources		
	(a) Everybody has access to grow crops in forest land	62.2	5.0
	(b) Only groups have access to grow crops in forest land	27.0	32.5
2.	How land borders are determined		
	(a) Original control in forest clearing/tree planting	29.7	90.5
	(b) Land purchased from local government/leaders	56.8	9.5
3.	Membership of local organisation (farmers group)		
	(a) Yes	78.4	27.9
	(b) No	21.6	72.1
4.	Number of local organisations actively involved		
	(a) 1	59.4	92.3
	(b) 2-3	25.0	7.7
	(c) >3	15.6	-
5.	Understanding rights, benefits & responsibility		
	(a) Yes	81.8	85.7
	(b) No	18.2	14.3
6.	Local enforcement of rules and regulations		
	(a) Yes	32.3	60.0
	(b) No	67.7	40.0

Source: Calculated from field observation

Respected and Enforceable Working Rules

Unlike the findings of institutional mechanisms of norms and conventions, people in the three RUPES study sites had a similar tendency to respect more formal working rules related to sustainable resource management. The

relationship between individuals and farmer groups, and local government officers is perceived to be 'good' by 65 percent of respondents in Singkarak, 31 percent in Sumber Jaya, and possibly by people in Bungo. Most respondents in Sumber Jaya (61%) chose the answer 'fair', instead of 'good', probably because

Table 4.2 Level of Working Rules Adopted in Sumber Jaya and Singkarak

	Variables and Indicators	Sumber Jaya (%)	Singkarak (%)
1	Relationship between group and the government		
	(a) Good	30.6	65.4
	(b) Fair	61.1	23.1
	(c) Bad	8.3	11.5
2.	Awareness of regional autonomy implementation		
	(a) Yes	50.0	77.3
	(b) No	50.0	22.7
3	Awareness of rural autonomy implementation		
	(a) Yes	30.6	9.1
	(b) No	69.4	90.9
4	Impression of local government performance		
	(a) Good	27.8	91.9
	(b) Fair	66.7	31.0
	(b) Bad	5.6	7.1
5	Impression of forestry agency		
	(a) Good	25.7	40.9
	(b) Fair	60.0	25.0
	(b) Bad	17.1	34.1
6.	Awareness of specific rules on protected forest		
	(a) Yes	72.2	97.7
	(b) No	27.8	2.3
	Reading the rules regarding protected forest		
	(a) Yes	27.8	27.3
	(b) No	72.2	72.7
7	Someone explaining the rules on protected forest		
	(a) Yes	66.7	97.7
	(b) No	33.3	2.3
8	Understanding on the main ideas of the rules		
	(a) Yes	66.7	67.4
	(b) No	33.3	32.6
9	Opinions on the proper enforcement of the rules		
	(a) Yes	54.3	92.5
	(b) No	45.7	7.5

Source: Calculated from field observation

of cultural differences. Ethnically, respondents in Sumber Jaya were mostly migrants from Java (80%), whereas all respondents in Singkarak were native Sumatrans from the Minang ethnic group.

Roughly similar results are also found with regard to impressions of local government performance. Most respondents in Sumber Jaya (60%) claim local government performance is 'fair', while 92% in Singkarak say performance is 'good'. However, more than 34 percent of respondents in Singkarak suggest a 'bad' performance by local forestry agencies, while only 17 percent of respondents in Sumber Jaya were confident to give this answer (Table 4.2). The bad impression comes from latent problems with illegal logging and witnessing significant amounts of illegal timber being taken away, among other factors. One should note that this finding could be verified against the quality of natural resources in the study sites, which might determine the level of respect for formal working rules relevant to developing environmental service markets in Indonesia.

With regards to regional autonomy — referring to Law 22/1999 and Law 25/1999 at the time of observation — most villagers were aware of the policy. However, most respondents (69% in Sumber Jaya and 91% in Singkarak) are not aware of rural autonomy being implemented in conjunction with the regional autonomy policy. This issue could become a very serious constraint on developing a RUPES payment mechanism if the strategy coincides with empowering rural people. A high dependency on formal government at rural level is probably not a good way to implement RUPES mechanisms, which require more transparency, accountability and participation from stakeholders at different governance levels.

Similarly, most villagers claim not to have read specific rules and regulations on protected forests, even though they understand the main idea that they cannot possess the land nor trespass on it. However, respondents in Sumber Jaya are not really satisfied with the enforcement of rules and regulations on protected forests, at least compared with Singkarak and Bungo. Distrust of government officers is also higher among rural people in Sumber Jaya, through previous experience with major evictions in the early 1990s. People who have returned to their previous plots after the fall of Soeharto in 1998 might also very probably feel a sense of revenge. If this is the case, the level of resource degradation in watersheds could be even worse, while poor people have to bear the burden of this misunderstanding and policy misuse.

Ongoing programs on negotiation support systems implemented by NGOs such as Watala and ICRAF, using an instrument of HKM policy, aim to reconstruct mutual trust to improve land tenure security and property rights. This policy has faced some constraints, mostly bureaucratic, such as the lengthy process for HKM approval and the attendant uncertainty. Currently, from about 15 HKM groups available in the study sites, only six have been granted tenure to use the land. Meanwhile, the government is also implementing a national movement on forest and land rehabilitation (GNRH, *Gerakan Nasional Rehabilitasi Hutan dan Lahan*, or simply *Gerhan*), involving the very same HKM groups cultivating multi-strata coffee in Sumber Jaya and tree crops such as locally developed avocado, durian and *langsat* varieties. Another concern is the pressure of land conversion in Bungo, from rubber agroforestry to coffee monoculture and even large-scale oil palm plantations. Coal mining in the protected forest, allowed under the controversial regulation *Perpu 1/2004*, which substituted some parts of Law 41/1999, could become a serious threat to institutional arrangements for sustainable forestry management.

This synthesis of constraints and opportunities to utilise institutional mechanisms (both norms and conventions, and working rules and regulations) for reward transfers for RUPES programs, could serve as an entry point to observe more closely the interplay between individuals, institutions and markets. What is clear is that the absence of incentives and disincentives, with clear rewards and punishments for individual decisions, could be a serious obstacle to developing more respected value systems for a better future. Societal-based collective action and more formal laws, rules and regulations down to local level have to be analysed more carefully to better explain the criteria and indicators necessary to develop more just and fair payment mechanisms between buyers and sellers of environmental services.

4.3 Institutional Environments: Interplay of Individuals, Institutions and Markets

The following findings should provide more insight into the interplay between individual decisions, locally initiated collective actions and the existence of markets. The interplay is also concerned with the links to more formal rules and government policy and state law on environmental services or related institutional

arrangements. Recall that the interplay between individual decisions and collective actions is focused on: (1) the mediation between individual and collective action; (2) how routines and value systems are formed; and, (3) examination of structural forms as the modality of transfer mechanisms and conflict management.

This section also focuses on how relevant policies can be compatible with the efforts and frameworks to reduce or overcome constraints on establishing a basis for payment mechanisms to reward poor people for providing environmental services to a larger community. Additional analysis could go beyond the interplay between individuals, institutions and markets, to focus on identifying constraints (such as legal, bureaucratic, political, social, and policy) on reward transfer mechanisms, and then formulating strategies to overcome the constraints.

4.3.1 *Collective Actions in Sumber Jaya, Lampung*

Societal-Based Collective Action

Some existing supportive institutional environments are expected to be able to govern and regulate groups of associated agents, enable collective control over transactions, and guarantee the consensus for action and the evaluation required for joint action. Existing societal-based collective actions in Sumber Jaya could provide a foundation to establish stronger bonding and bridging social capital, with good prospects for an environmental services market. Based on field observation in the villages of Simpang Sari and Gunung Terang, and other secondary sources, there are at least five main collective actions in the Way Besai watershed study site, namely: (1) *gotong-royong* or labour share in common property, (2) *arisan* or periodic capital share on regular basis, (3) *simpan-pinjam*, or borrowing and saving arrangements for special purposes, (4) *yasinan*, a religious or spiritual gathering that also serves as a weekly information exchange and, (5) forum SDA or information sharing to obtain the tenure. Each initiative or collective action will be briefly discussed below.

(1) Gotong Royong. The word '*gotong-royong*' is a general term for labour sharing, mostly for public purposes such as constructing or renovating mosques, schools, meeting rooms, roads, irrigation channels and graveyards. Both formal and informal village leaders can mobilise village labour to perform such public works. *Gotong-royong* is not regular, but mostly occurs

every two weeks or every month on Friday or Monday. The neighbourhood head (RT, *rukun tetangga*) and the head of hamlets (RW, *rukun warga*) generally coordinate mass mobilisations. Therefore, once there are leadership problems, societal collective actions such as *gotong-royong* usually face problems as well. With monetary economies growing in rural areas, leadership issues are significant in determining the success of *gotong-royong* as a way to improve social cohesion. This also creates more complications when implementing development programs.

For example, in the study sites the *gotong-royong* participation rate to clean up roads and roadside streams has decreased significantly because people are not satisfied with the distribution of 'food-for-the-poor' programs (*beras untuk keluarga miskin*, or *Raskin*). Village heads and staffs have worked very hard to resolve the problems, reducing the amount of rice distributed from 20 kg to 10 kg for each poor household. This 'innovation' actually does not follow properly the *Raskin* program guidelines, but could improve the *gotong-royong* participation rate. Moreover, the term *gotong-royong* is also used for labour sharing for private purposes, such as wedding parties, funerals and building houses. In this case, labour-sharing is generally complementary and in addition to the main paid or professional labour such as carpenters and construction workers. People participating in this type of *gotong royong* can expect others to return the favour when needed.

(2) Arisan. This is a form of collective saving on a regular basis, which could serve as capital sharing for special purposes. *Arisan* usually involves a group with 20 to 50 members. Each member makes a payment varying from Rp 10 000 to Rp 50 000 every week, every two weeks or every month. Each member is entitled to receive the accumulated money once during the accumulation period. For example, an *arisan* group of 20 members each saving Rp 10 000 would accumulate Rp 200 000 every week. Each week, a member's name written on a very small piece of rolled paper is drawn from a jar or glass, and that person can withdraw the total amount. The probability of winning the draw increases over time as past winners are not entitled to another draw.

In this example, every member will have received Rp 200 000 by the end of the 20th week, and the *arisan* process will start over from the beginning, probably with different arrangements on the weekly contribution and the number of members. In some cases, withdrawals are by simple rotation

among members by consensus. The collective action of *arisan* enables each member to help each other in terms of cash needs or capital share for certain purposes. Members who receive money the last are actually subsidising those who received money the first. The *arisan* system is run entirely on trust, with the chairman or coordinator required to have integrity and be trustworthy. No interest rate or discount factor is currently involved in calculating the amount of money received by *arisan* members in the study sites. Moreover, the *arisan* group does not charge members any additional or operational fees.

(3) Simpan-Pinjam. This simply translates as 'saving-borrowing', a form collective action serving as an informal local banking service in the study sites. Similar to *arisan*, *simpan-pinjam* is also run on a voluntary basis, where the head of the farmers' group is responsible for administering the saving and borrowing. Members could deposit a very small, modest amount at any time, as low as Rp 5000 such as in Rgis Jaya, and normally paid together with the instalment of the HKM fee. Members could borrow a minimum Rp 20 000, especially to purchase fertiliser and pesticides collectively. However, the amount of money to be repaid is Rp 21 000 within two weeks, implying an interest rate of about 10 percent per month or 120 percent per year. In Gunung Terang, if Rp 50 000 is borrowed, the borrowers have to repay Rp 51 000 within one week. This means an effective 96 percent annual interest rate, a little bit lower than in Rgis Jaya. The interest rates for savers are not clearly determined, and possibly much lower than the borrowing rates. At the time of the study, this *simpan-pinjam* collective action was not yet developed and there were no written rules and regulations. What is clear is that trust-based institutional arrangements already exist in the study sites and could be further developed to improve bonding and bridging social capital for payment mechanisms in an environmental services market.

(4) Yasinan. This is a religious gathering every Thursday night or Friday eve. Originally, *Yasinan* meant to pray together, to praise Allah and to recite *Surah Yasin*, an important chapter of the *Holy Qur'an*. Because praying does not take long, members of the group generally take this opportunity to discuss many things, and often make decisions on issues such as planting season, harvesting time, government programs such as fertiliser applications, food security, rural credits, and strategies to overcome pest and disease outbreaks. In every gathering, members each contribute between Rp 1000 and Rp 5000 to a jar

or milk-can collected by group leaders. The total is counted and announced at the end of gathering. *Yasinan* is held in the house of any member willing to host 30-40 people for prayers. Normally the village middle or upper classes can afford to host a *Yasinan* gathering. The money collected is for savings and treasures, mostly to cover group needs to renovate mosques and religious schools, and emergency expenses such deaths and funerals. Some money also covers the costs of snacks and refreshments during the gathering, but normally the host takes care of these expenses. For special requests — such as preparation of wedding parties, thanksgivings for childbirth or successful harvests — the host is requested to complement the *Yasinan* with a 'big supper'. However, lower classes are also encouraged to host the gathering because the group technically supports the cost for foods and snacks.

(5) Forum SDA (Sumber Daya Alam, meaning natural resources). This forum is an expansion of quarterly routine meetings of farmer groups to discuss anything related to HKM issues. The ultimate benefits of forming an HKM group include (i) land tenure security, albeit temporarily; (ii) priority to receive assistance from development projects; and (iii) priority in forest rehabilitation projects such as the ongoing GNRHL, or *Gerhan*. These benefits encourage local people to form farmers' groups and hold meetings, one of the HKM criteria. This means that those not in HKM groups sometimes have difficulty accessing government services and/or development assistance. Forum SDA is an arena for exchanging information, receiving progress updates, learning from lessons, and any other necessary collective actions related to the improved management of natural resources in the Way-Besai watershed. In this case, the benefits of forming HKM groups are much broader than simply obtaining land tenure security.

In short, these societal-based collective actions could provide the foundation for developing better institutional environments and mediating reward transfer or payment mechanisms from the buyers of watershed services to the providers. Recall that the buyers of watershed services in Sumber Jaya include households, PLTA Way Besai, and governments interested in or responsible for sustainable forest management in the area. Because the scale of watershed services in Sumber Jaya is very local, payment mechanisms from downstream households or domestic water users could be developed based on consensus and agreements with the upstream farmers. The mechanism could be technically feasible, especially

because some households using the water also control land upstream. Commitments on community development from the PLTA Besai to better improve land rehabilitation and prevent forest degradation upstream could be seen as potential mechanisms for reward transfers in the near future. Better intermediaries are ultimately needed to improve the quality of bridging processes between these buyers and poor farmers.

Finally, government agencies as prospective buyers can be approached because they have a popular mandate to protect public ecosystems and improve the sustainable management of natural resources. However, more rigorous analysis of the criteria and indicators is required in order to determine whether or not HKM rights to utilise state-owned forest land can be used as a payment mechanism for watershed services in Sumber Jaya. What is clear is that establishing stronger bonding social capital within the sellers and within the buyer groups is a very important step in developing an environmental services market in the area. Under prospective and dynamic societal-based collective actions, developing workable bridging social capital between buyers and sellers could be facilitated by third parties, either from non-government organisations (NGOs), universities, international organisations, or other stakeholders concerned with environmental service markets in Indonesia.

More Formal Collective Action:

More formal collection action was also found, such as the watershed community forum for conserving natural resources (Forum SDA, as explained above). This forum could be considered formal because it was launched by local government officers in January 2004 and endorsed by local government decree (SK Bupati Lampung Barat). Another example of more formal collective action in Sumber Jaya and other Indonesian villages is a rural autonomy setup based on the new Indonesian Law 22/1999 and its improved version, Law 32/2004. This law complements the previously mentioned Decree of Minister of Forestry Number 31/2001 HKM; Law 41/1999 on Forestry and its relevant regulations such as PP 34/2002 on Forestry Land Use and Forestry Management Planning; PP 35/2002 on Reforestation Funds; and the newly passed PP 44/2004 regulation on Forestry Planning.

In terms of specific watershed issues, Law 34/2000 for taxes on surface and sub-surface water (*Pajak Air Permukaan dan Bawah Tanah*), and

Government Regulation PP (*Peraturan Pemerintah*) 65/2001 on regional taxation (*Pajak Daerah*) could be considered as important formal collective actions to protect and conserve water resources. Finally, there is the newly passed Law 7/2004 on Water Resources (*Sumber Daya Air*), a comprehensive law on planning, utilising, conserving, trading, operating and maintaining, controlling the effects, coordinating, improving the roles of society and developing an information system of water resources. Locally, formal collective actions on Government Regulation (*Perda*) on natural resource 'mining', including water, could be an important entry point for RUPES. The local government, law-makers at local level, and other stakeholders concerned with water issues have discussed an initial draft of taxing mechanisms and user-pays principles on irrigation water.

4.3.2 *Collective Action in Bungo, Jambi*

Societal-Based Collective Action

In Bungo, several societal-based collective actions were found in the study sites such as (1) *pelerin*, labour share on privately owned land; (2) *gotong royong*, a method of labour share in common property; (3) *berselang*, labour share for planting and harvesting rice; (4) *julo-julo*, capital share for special occasions; and, (5) *arisan*, capital share periodically on a regular basis. Each collective action will be explained briefly below:

(1) Pelerin. The term *pelerin* is commonly used in Jambi society and West Sumatra. *Pelerin* refers to labour sharing on privately owned land, primarily for agriculture, to overcome local labour shortages. The timing is usually very flexible, either during weeding, crop care, or harvesting, as long as they are still in the same seasons. Villagers usually commit their labour to work together on someone's agricultural land, with the exception of opening up forests for food and cash crops. Participation levels in *pelerin* are determined by the degree of social cohesion. People are willing to participate because they can expect labour in return on their agricultural lands. Similarly, those who miss someone's *pelerin* could be considered as owing a labour debt that has to be repaid in the future.

(2) Gotong Royong. Similar to the term *gotong-royong* used in Sumber Jaya, in Bungo the term also refers to labour sharing for public purposes or in common property such as roads, streams and irrigation channels. *Gotong royong* routinely takes place every Friday or Sunday, but

can be incidental for special occasions such as during Ramadan, before the feast of *Idul Fitri* or even before National Independence Day on 17 August.

(3) Berselang. Similar to *pelerin*, *berselang* is another labour sharing arrangement for planting and harvesting rice. The action is voluntary and mostly open for young farmers planning to stay in agriculture. *Berselang* is a looser form of *pelerin*, so those who miss participating are not required to pay back the labour another day. For young villagers, *berselang* is more attractive because it is an arena for young women and men to get to know each other while working on farm land, primarily planting and harvesting, which are usually more labour-intensive than any other activities in rice cultivation.

(4) Julo-julo. This collective action is quite common in Jambi and in West Sumatra, and refers to non-regular forms of *arisan* or collective capital sharing for special occasions such as wedding parties. Participation in *julo-julo* is voluntary and the system is mostly based on trust so that villagers are free to join in or not.

(5) Arisan. This form of collective action is very common in Indonesia, serving not only to overcome cash shortages for special purposes, but also as a means for social gatherings, information exchange and other interaction. The main purpose is collective saving for use by members when they win the draw. The *arisan* setup in Bungo does not differ significantly from in Sumber Jaya or elsewhere in Indonesia, so there is no need to explain by way of illustration again. Participation rates in Bungo very much depend on the level of trust within the society and probably on external cultural influences on individual decision-making.

More Formal Collective Action:

The decentralisation Law 22/1999 and its improved version, Law 32/2004, are significantly related to reward transfer mechanisms in Bungo. Even though most village heads (*kepala desa*) in the field have heard of Law 22/1999, they are not aware of the important nature of the new rural autonomy policy, where rural governance systems could contribute to locally specific setups for biodiversity services. Other formal rules related to land administration and land certification — Law 2/1960 on agrarian principles, Law 25/2004 on plantation, and so forth — are also relevant to RUPES mechanisms. The principles of community-based forestry, such as clearly written in the Decree of Minister of Forestry Number 31/2001 (HKM), should also

contribute to biodiversity conservation in this RUPES study site.

More importantly, in the case of biodiversity services, the most relevant formal collective action is Law 5/1994 on the ratification of the United Nations Convention on Biological Diversity. This two-article law is inseparable from the original English text, consisting of 42 articles and two annexes. The UN convention states that the 'fundamental requirement for the conservation of biological diversity is the in-situ conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings'. Complementary laws and regulations include Law 41/1999 on Forestry, regulations PP 34/2002 on Forestry Land Use and Forestry Management Planning, PP 35/2002 on Reforestation Funds, and the newly passed regulation of PP 44/2004 on Forestry Planning. However, Indonesia has also just passed government regulations to substitute the law (*Perpu*) 1/2004, relaxing the permission for mining, even in protected forests, which of course creates more threats to the sustainability of forest resources.

4.3.3 Collective Action in Singkarak, West Sumatra

Societal Based Collective Action

In Singkarak, societal collective actions were also common. Some traditional formats were found in the field such as *gotong-royong*, *julo-julo* and *Gebu Minang* or the movement to mobilise resources from upper class members of the *Minang* (West Sumatran) ethnic group living elsewhere. Each collective action is briefly explained below:

(1) Gotong Royong. Previous explanations relating to Sumber Jaya and Bungo should be adequate. *Gotong-royong* in Singkarak occurs every week or every other week on Friday or Sunday morning, depending on the local society. Even though the value of *gotong-royong* has eroded recently, the spirit of being together, united in a solid group, could improve the level of participatory planning as a whole.

(2) Julo-julo. Similar to *arisan* in Java, *julo-julo* is very common to overcome capital shortages for occasions requiring a large amount of money. *Julo-julo* is generally used in rice production, especially during the planting season. More recently, *julo-julo* is not easily found in modernised rural areas, but it is common in the more traditional rural systems found in the Singkarak catchments.

(3) Gebu Minang. The term is a contraction of *Gerakan Seribu minang* or the movement to mobilise resources for *seribu rupiah* (A Rp 1000 charity for buying land in West Sumatra) from upper class members of the Minang ethnic group living in other parts of the country. Because inflation in Indonesia is quite high, movement of resources at Rp 1000 per household does not adequately meet the growing demand for better infrastructure and human resource development. Recently, the movement has been recast so as to accommodate more money, from *seribu rupiah* (Rp 1000) to *sepuluh ribu rupiah* (Rp 10 000), *seratus ribu rupiah* (Rp 100 000), *sejuta rupiah* (Rp 1 000 000) and so forth, so that the term used for the occasion is usually GESE (*Gerakan Seribu, Sepuluh Ribu, Sejuta*, etc). The fund is normally used to improve infrastructure such as roads, bridges, and irrigation channels.

More Formal Collective Action

In addition to formal collective action on regional autonomy (Law 22/1999, and its improved version Law 32/2004, which has encouraged the revival of the *nagari* system), the new Law 7/2004 on water resources is an important formal collective action influencing the future of Singkarak watersheds. Wider autonomy for the rural mayor (*Wali Nagari*) could be seen as an important driving force for watershed rehabilitation, afforestation and reforestation in the Lake Singkarak catchment. More importantly, the newly passed Law 17/2004 on Ratifying the Kyoto Protocol — signed by President Megawati on 19 October 2004, a month before she officially lost office — should provide the main principles, significant resources and recommendations for policy reforms to establish reward transfers for clean development mechanisms on carbon projects.

As mentioned previously, Law 34/2000 on taxing surface and sub-surface water, Law 7/2004 on Water Resources, Government Regulation (PP) 65/2001 on regional taxation, and Local Government Regulation (*Perda*) 4/2002 on surface and sub-surface water taxes could be seen as significant collective actions that could establish the basis of RUPES reward transfers in Singkarak. However, the Decree of Minister of Forestry Number 31/2001 on community based forestry management (HKM) could also be relevant, but is not really used as a basis for increasing participation in development planning in forestry or in watershed conservation in general.

One should note that several stakeholders — *nagari* mayors, Regents of Solok and Tanah Datar,

and some provincial parliament members — have agreed to establish a coordinating body and implementing agency for Lake Singkarak. At the time of this study, the Management Agency of Lake Singkarak (*Badan Pengelola Danau Singkarak*) was finalising its roles, structures, and functions in more detail. Such an organisation could play an important role in formulating reward mechanisms and payment transfers for the upland poor who have shown interest in, and commitment to, rehabilitating the Singkarak catchment, and who have contributed significantly to initiating carbon projects in Indonesia under the clean development mechanism strategy.

4.3.4 *Synthesis of Institutional Environment for RUPES Mechanism*

The findings on the institutional environment at the RUPES study sites have shown the ranges of interplay between individual decisions, locally initiated collective actions and the existence of 'markets'. Some formal collective actions, or working rules, operate through state law, government regulations, ministerial decree and local government regulations related directly and indirectly to environmental services in the form of watersheds, biodiversity and carbon sequestration. This synthesis will explain some specific issues compatible with the efforts and frameworks to reduce or overcome constraints on establishing payment mechanisms for environmental services that poor people are providing to a larger community. The payment mechanism in each environmental service will be assessed based on the constraints and opportunities available in the existing societal-based collective action and more formal laws and regulations.

Decentralising Forestry Management

First, decentralisation in forestry management is hampered by conflicting arguments over Law 41/1999 on forestry and Law 22/1999 on Regional Autonomy; the arguments mostly revolve around the 'power' of forestry management. According to Law 41/1999, 'all forests within the territory of the Republic of Indonesia including all the richness contained therein are under the state control for the maximum welfare of people' [article 4, paragraph (1)]. In addition, state control over forest as referred to in paragraph (1) gives the government the authority to: (a) regulate and organise all aspects related to forest, forest area and forest products; (b) assign the status of certain areas as

a forest area or a non-forest area; and, (c) regulate and determine legal relations between man and forest, and regulate legal actions concerning forestry [article 4, paragraph (2)].

In addition, the central Government shall determine the status of forest as state forest, right forest, and *adat* forest, the latter status granted as long it exists in reality and its existence is recognised [article 5, paragraphs (3) and (4)]. If customary communities no longer exist, the customary right of those *adat* forests shall be returned to the government [article 5, par. (5)].

According to Law 22/1999, local government is responsible for all forestry matters that fall outside the jurisdiction and obligations of the central and provincial governments. In administering the forest, the central government shall delegate some authority aspects to local government. This delegation is intended to improve the efficiency of forest administration in the framework of local autonomy [article 66]. In terms of *adat* control, Law 41/1999 also states that state control shall respect customary laws, as long as these customary laws exist, their existence is recognised, and they do not contradict national interests.

Collective action based on regional autonomy Law 22/1999 has been mobilised based on the following: (a) forest protection and nature conservation; (2) local *adat* community; (3) forest rehabilitation and forest reclamation; (4) education and training in forest extension; and, (5) performance fee guarantee and investment in forest conservation. More importantly, the Ministry of Forestry has revoked Ministerial Decree No. 05.I/Kpts-II/2000 (or decree 05/2001) on small scale forest. The decree was revoked in the face of public pressure and stakeholder concerns about improper implementation in the field and the tendency to increase deforestation rates.

The government put priorities on improving understanding among stakeholders at local level, and synchronising some policies on forestry decentralisation in the frame of sustainable management. This includes: (1) developing networks on forest management among central, provincial and local government; (2) disseminating two important government regulations — PP 34/2002 on Forestry Land Use and Forestry Management Planning and PP 35/2002 on Reforestation Funds — to a wider audience and relevant stakeholders; (3) giving more authority to governors to evaluate forest management

(such as mandated by Law 41/1999, PP 20/2001 and Presidential Decree (*Kepres*) 74/2001); and, (4) improving communication between central, provincial and local governments to improve the database and other related information on sustainable forest management.

One should note that these efforts resulted in the newly passed PP 44/2004 on Forestry Planning. Stakeholders expect this regulation will better support decentralisation of forestry management and provide more opportunities for local stakeholders such as community groups and *adat* leaders to participate in the planning process. This also means that some other regulations, such as the new Law 32/2004 on regional autonomy and Law 33/2004 on fiscal decentralisation, should support the principles and spirit of participatory forestry planning and development.

Formal collective actions and societal-based collective actions already developed at local level provide a strong foundation for developing initial schemes for watershed services, which are necessary for RUPES payment mechanisms in Sumber Jaya. Moreover, participatory forestry planning also implies a significant recognition of agricultural practices in forest areas, as long as these practices adopt sustainable land-use management, such as coffee multi-strata and other relevant agroforestry techniques.

Integrated Social Forestry Development

Concerns about integrated social forestry development keep appearing in public policy debates due to conflict between the community living within or around forests, and the state apparatus or workers for forest concession companies. Several programs and projects on participatory management have been initiated, especially after the fall of President Soeharto, but without tangible outcomes in terms of sustainable forest resource use. The principles of social forestry are governed by the Minister of Forestry Regulation (*Peraturan Menteri Kehutanan*) Number P.01/Menhut-II/2004 on social forestry. This regulation covers several programs on participatory forestry management, such as the well-known *Hutan Kemasyarakatan* (HKM), *Pengelolaan Hutan Berbasis Masyarakat* (PHBM), *Pengelolaan Hutan oleh Masyarakat* (PHOM), and *Hutan Rakyat*, all of which could be defined as community-based forestry management (CBFM).

According to the ministerial regulations (P.01/2004), social forestry involves long-term community empowerment and improved capacity building for people living within and around forest

areas so that they can enjoy the benefits without neglecting the main principles of sustainable management. Social forestry is meant to contribute to rural poverty alleviation, because the program is associated with empowering local people who live mostly below poverty line. By giving these people more comprehensive rights to manage forest resources, their livelihood and 'property rights' to benefit from forests would be more secure. Therefore, social forestry aims to improve the livelihood of forest-dependent communities and to increase rehabilitation rates, especially in degraded areas, critical lands, protected forests and the upper portions of watersheds [article 1 to 4].

This new umbrella policy could be seen as a comprehensive approach that covers ideology, strategy and implementation (Wardojo 2003), especially in support of broader decentralisation principles. The end result is local people empowerment. The government shall facilitate the process of strengthening local institutions, improving local people's capacity in business management, and assuring sustainable and participatory forestry management. In this case, the main principles adopted in social forestry include: self-sustained benefits, partnerships, integration, sustainability, local-specific and adaptation [article 7]. The social forestry policy is implemented by setting-up 'the pre-condition' at local level, to accumulate commitments from local, provincial and central government, and to improve the rules and regulations on integrated social forestry development (Rusli 2003).

Under this principle, the implementation of social forestry does not necessarily have to change the status and function of the forested area. Neither does it give ownership rights to state-owned protected forest. The rights to manage the forest shall be exercised in a more comprehensive manner [article 8], with public-private partnerships between government, private sector and community being central to this principle. Institutional development to support social forestry policy shall mean increasing the capacity of organisations, the quality of rules and regulations, and human resources development. This would include facilitation and partnership to develop small-scale businesses related to resource-based economic activities around the forest area [article 9].

This umbrella policy of social forestry shall also cover the principles of HKM (Decree 31/2001), emphasising the determination of the HKM area, participatory mapping, forestry management,

monitoring and control, as well as rights and obligations. After decentralisation, local government regulations (*Perda*) shall govern the details of participatory forestry planning and management, by involving many stakeholders such as non-government organisations (local or international), universities or community groups. More importantly, the implementing principles of HKM should also govern sustainable natural resources management, recognition of *adat* norms and conventions, and other local wisdoms associated with community-based forest management.

The specific incentives and disincentives for some communities and individuals who support protection, control and supervision of natural resources management (article 17 of Decree 31/2001) could be a basis for further developing watershed service mechanisms such as RUPES in *Sumber Jaya*. However, a more rigorous analysis of the indicators and criteria is required to determine whether or not these opportunities for poor people to obtain rights to manage the state forest could be considered as a payment transfer. Community participation in sustainable forestry management from those living around forested areas is an entry point to develop a market for watershed environmental services at this local scale. One might argue that in this case, the government — local, provincial or central — could serve as a buyer, because the government has an interest in implementing successfully the integrated social forestry policy. The upland poor people living around the protected forest could serve as the sellers by practising land rehabilitation and reforestation. Therefore, the details of issuing permits, the rights to manage forests and the empowerment strategy for building capacity among local people shall be the policy reform agenda for the future.

Participatory Conservation of Biological Diversity

Participatory practices to conserve biodiversity in *Bungo* are relevant to formulating better reward mechanisms for those who for years have maintained rubber agroforestry systems, or jungle rubber. Local smallholders are generally not aware that rubber agroforestry has helped to preserve biodiversity. A high level of involvement in this conservation by rubber share-tappers — the smallest income quintile in the village — has revealed that providing proper rewards to these people would increase the opportunities to improve their livelihood. Because these poor people are also engaged with several local norms and conventions and societal collective actions — both determinants for more formal collective

action on biodiversity preservation — developing a participatory approach to encourage more permanent jungle rubber cultivation over the long term would be an option.

The practice of share-tapping is commonly found in Bungo, where the tappers provide labour, but control only limited capital, and the landlords or rubber owners do not have enough labour to tap the latex by themselves. The income from jungle rubber tapping is usually shared 75 percent for tappers and 25 percent for the owners. A 50:50 share is also found for clonal rubber, because of its high latex yield. Production costs are shared on the basis mostly of verbal agreement between the tappers and owners. The labour market for share-tapping is sometimes not very flexible due to psychological factors and the feeling of dependence or patron-client relationship. Tappers tend to feel they have to work for certain landlords, not for others, because these landlords sometimes provide assistance in the forms of cash advances and other daily needs. Therefore, efforts to build the capacity of these share-tappers, to provide opportunities to improve their welfare would be an important step towards more systematic reward mechanisms for those who have contributed to biodiversity conservation. Local government in Bungo has an important role to play in the capacity building of poor share-tappers, instead of simply approving mining industries and oil-palm plantations that add to the pressures on, and threats to, biodiversity services in jungle agroforestry.

According to Law 5/1990, government and society are responsible for conserving biodiversity and its ecosystems [article 4]. The government is responsible for managing nature reserves to conserve plant and animal biodiversity [article 16], national parks, forestry parks (*taman hutan raya*) and ecotourism parks [article 34, paragraph (1)]. Moreover, to support ecotourism and recreation, the government could give individuals or legal entities the rights to utilise national parks, forestry parks and ecotourism parks, and also encourage people to participate in the planning process and implementation stages [article 34, paragraph (3)]. The central government could delegate local government to partly implement the above measures to help conserve biodiversity and its ecosystems.

Indonesia has also passed the Law 5/1994 to ratify the United Nations Convention on Biological Diversity, acknowledging that 'the provision of new and additional financial resources and appropriate access to relevant technologies can be expected to make a substantial difference in

the world's ability to address the loss of biological diversity'. The Convention has the following objectives: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of benefits arising from the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding [article 1]. Signatories to the Convention aim to develop national strategies, plans or programs to conserve biodiversity or adapt for this purpose existing strategies, plans or programs to reflect the measures set out in the Convention; and to integrate, as far as possible and appropriate, the conservation and sustainable use of biodiversity into relevant sectoral or cross-sectoral plans, programs and policies [article 6].

In short, participatory conservation of biodiversity should be directed towards land uses sustaining rich biodiversity, such as those found in rubber agroforestry systems, because different stakeholders would value biodiversity differently. Rewarding biodiversity service providers, such as rubber smallholders and poor rubber share-tappers in Bungo, Jambi, is expected to reduce the harmful effects of biodiversity losses. Disseminating proper information and knowledge to local government officers and other stakeholders in the private sector, universities and local communities could improve common understanding on the importance of biodiversity values for human life. These stakeholders could serve as intermediaries in formulating payment mechanisms for the biodiversity services. Finally, potential buyers such as conservation organisations or even multinational corporations need to be persuaded that 'the market' for biodiversity services would work well, providing future benefits in their own interests.

Public-Private Partnership for Water-Resource Management

Synthesis of the institutional environment for carbon sequestration services in Singkarak suggested a need to develop public-private partnerships for water-resource management at local and provincial levels. The result is a steering committee of the BPDS (Executing Agency of Lake Singkarak Management), which has been established to improve the quality of water resource management in the lake's catchments. As mentioned previously, BPDS is a concept developed by Lake Singkarak stakeholders to coordinate and implement water management, land rehabilitation in the catchments, and, more

importantly, afforestation and reforestation of degraded areas as a basis for initiating carbon projects under the Kyoto Protocol's clean development mechanism.

Strong local collective actions, sophisticated *nagari* institutional arrangements, *adat* and *ulayat* systems of land use within the catchments and some formal laws and regulations could be seen as important driving forces to develop an environmental services market in Singkarak. Even though existing laws and regulations do not clearly mention rewards for the upland poor for their efforts in land rehabilitation, some principles found in Law 34/2000 on tax and redistribution to local government, and Law 7/2004 on water resources could be developed further. According to Law 34/2000, the maximum tax rate for utilising surface and subsurface water is 20 percent [article 3, paragraph (1)d]. No less than 70 percent of the revenue shall be allocated to the local government [article 2A, paragraph (1)c]. In addition, the provincial government of West Sumatra has announced Local Government Regulation (*Perda*) 4/2002 on tax for surface and sub-surface water. This regulation shall be supported by similar local regulations to encourage water conservation and rehabilitation of damaged areas in the watershed.

At a national level, the newly passed Law 7/2004 also strongly encourages water conservation to maintain the sustainability of carrying capacity, catchment services and water resource functions in general [Chapter III, particularly articles 20 and 21]. The law also explicitly mentions the management of water quality, such as in the Singkarak watershed, to maintain the quality of water inflow, including water infrastructures [article 23]. However, the detailed arrangements for maintaining water quality and controlling water pollution has to be formulated in a separate regulation. Similarly, specific rules and institutional arrangements shall govern water resource conservation within protected forests, forest reserves, national parks, and coastal areas [article 25].

Public-private partnerships could provide inputs for local government on policy setting and the establishment of new local regulations, especially in support of developing reward transfer mechanisms for poor people who have contributed to sustainable resource management. In short, this partnership could serve as a steering committee, and act as a bridge between local stakeholders, provincial government and the central government. The immediate challenge is how the interests and commitments shown by local stakeholders in

rehabilitating the Singkarak catchments could be rewarded properly, especially by empowering local people who are most dependent on water and forest resources, and improving their livelihoods to make a better future.

Steering committees have commonly been adopted as the reward transfer mechanism for environmental services, such as in Cidanau in the Province of Banten. Revenue from water charged to the downstream users in the City of Cilegon was forwarded to upstream providers through the neighbouring local governments of Pandeglang and Serang. Forest managers in these upstream districts serve as the watershed service providers, while some units in the local government act as intermediaries for the environmental services market (Santoso 2004, personal communication). However, the effectiveness of mechanisms like government transfers need to be monitored and evaluated to provide objective and accurate information on developing mechanisms suitable for other cases of environmental services.

Catchments Rehabilitation for Clean Development Mechanism

Institutional arrangements for reward mechanisms in Singkarak are somewhat complicated, not only because of the sophistication of the *nagari* governance system and *ulayat* resource management, but also because of potential carbon projects under the Kyoto Protocol's clean development mechanism (CDM). As Indonesia has only just passed the new Law 17/2004 to ratify the Protocol, several authoritative bodies have yet to be established, such as the key organisation to be known as the Designated National Authorities (DNA). The DNA will be an independent institution, representing government agencies and other stakeholders; the entity will be responsible for making CDM projects in Indonesia succeed. The Indonesian Government through the State Ministry of Environment is in the process of finalising the DNA, with some assistance from foreign agencies such as German Technical Cooperation.

The Kyoto Protocol specified legally binding commitments by most industrialised countries to reduce their collective greenhouse gas emissions by at least 5 percent below 1990 levels by the period of 2008-2012. With the goal of reaching these targets at the lowest possible cost, the Kyoto Protocol created two 'flexibility' mechanisms: emissions trading and the CDM. The CDM is intended to be an opportunity for developing countries that did not accept binding

emissions reductions to be involved in greenhouse gas emissions mitigation.

The specific CDM objectives are: (1) to assist in achieving sustainable development; (2) to contribute to attaining the environmental goals of the United Nations Framework Convention on Climate Change; and, (3) to assist Annex B parties — mostly developed countries — in complying with their emissions reduction commitments [article 12]. Furthermore, article 12 specifies that developing countries are to benefit from CDM projects resulting in 'certified emission reductions' (CERs), and that industrialised countries may use CERs to comply with their commitments. It is interesting to follow the Protocol's progress closely, primarily because the United States is not willing to ratify it. Recently, China, India, and most other developing countries joined forces with the United States to completely reject the idea of future binding emission limits.

Meanwhile, the global carbon market is now growing either via Kyoto mechanisms like CDM, or non-Kyoto mechanisms, such as the Bio Carbon Fund (Boer *et al.* 2004). In these mechanisms, developed countries can purchase carbon benefits generated by projects that reduce greenhouse gas emissions, increase carbon sequestration, and/or conserve the carbon fixed in forests. Communities who participate in such projects are paid for selling the carbon. As Singkarak has been designated a potential site for forest-carbon projects, the potential buyers such as international agencies, non-government organisations and possibly multinational corporations might also be directed to improve the capacity of local people to actively participate in rehabilitating forests and degraded land.

4.4 Policy Reforms: Facilitating Payment-Transfer Mechanisms

This section is developed mostly from the previous analysis of institutional mechanisms emphasising norms and conventions, and of institutional environments relying on societal collective action and formal collective actions such as laws and government regulations. There is additional analysis of stakeholder preferences on payment mechanisms and on the composition of transaction costs in organising and sustaining HKM groups at a local level. The potential policy reforms for reward mechanisms for environmental services in the RUPES program

include how workable are the frameworks to reduce or overcome institutional constraints in the field. Policy reforms should be directed to create more opportunities for developing environmental service markets at the local (landscape) scale, and on a national and global scale. These should provide important avenues in light of the examination of possible constraints on transfer payment agreements in the field.

Sellers Perspective on Payment-Transfer Mechanisms

Stakeholders who have practised more sustainable resource management that protects tangible environmental services such as watersheds obviously deserve to be rewarded. Poor farmers living upstream or cultivating land upstream could represent the service sellers. The results of the sampling survey in Sumber Jaya show that these farmers believe the rewards are for supporting conservation efforts (31%), compensation for ensuring adequate water for future generations (31%), or for people living upstream who have conserved their water use and other natural resources. These findings are quite the opposite of perceptions among farmers in Singkarak, where most think the reward transfer is about economics (47%). These people believe 'water supply is a private good' or 'nothing in the world is for free'.

Respondents in Sumber Jaya suggest that individuals using the water and water-user groups equally should bear the costs of consumption (59%), while people living downstream (23%) and government or water conservation authorities (18%) could also contribute direct payments.

Farmers living upstream mostly think that the government (56%) and water-user associations (44%) should pay the costs of environmental services or contribute to water resource conservation (Table 4.3).

In a more in-depth interview, people living upstream in Sumber Jaya's Wway Besai watershed are mostly concerned with excessive water use by individuals and/or water-user associations downstream. Semi-modern housing compounds available exclusively to local government officials and businessmen in 'downtown' Simpang Sari are viewed as unfair. Moreover, irrigation for lowland paddy fields is also considered a poor use of one of the Earth's scarcest resources. The key informants in Sumber Jaya are mostly concerned about downstream water-user associations that are not operating properly as an organisation. The water groups have been quite dormant in recent years following their initial establishment phase in the late 1990s when the government and

donor-funded projects actively supported the collection of water fees, maintaining simple infrastructures and monitoring the quality of canals, streams and pipes. This should reveal opportunities to revive the water-user groups, otherwise the sustainability of water resources in Sumber Jaya will be seriously threatened.

In Singkarak, most people living in the catchments are concerned with the falling water table and the quality of streams flowing into and out of the lake.

Villagers consider the lake to be common property so that norms, rules and regulations should be formulated in line with the interests of most stakeholders, such as poor farmers and fishermen highly dependent on the lake. It means that the water intake by the PLTA Singkarak is much too high, resulting a significant decline in water for irrigation through Ombilin River outtake. This would not only account in large part for declining rice yields and other irrigated food crops, but also on the deteriorating habitat

Table 4.3 Sellers' Perspectives about Payment-Transfer Mechanism

	Variables and Indicators	Sumber Jaya (%)	Singkarak (%)
1	Practising agroforestry for resource conservation		
	(a) Mixed Kebun	10.8	66.7
	(b) Multi-strata coffee	24.3	-
	(c) Shaded coffee	22.2	-
2.	If not agroforestry, the major land use practices		
	(a) Coffee monoculture	-	2.2
	(b) Upland paddy	-	26.7
	(c) Other food crops	-	-
3	Awareness of impacts of unsustainable practices		
	(a) Yes	100	88.1
	(b) No	-	11.9
4	Willingness to sell the environmental services		
	(a) Rp < 100 000 per month	50.0	9.6
	(b) Rp 200 000 – 400 000 per month	-	-
	(c) Rp 400 000 – 600 000 per month	-	54.8
5.	Reasons of receiving the rewards		
	(a) Economic: water supply is a private good	12.5	47.6
	(b) Management: maintain water quality & quantity	18.8	14.3
	(c) Conservation: provide enough water for future	31.3	14.3
6	Potential buyers of environmental services		
	(a) Individual using the water	29.4	-
	(b) Water-user association or other organisations	29.4	43.9
	(c) Government or other authority of conservation	17.6	56.1
7	Responsible to collect the rewards		
	(a) Individual or households in the upstream	5.9	61.9
	(b) Farmer groups such as HKM organisations	52.9	7.1
	(c) Local leaders with charisma and respect	29.4	16.7
8	Reward preferred, instead of money		
	(a) Land tenure security, or extension of rights	6.3	2.7
	(b) More land to grow crops in forest lands	37.5	8.1
	(c) More infrastructure in the village	12.5	86.5
	(d) More schools, health service, social facilities	25.0	2.7

Source: Compiled from field observation

for the exotic fish *Ikan Bilih*. Rising pressures from residential areas around Lake Singkarak have also resulted in water pollution and poorer overall water quality, shown by the vast spread of the water weed *enceng gondok*, which has prevented small fishing boats cruising further up into the streams.

When more than 56 percent of respondents in Singkarak are willing to shift the burden of declining water quantity and quality onto the government — allowing more state responsibility over PLTA Singkarak — the argument about excessive water consumption is more rational than blaming deforestation in the catchments. Empirical studies have shown that more forest cover can provide a more buffered inflow into the lake, but the trees also use more water for evapotranspiration. However, less forest cover could increase the water inflow, because the evapotranspiration rate declines (Van Noordwijk 2004). This means that more land rehabilitation upstream would directly reduce the performance of PLTA Singkarak, unless the hydro-electric power plant (HEPP) could modify the water balance between rainy and dry seasons. Rural people living in the catchments serving the HEPP are mostly demanding that the company share responsibility for the declining quality of life around Lake Singkarak. Meanwhile, the HEPP has allocated some funding to community development, not only for social purposes for charity, but also for empowering rural people, human resources, agricultural practices and development of small-and-medium enterprises (SME). Support for land rehabilitation and reforestation does not seem to be directly related to the actual problem of the lake's declining water table and deteriorating quality of water inflow and outflow. Despite its importance, the effort could not be claimed as a market approach for watershed services, but could be seen as an important step towards corporate social responsibility as currently adopted by big companies around the world.

Interesting findings regarding the sellers' perspective on payment-transfer mechanisms relevant to RUPES programs are also shown in Table 4.3, where 53 percent of respondents in Sumber Jaya prefer that farmer groups such as HKM organisations should collect the rewards. The second preference (29%) is charismatic local leaders respected for their leadership, honesty, and trustworthiness. These results are similar to those in Bungo of Jambi (not shown in the table), where key informants prefer local farmer groups involved in coffee growing. HKM associations in

Sumber Jaya play an important role in handling any matters related to tenurial security and expansion of the land planted with coffee within the state forest. This is quite the opposite from the preference in Singkarak, where most respondents (62%) prefer individuals or households living upstream to directly collect the rewards or payments made by people living downstream. People in Singkarak are also complaining about pine trees planted as reforestation crops during the 1980s, as these trees have consumed more water from the streams and the lake. During the centralistic Soeharto administration, ideas from the grassroots were hardly ever accommodated in the policy-making process. This was also the result of the project-oriented approach of the development process, where reforestation funds were mostly cosmetic covers for strategies aimed at extracting resources. As individual households have to carry the cost burden of the declining water table in their own fields, these people have to be directly compensated more fairly. Any reward transfers or other compensation programs concerned with natural resource management in Singkarak should be handled properly to benefit individual households, especially those at risk of sinking into poverty.

Finally, direct transfer payments are not the only option for compensating the poor people who have conserved resources and maintained sustainable natural resource management. If they are able to choose, respondents in Singkarak prefer to be rewarded with more forest land to grow crops (38%), and more schools, health services and social facilities in the village (25%). Respondents who have already obtained HKM rights to utilise the state forests do not assume that secure land tenure could serve as a form of reward. These people even sceptically think that extending the rights after five years is only an administrative matter, implying that the government authority would not dare to evict them from the forest any more, given the bad publicity from previous experiences. However, respondents whose HKM permit applications are still being processed generally choose that the government should grant the rights to take benefits from state forests as a reward transfer.

In contrast, most respondents in Singkarak (86%) prefer more infrastructure — roads, bridges, irrigation facilities — in the village; the same is possibly true of Bungo. People in Sumber Jaya are concerned that roads could facilitate more illegal logging in protected forests, especially at night. Because the infrastructure quality in

Sumber Jaya is relatively better than Singkarak and Bungo, infrastructure issues are not significant concerns. Some people argue that better roads could reduce transport costs for coffee to nearby markets, implying more bargaining power for producers compared with when the roads are in very poor condition. However, for people in Singkarak and Bungo, road, bridge and irrigation infrastructures are almost everything to their daily life because of the remote location of farming activities and high dependence on forest resources. Key informants in Bungo argue that improved economic opportunities in rural areas are the most important determinants for biodiversity conservation in jungle rubber systems.

Buyers' Perspective on Payment-Transfer Mechanisms

This section draws heavily on a sampling survey of water-users in Sumber Jaya, complemented by in-depth interviews with key people in the government, university and research institutes, and hydro-electric power plants. The objective was to grasp the idea of buyers' perspectives on payment-transfer mechanisms. The local nature and tangible benefits of watershed services are among the reasons for exploring this perspective in a more structured format. However, one should note that strategies to develop environmental service markets in Indonesia are far more complicated than the upstream-downstream relationship of water users or lake water stakeholders in general. Policy reforms to facilitate environmental service markets would include: (1) strategically setting-up the policy-making process, with laws, rules and regulations formulated to clearly address reward transfers from beneficiaries to providers; (2) improving organisational structures and management level reforms to facilitate payment-transfer mechanisms; and, (3) creating the implementation taskforces and public-private partnerships of intermediaries that could translate the norms and conventions, execute payment mechanism principles, and closely monitor and evaluate the action plans towards transparency and accountability.

One should note, however, that survey results in Singkarak are not very reliable for further analysis because the respondents are mostly watershed service providers. Respondents who mostly blame PLTA Singkarak as the main user of lake water could not be persuaded that they also are consumers. In Sumber Jaya, most respondents (79%) rely on their own well for domestic water, and only 14 percent use clean water delivered via a simple pipeline system. This does not imply that

maintaining the watershed's quality is no longer important, but rather the wells are very much dependent on what happens upstream.

Respondents are also dependent on sub-surface sources such as springs for irrigated agriculture (56%) and the simple (*swadaya*) irrigation system (44%). Interestingly, respondents are willing to pay for water consumed in domestic and agricultural activities, although at a very modest price. For the domestic consumption rate of nearly 450 litres per day, 38% of respondents are willing to pay less than Rp 100 per month, and 38% are willing to pay more than Rp 300 per month, which could be seen as very cheap. However, for 5500 litres per day for agricultural water, 27% of respondents are willing to pay as much as Rp 2000 – Rp 3000 per month, while the same percentage is willing to pay less than Rp 1000 per month.

Table 4.4 also shows that respondents in Sumber Jaya consider water management issues to be very important because 44 percent have chosen this factor as influencing their willingness to pay. The other 19 percent think that water is a private good so everybody should pay to use it; this group normally pays for commercially bottled drinking water which is not cheap at about Rp 2000 per bottle. Not surprisingly, respondents prefer a water-user entity or other provider organisation to manage the quantity and availability of water (31%), or a government or other conservation authority (31%). This could imply that people in Sumber Jaya are also willing to have active water-user organisations that provide water, maintain the flow and conserve water sources.

Leaders in PLTA Besai are also concerned about declining water flows to move the turbine, especially during the dry season. Since 2002, this HEPP has implemented land rehabilitation and reforestation programs by empowering local people, even though the programs spent only Rp 60 million or about Rp 30 million each year. The rehabilitation target is about 50 hectares of reforestation, which could cost Rp 100 million over five years. PLTA Besai in the first years focused only on its jurisdiction over land being rehabilitated, by providing seedlings, lumber and polybags. Clearly, these efforts could improve the land's capacity to hold water, before being discharged to the river, but probably would have little effect on the water flow needed to move the turbine. The company should start thinking about improving the storage capacity of the Way Besai catchments, so that a better water balance between dry and wet seasons could be achieved.

Table 4.4 Buyers' Perspectives about Payment-Transfer Mechanism

	Variables and Indicators	Sumber Jaya (%)	Singkarak (%)
1	Estimated amount of domestic water consumption		
	(a) Drinking (litre per day)	21.86	-
	(b) Cooking (litre per day)	101.67	-
	(c) Washing (litre per day)	120.58	-
	(d) Other uses (litre per day)	189.31	-
2	Major sources of freshwater		
	(a) Own well	79.3	-
	(b) Clean-water system	13.8	-
	(c) River or water canal	3.4	-
	(d) Other sources	3.4	-
3	Willingness to pay the water for domestic use		
	(a) Rp <100 per month	38.5	-
	(b) Rp 100 – 200 per month	11.5	-
	(c) Rp 200 – 300 per month	11.5	-
	(d) Rp > 300 per month	38.5	-
4.	Estimated amount of agriculture water consumption		
	(a) Lowland paddy (litre per day)	2016	-
	(b) Upland paddy (litre per day)	1500	-
	(c) Vegetables (litre per day)	1533	-
	(d) Other food crops (litre per day)	514	-
5	Major sources of water for agriculture		
	(a) Public canal or irrigation system	-	-
	(b) River or simple (<i>swadaya</i>) irrigation system	43.8	-
	(c) Sub-water sources	56.3	-
	(d) Other sources	-	-
6	Willingness to pay the environmental services		
	(a) Rp <1000 per month	26.7	-
	(b) Rp 1000 – 2000 per month	33.3	-
	(c) Rp 2000 – 3000 per month	26.7	-
	(d) Rp > 3000 per month	13.3	-
7.	Reasons of paying the rewards or water charges		
	(a) Economic: water supply is a private good	18.8	-
	(b) Management: maintain water quality & quantity	43.8	-
	(c) Conservation: provide enough water for future	6.3	-
	(d) Compensation: pay people living upstream	6.3	-
8	Potential recipients of water payments		
	(a) Individual seller of water	18.8	-
	(b) Water-user association or other organisations	31.3	-
	(c) Government or other authority of conservation	31.3	-
	(d) Direct payment from downstream parties	6.3	-

Source: Compiled from field observation

In addition, PLTA Besai has claimed that it has contributed as much as Rp 80 million since 2002 for community development, to help people living around the power plant. The company also grants scholarship for students — elementary, high school and university — and has subsequently contributed to charities for religious occasions, mosque and school renovation, and other community projects.

Efforts to Reduce High Transaction Costs

Efforts to reduce high transaction costs become relevant in the policy reforms agenda because high transaction costs could represent inefficient economic organisation, policy formulation processes and implementation procedures. The estimated transaction costs in this study were based on a sampling survey of HKM members in

Sumber Jaya of Lampung who happen to be watershed service providers. The questionnaire was structured and the interview technique carefully designed to capture the main cost components, which are information, coordination and enforcement. As was expected, regular HKM members could not estimate the costs of each component, so that this information was collected from leaders, managers and activists for HKM groups and those feeling confident to disclose information about the group's history and performance. Of 37 respondents, only 18 were able to detail the cost components.

The data are not reliable on transaction costs for water-user organisations as a proxy for water users or beneficiaries of watershed services, so further analysis could not be performed. This is mostly because water-user organisations have not performed very well in recent years, as explained previously. Future estimation efforts on transaction costs should emphasise the routine, regular, and livelihood criteria of the groups to be observed, otherwise the limited resources to undertake field interviews and the necessary observation for the analysis would be wasted. Similarly, further analysis of transaction costs in Singkarak cannot be done, mostly because there is no active farmers' organisation or HKM group as in Sumber Jaya. Our enumerators are having difficulty quantifying the component costs. All hypothetical questions being asked of the respondents — such as whether there should be payment mechanisms for poor farmers living in upstream in Singkarak — could not be answered very well.

As explained previously, the transaction cost components that could be measured include: (1) the costs of initiation/information searching, such as the costs of group establishment, lobbying costs and obtaining permits; (2) the costs of coordination/organisation, such as the costs of overheads, regular meetings, and opportunity foregone to attend meetings; and, (3) the costs of enforcement, including the costs of guarding the crops from encroachers, 'parcel maintenance' and dispute settlement. It should be noticed that the range of these cost components varies significantly, implying different perspectives among respondents in Sumber Jaya. One possible cause is that the respondents cannot distinguish between 'production costs' such as crop watching and parcel maintenance to improve productivity, and the real 'transaction costs' such as the time allocated to guard the crops from encroachers. Another possible cause is that the reported time allocation is actually overestimated, as commonly

found in farm-budget analyses, where the revenues are normally underestimated while expenses are overestimated. Notwithstanding, the estimated costs are calculated using the time allocated to perform such activities, multiplied by the actual wage rate in Sumber Jaya, allowing the opportunity costs forgone for HKM members to attend meetings, plus additional transport costs from their homes to the meeting room. For more a rigorous quantitative analysis, the total costs of participation in the meeting as a component of coordinating costs could be extrapolated with the proportion of farmers who participated.

The estimated transaction costs to establish, manage and run the HKM group are quite high according to rural standards. Rp 504 000 per household (about US\$55 at the current exchange rate) is considered expensive, especially when the average annual income for farm households in Sumber Jaya is Rp 1 million or less. Initiating or searching for information accounts for 70 percent of the total, compared with coordinating or organising the group (27%); and monitoring or enforcement (3%). Of general concern is the long time — about four years — that it takes to establish an HKM group and go through the procedures to obtain the permit, including any other lobbying required. In an exceptional case, the first HKM group obtained its permit less than six months after applying. During that time, an intensive consultation and possibly good lobbying with the provincial office of the Ministry of Forestry (*Kantor Wilayah Departemen Kehutanan Propinsi Lampung*) speeded up the process. But under regional autonomy, where the power to issue permits was transferred to the district authority (*Dinas Kehutanan*), the procedures have taken far longer than expected. Therefore, simplified and clear procedures, predictable application costs, and the time required for approval could obviously reduce the transaction costs borne by household members of HKM organisations.

In addition, the three main requirements to obtain the HKM permits — participatory mapping of the area managed, rules of the game for the group, and five-year planning and development of the forest land — have taken up a lot of energy and resources in the farm households and from the leaders in submitting tenure applications. Creating participatory mapping has not been easy, assuming high accuracy, transparency and objectivity in determining the border of each household's parcel. Putting more resources into

Table 4.5 Transaction Costs of HKM Group in Sumber Jaya (Rp per household)

	Components of Transaction Costs	Total Costs (Rp)	Percentage (%)
1	Costs of initiation/information		
	(a) Group establishment	119 590	23.75
	(b) Lobbying costs	39 583	7.86
	(c) Obtaining permit	191 944	38.12
	Sub Total	351 118	69.72
2	Costs of coordination/organisation		
	(a) Overhead	23 190	4.61
	(b) Regular meeting	24 938	4.95
	(c) Opportunity forgone to attend meeting	87 824	17.44
	Sub Total	135 952	27.00
3	Costs of Enforcement		
	(a) Guarding the crops from encroachers	4000	0.79
	(b) Kebun or parcel maintenance	6521	1.29
	(c) Dispute settlement	6000	1.19
	Sub-Total	16 521	3.28
	Total Transaction Cost	503 591	100.00

Source: Calculated from field observation

such 'investment' steps — time, energy, money, marathon meetings and ground surveying and measurement — is probably beneficial for future generations, at least in preventing and reducing land conflicts horizontally with neighbouring farmers and vertically with the authorities. As can be also expected, setting up group rules that encourage a sense of ownership and responsibility has taken a lot of time, several meetings, fluctuating enthusiasm, and good social relations and cohesion at the local level. Existing societal collective actions such as *arisan*, *yasinan*, and *gotong royong* have played important roles in keeping spirits up among group members. Similarly, formulating five-year action plans on the resources has not been easy because of the limited capacity of the members and leaders of the HKM groups alike, as well as mistrust toward the authorities. Therefore, the roles intermediaries such as NGOs (national and international) can play at this stage are extremely important, especially if the HKM has the prospect of serving as a reward mechanism for the poor people living upstream who have adopted

sustainable resource management techniques that contribute to good watershed ecosystem services.

The costs of coordinating and running the group are also not cheap, as commonly found elsewhere. Cost components such as overheads and meetings to maintain the group's solidarity are not very high and quite normal for an organisation. The opportunity forgone among group members to attend the meeting, especially during the day, at the village and subdistrict levels, is really costly, because farmers could lose their time and income expected from that day. Some members have to spend a day travelling from their homes in the forest, and have to pay expensive rental for a motorcycle because of the poor rural roads. Normally, many farmers happily participate, not only to socialise and share their daily problems and progress, but also to obtain more direct information from credible sources. Households or group leaders whose HKM permits are still in the application process are normally very enthusiastic to attend. The

holders of HKM tenure rights also expect to hear new information about the future status of their rights and other relevant information such as opportunities to participate in the national GNRHL program, which encourages a more participatory approach to land rehabilitation to prevent forest degradation. Some members are only interested in attending informal gatherings such as *yasinan* and *arisan*. Improving the roads and infrastructure could reduce the transaction costs, but clear and secure property rights also could substantially lower costs and the intensity of transaction.

Enforcement costs, such as guarding land from encroachers — and more importantly monitoring outsiders who may infiltrate and take the benefits of the forest products at the expense of group credibility — could increase in the future. Rising demand for forestry products and rising timber prices in domestic and world markets, would increase the pressure to harvest forest products, especially high quality exotic timbers such as those from Sumber Jaya's protected forest. At the time of field observation, these transaction cost components were not very high, mostly because the problems were not complex and were under the HKM group's control. However, sustainable resource management issues are becoming modernised, world demand for coffee and timber products is increasingly more sophisticated, and enforcement costs will be higher in the future. Therefore, capacity-building for local governments dealing with forestry and watershed management, such as empowering forest guards and local policemen, could reduce the HKM groups' transaction costs for monitoring.

For the sake of formulating reward transfer mechanisms for RUPES actions, a dynamic analysis of transaction costs in establishing, running and enforcing the HKM group should be on the agenda for future studies. A snapshot analysis of transaction costs such as in this study might be an important initial step, but clearly cannot capture the dynamic relationship between economic transactions and policy decisions. Therefore, more rigorous analysis of group dynamics and expected farm income in a certain planning cycle is obviously important in sharpening policy reforms to reward upland farmers or poor resource managers who are cultivating multi-strata coffee in Sumber Jaya's forests or other places in the developing world with similar characteristics. For example, proper dissemination is very important for improving the understanding of government regulations PP

34/2002 on Forestry Land Use and Forestry Management Planning, PP 35/2002 on Reforestation Funds, and the recently passed PP 44/2004 regulation on Forestry Planning.

These regulations aim to define in more detail Chapter V (forestry management), Chapter VII (supervision), and Chapter XV (compensation and administrative sanction) in Law 41/1999 on Forestry. For example, utilisation of the forest area could be implemented in the form of environmental services such as watersheds, carbon sequestration and trading, and forest and resource conservation (article 20 of PP 34/2002). Therefore, sustainable management through encouraging environmental service benefits could be a useful entry point to develop an environmental service 'market' at this local watershed scale. In this case the government — local, provincial or central — could serve as an environmental service buyer because the government has an interest in successfully implementing the policy on integrated social forestry. Upland poor people benefiting from protected forests could serve as the sellers by practising land rehabilitation and reforestation. Therefore, the details of permit issuance, the rights to manage forests and the empowerment strategy for building up local capacity shall be on the agenda for future policy reforms.

Even though this study does not employ transaction cost analysis for biodiversity services and carbon services, a participatory approach to implementing biodiversity conservation practices would benefit poor farmers who for years have maintained rubber agroforestry systems, or jungle rubber. Local smallholders are generally not aware that existing rubber agroforestry practices have helped to preserve biodiversity. A high level of involvement by rubber share-tappers — the smallest income quintile in the village — in conserving biodiversity has revealed that providing proper rewards to these people would increase the opportunities to improve their livelihood. In this case, local governments and civil society alike should do more to build capacity among poor share-tappers and rubber smallholders at local level as a form of reward transfer from the buyers to the sellers of biodiversity services. Potential buyers such as conservation organisations or even multinational corporations need to be persuaded that 'the market' for biodiversity services would work well if transaction costs mediate the interests of the poor sellers and these rich buyers. Developing a reward transfer mechanism for carbon sequestration services could be approached by

community involvement in reforestation and afforestation in the Lake Singkarak catchments, to improve water quality in the lake. The policy reforms should be directed towards land rehabilitation of the catchments, at the same time empowering local people who benefit from water and forest resources.

5 CONCLUDING REMARKS

5.1 Summarised Findings

This report has presented major elements of institutional studies regarding the constraints on and opportunities for developing environmental service markets in Indonesia. The institutional economic analysis within this report has focused on institutional mechanisms, institutional environments and directions for policy reforms, particularly regarding the requirement for and conditions of such reforms. These reforms would facilitate and enable environmental transfer agreements in Indonesia and possibly other parts of the world with the potential to develop environmental service markets. Three RUPES sites — watershed services in Sumber Jaya of Lampung, biodiversity services in Bungo of Jambi, and carbon sequestration services in Singkarak of West Sumatra — have provided exemplary comprehensive case studies of the institutional constraints on and opportunities for future compensation and reward transfers to poor people who are providing the services.

5.1.1 Institutional Mechanisms

Based on institutional classes, major stakeholders in Sumber Jaya have adopted the norms and conventions based on the (economic) values of migrant, frontier and forest-pioneer characteristics. Military operations in the 1990s and during the Soeharto regime sought to overcome the misuse of or encroachment into protected forests by evicting small farmers cultivating coffee gardens and engaging in mixed agroforestry. These mass evictions were a nightmare and hard for most Sumber Jayan people to forget. The villagers or providers (and beneficiaries) have understood the norms that if they were united in an organisation, they could obtain a right to use the forest land for 25 years, including a five-year probationary period, under community-based forestry management programs (CBFM or HKM).

Farmers in Sumber Jaya generally grow the Robusta coffee species, which thrives in shaded coffee and monoculture fields, and is also common in agroforestry systems. The conventions to justify crop cultivation within the forest are normally based on the 'original control' in clearing and tree crop planting. As commonly practised in the forest frontier community, the HKM community in Sumber Jaya follows the norms of 'first come, first served', where individuals who opened up the forest in the 1970s or earlier could legitimately claim 'possession' of forest land (not necessarily 'rights' or 'ownership') and could grow any crops necessary to generate economic returns. The conservation values strongly adopted by the HKM organisations include that members closely monitor economic activities within the protected conservation forest block, mainly to resist encroachers and illegal loggers. Each HKM group in Sumber Jaya has claimed to capture 2-3 encroachers and illegal loggers within its jurisdiction.

Farmers and forest communities in Sumber Jaya have effectively set working rules for collective *kebun* (mixed agroforestry gardens). Temporary written rules on 'tenure' to use the land upstream are an adequate basis for water resources protection and conservation for downstream users. There are some clearly defined and understood rules to obtain the tenure permits such as joining a farmer group that has internally governed rules and regulations, a sensible five-year work plan and long term plans to develop community-based boundary maps. A very strong law on 'no-trespassing' on state forest land is effectively enforced because the underlying institutions of the villagers provide strong enough mechanisms.

Institutions supporting biodiversity services in Bungo were developed based on the norms and conventions that a right to use the land is generally attainable through forest frontiers, such as an initial planting of cash crops like rubber, or cinnamon. However, the society in Bungo enforces strongly that people absent from the land for more than 10 years lose their rights. In this case, the land is considered common property where everybody in the society can control its use through *adat* leaders. Farmers in Bungo are strongly encouraged to grow paddy rice, both lowland and upland. Compared with other land uses, the society generally regards paddy fields as having the highest value for food security, even though labour costs are rising substantially. More recently, more attention is

being paid to converting land to palm oil because the future benefit stream from both small and large plantations is attractive. Some portions of *adat* or *ulayat* land, where rubber agroforestry systems are regarded as the hottest spots for biodiversity richness, are now threatened with conversion to oil palm plantation because the local government has approved the *ijin prinsip* (initial permission) or investment for these projects.

Society in Bungo also strongly enforces *tanah batin*, a category of land-use norms and conventions precluding permanent ownership. This category includes a special designation for upland paddies where the society could control sustainable use of land designated for cemeteries,, and rivers for general purposes and *lubuk*, or aquaculture. However, although in theory ownership or the rights to use '*tanah nenek*' within social or lineage systems can be transferred, in practice it never happens. Villagers still consider these land types as heritage to sustain Bungo society as a whole.

In addition, Bungo society acknowledges self-ownership and open access to land as governed by working rules, formal state rules, and represented by the local land administration office. However, the open access category is weak and open to multiple interpretations. The rules are written and enforced by the state, down to village level. Informal rules are well defined and enforced, but formal rules are not clearly understood or, at least, the villagers are not interested in the nitty-gritty arguments regarding formal land administration issues. Other examples of clearly defined and understood rules include land ownership regulations or land certificates, even though most villagers do not hold the piece of paper. Villagers in Bungo also understood the rules of 'no-trespassing' on state land, conservation forests, and so forth, even though some villagers are tapping some resources and non-timber products such as honey from the protected forests.

The norms and conventions adopted in Singakarak of West Sumatra reflect the revival of the sophisticated *nagari* system, a very complex social system defining and governing land use, and other aspects of daily life. Land ownership (or more precisely the 'right to use' the land) is governed through locally defined conventions within *kerapatan nagari*, a decision-making institution that survived from pre-independence days. Lake water and other hydrologic systems are considered common property for fishing, irrigation, aquaculture and other life-support

activities. Each *nagari* government governs and enforces the norms and conventions for the sake of overall prosperity. In addition, paddy fields are a sign of food security and prosperity in Singkarak and other areas in West Sumatra. For example '*Bareh Solok*' (rice from Solok, a district adjacent to Singkarak) is a well-known product of West Sumatra and probably Indonesia.

In terms of working rules and property relations in Singkarak, the *nagari* system acknowledges self-ownership both by societal rules and formal state rules. Formal rules are necessary for investment and business purposes. The rules are written and enforced by the state. As explained previously, informal rules are well defined and enforced. Society in Singkarak is generally aware of formal rules enforced by the state. Rules on land ownership, and 'no-trespassing' to *tahura* (*Taman Hutan Raya* or privately-owned forest land) are generally understood and complied with by local people. Sometimes the complexity of the *nagari* system in governing rural land uses discourages investment, especially if the investors are from outside West Sumatra.

5.1.2 Institutional Environment

Some existing supportive institutional environments are expected to govern and regulate groups of associated agents, enable collective control over transactions, and guarantee the consensus for action and the evaluation required for joint action. Existing societal-based collective actions in Sumber Jaya could be seen as a foundation to establish stronger bonding and bridging social capital, with prospects for developing environmental service markets in the area. These actions are known as *gotong-royong* (labour sharing in common property), *arisan* (capital sharing periodically on regular basis) and Forum SDA (which is a formal farmer group meeting to share information on obtaining tenure). More formal collective action was also found in the region, such as the watershed community forum for conserving natural resources established in January 2004 and endorsed by local government. There is also ample room for village heads to play important roles in the new rural autonomy setup based on Indonesian Law 22/1999 and its improved version of Law 32/2004.

In Bungo, several societal-based collective actions were found in the study sites such as *pelerin* (labour share in privately owned land), *gotong royong* (a method of labour sharing in common property), *berselang* (labour sharing for rice

planting and harvesting), *jolo-jolo* (capital sharing for special occasions), and *arisan* (capital sharing periodically on regular basis). Some formal rules are eroding since the *reformasi* era began but formal organisation is still important for land administration, certification, and so forth. Even though most village heads (*kepala desa* or *lurah*) in the field had heard of the Basic Law 22/1999, the village head also plays an important role in the new autonomous setup.

In Singkarak, societal collective actions were also common. Some traditional formats are also found in the field such as *gotong-royong* and *Gebu Minang* (resources mobilised from the upper classes of Minang society, living in other parts of the country). One should note that the regular village (*desa*) system no longer exists, with the *nagari* system fully adopted after *reformasi*. In this case the *nagari* head is coordinated at subdistrict (*kecamatan*) level under the administrative authority of the City and District Government. Finally, in urban areas or Minang enclaves, basically there are no changes to the *kelurahan* system, where the urban village head (*lurah*) is a government-appointed officer.

5.2 Elements for Reform and Policy Strategy

Policy reforms and advocacy strategies are formulated based on lessons learned from the institutional analysis and additional transaction costs analysis. However, these results should be interpreted with caution primarily because of the uniqueness of the environmental services concerned, such as the identification of providers and beneficiaries, the process of monitoring environmental service functions and institutionalisation of the rewards. Findings regarding the institutional mechanisms and environments should be very important in light of the possible constraints on transfer payment agreements in the field. This could serve as an entry point to observe more closely the interplay between individuals, institutions and markets. What has been clear is that the absence of incentive and disincentive systems, with clear rewards and punishment for individual decisions, could be a serious obstacle in developing more respected value systems for a better future. Societal-based collective action and more formal laws, rules and regulations could be explained further by the criteria and indicators necessary to develop more just and fair payment systems between environmental service buyers and sellers.

Efforts to reduce high transaction costs become relevant to the policy reform agenda because high transaction costs could represent inefficient economic organisation, policy formulation, and implementation procedures. The estimated transaction costs for the Sumber Jayan HKM group is about Rp 504 000 per household (about US\$55 at the current exchange rate), which is expensive given the average annual farm household income is about Rp 1 million or less. Simplified and clear procedures, predictable costs of application, and the time required for approval could obviously reduce the transaction costs borne by household members of HKM organisations. In addition, intermediaries such as NGOs (national and international) play an extremely important role in reducing transaction costs, especially if the HKM has potential to serve as a reward mechanism for the poor people living upstream who have adopted sustainable resource management methods to protect the watershed's ecosystem services. Finally, reforms should be directed at building up the local government's capacity on forestry and watershed management, such as empowering forest guards and local policemen; this could reduce the transaction costs of monitoring by the HKM group.

This report proposes some strategic steps for the RUPES Program and its replication in other places in Indonesia. The policy action phase is equally important if similar reward mechanisms are to be successfully replicated in the future. For example, the community level benefits could combine facilitation of farmer-led tree innovations such as in Lampung, and steps to improve public health, schools, and conflict resolution at local level. This result should be used as an early benchmark for investigating the requirement for, and conditions of policy reforms that would facilitate environmental transfer agreements. This contributes to proposed strategic steps for the RUPES program in the future, and establishes a coherent work plan for engaging in policy reformulation, including a funding strategy. Strategies for different stakeholders should be sharpened and more applicable at field level.

Finally, the strategy to implement the reward transfer to the poor or simply the payment mechanism should be initiated by establishing a public-private partnership in each of the three RUPES sites. Coordination meetings among stakeholders should be held regularly. A community forum on natural resource management could at least serve as an arena for policy exercises directly and indirectly related to RUPES development at national and site levels.

The main purpose of this public-private partnership is to establish criteria on how to implement the reward mechanisms through the available options at the landscape, regional and national levels

In short, this partnership could serve as a steering committee, and act as a bridge between local stakeholders, provincial government and the central government with regard to reward transfers for environmental services. The immediate challenge is how the interest and commitment shown by local stakeholders to rehabilitate catchments can be harnessed,

especially to empower local people who are most dependent on water and forest resources, and to improve their livelihoods. At the same time, poor rubber smallholders could contribute to maintaining the jungle rubber agroforestry system to preserve biodiversity and assist the transition from maintaining watershed services to reforestation and afforestation in order to comply with the Kyoto Protocol. This is the only way that Indonesia will be able to implement carbon sequestration services under the Protocol's clean development mechanisms.

GLOSSARY

<i>adat</i>	customary or traditional norms and conventions
BGBD-GEF	Below-ground Biodiversity-Global Environmental Facility
BRN	<i>Biro Rekonsiliasi Nasional</i> , National Reconciliation Bureau
CBFM	Community-based Forestry Management
CDM	Clean Development Mechanism, under the Kyoto Protocol
GNRHL	<i>Gerakan Nasional Rehabilitasi Hutan dan Lahan</i> , or National Movements on Forest and Land Rehabilitation. Also called simply <i>Gerhan</i>
HEPP	Hydro-Electric Power Plant
HKM	<i>Hutan Kemasyarakatan</i> : program on community-based forestry management
ICRAF	World Agroforestry Centre
PLTA	<i>Pembangkit Listrik Tenaga Air</i> or Hydro-Electric Power Plant
PP	<i>Peraturan Pemerintah</i> , or government regulation
RUPES	Rewarding Upland Poor for Environmental Services
Forum SDA	<i>Sumber Daya Alam</i> , meaning natural resources.
TSDP	Tree-Seed Development Project
<i>ulayat</i>	customary or traditional rights on land

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