Transaction Cost Analysis of Upstream-Downstream Relations in Watershed Services: Lessons from Community-Based Forestry Management in Sumatra, Indonesia

Bustanul Arifin

Department of Agricultural Economics and Social Sciences,
University of Lampung (UNILA)
Jl. Sumantri Brojonegoro No. 1, Bandar Lampung 35145, Indonesia
Phone: +62-812-940-1150, Fax: +62-21-7919-4018
E-mail: barifin@uwalumni.com

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Bustanul Arifin
barifin@uwalumni.com

Abstract

This study analyzes transaction costs occurred in the existing set-up of upstream-downstream relations and reward mechanisms of the watershed services in Sumatra, Indonesia. The rewards are manifested through property right reforms in terms of "recognition" and "loss of fear of eviction" among local communities to utilize land within the "protection forest", such as implemented under the community-based forestry management (CBFM) policy. The study sites of Sumber Jaya watershed in Sumatra, Indonesia has been notoriously known as a benchmark for conflict of watershed functions between the state and the society, and among stakeholders such as coffee growers, domestic water-users, hydroelectric power company, etc. Estimated transaction cost to implement the rewards is US$ 55 per household, a relatively high cost for rural standards. The component consists of costs of searching information (70%), organizing the group (27%), and enforcement of working rules and regulations (3%), implying a non-efficient economic organization of the society and non-clear policy structures at regional and national level. Roles of intermediaries such as NGO (national and international) are extremely important to implement the negotiation support system and develop multi-stakeholders strategy to reduce transaction costs, especially to ensure conflict resolutions, improve trusts and shared responsibility to achieve more sustainable resource management.

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Keywords: Environmental services, transaction costs, Indonesia

1. Introduction

Environmental services market has increasingly obtained attention in academic communities, government agencies, private sectors and organizations concerned with the empowerment of civil society. Services include clean and abundant water supplies from watersheds, biodiversity protection, stocks of carbon that may alleviate global warming and landscape beauty for recreation and tourism. The sellers of environmental services are people living upstream, where land use practices and the techniques and knowledge adopted for farming practices significantly affect the nature of resources and the quality of ecosystems services. The

buyers of the services include people living downstream, private entities, national and international organizations interested in conserving the resources. However, upland communities, generally the poor and most marginalized, are not sharing in the benefits that these services provide. The benefits of national and local investments in economic development often bypass these people and in many cases these upland communities are bearing a large share of the negative aspects of development.

There is an urgent need to support a process of self-empowerment so that poor upland communities can take the necessary decisions to build a sustainable future based on their resources, on improved technology and centuries of accumulated wisdom. Therefore, rewarding poor upland communities for providing environmental services (RUPES) would enhance their livelihoods and reduce poverty. The program of RUPES is formulated to develop working models of best practices for successful environmental transfer agreements adapted to the Asian context in general and to the Indonesian context in particular. However, as the institutions governing the interactions among these stakeholders have not developed properly, establishing rewards and payment transfers for providers or sellers of the services face serious complexities. The latter is where poor people are very dependent on environmental resources. Under such institutional arrangements, the transaction costs of implementing rewards and payment transfers are extremely high. In addition, political constraints to implement the concepts are substantial, especially when the communities receive rewards for services only in exchange for votes.

This paper analyzes transaction costs occurred in the existing set-up of upstream-downstream relations and reward mechanisms of the watershed services in Sumatra, Indonesia. The rewards are manifested through property right reforms in terms of "recognition" and "loss of fear of eviction" among local communities to utilize land within the "protection forest", such as

implemented under the community-based forestry management (CBFM) policy. First, the approach and framework of the institutional studies are described, with brief descriptions of site characteristics. Results of transaction cost analysis are presented to show a non-efficient economic organization of the society and non-clear policy structures at regional and national level. Finally, the paper concludes with steps for institutional reforms to implement the negotiation support system and develop multi-stakeholders strategy to reduce transaction costs, especially to ensure conflict resolutions, improve trusts and shared responsibility to achieve more sustainable resource management.

2. Approach and frameworks

An institutional economic approach is mostly used in the study, combined with quantitative analyses of the transaction costs of the existing and potential collective actions for transferring rewards. The basic principles in studying the institutional mechanisms rest on the meaning and scope of institutions as a set of rules of going concerns, as viewed by both old institutional economics and new institutional economics. The fundamental distinction between the everyday use of the term "institution"—as being synonymous with an organization such as the Ministry of Forestry or a university—and the working rules is therefore the focus here. Organizations such as a university or a corporation acquire their meaning from the working rules (institutions) that define them.

Three classes of institutions are adapted in the study: (1) norms and conventions; (2) working rules; and (3) property relations (Bromley 2003). Norms and conventions are accepted regularities in behavior, though not written, that bring order and predictability to human relationship. The enforcement of norms and conventions tends to reside close to the individual so that the roles of codes of conduct are very important. Norms and conventions must be

distinguished from the class of institutions for which there exist formal (codified) enforcement mechanisms. Therefore, compliance processes must be set up by the state to enforce conformance with an evolved norm, that is, the working rules.

Collective actions relevant to the development of environmental services markets would go beyond "autonomous" processes to accumulate trusts within the group. It requires systematic efforts to search for recognition among different groups (and subgroups), and mechanisms to build long-term relations and networking systems in a broader context for 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 trusts could grow significantly higher and civil society as a whole would grow healthier and even stronger than otherwise. Therefore, intermediaries are really needed to develop a negotiation support system that strengthens the "bridge" and accumulate "trusts" in the society.

Societies characterized by high levels of trust 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 system of financial intermediation, 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 being 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 to

accumulate physical capital, but are also likely to have higher returns to accumulation of human capital (Knack and Keefer 1997).

The present study applies transaction-cost principles, one of the main components in the institutional economics, believing in a costly process of every economic exchange. At the community level, transaction costs could arise (1) from coordination activities among the community members and (2) from interaction (lobbying, bargaining, etc.) between local communities and state agencies (Mburu et al. 2003). Transaction costs may differ between households due to household characteristics and differences in the willingness of households (or the incentives created for them) to bear the transaction costs involved in collective actions of natural resource management. Previous studies on the subject suggest that transaction costs arising from coordination activities are influenced by the social cohesion or the social capital of the community members (Ostrom 1994, 2000). The transaction costs arising from the interaction with state agencies probably depend on perceived relations between the community members and the agencies concerned.

The incentives for households to bear transaction costs involved in implementing community-based (agro) forestry management (CBFM) as an important proxy to provide environmental services obviously depend on the benefits that the household expects from this management. This includes the capacity of the household to spend time and resources, such as financial capital and the availability of labor in the household. The studies were conducted using a combination of desk studies and field observations in the study sites of Sumber Jaya watershed, by performing in-depth interviews with key persons in the field, relevant stakeholders, and policy makers.

To develop options for institutional mechanisms, 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 p.6). Therefore, "transaction cost economics concurs that transaction is the basic unit of analysis and regard governance as the means by which order is accomplished in a relation which potential conflict threatens to undo or upset opportunities to realize mutual gains" (Williamson, 1998, p.6). Just as interests shape the patterns of internal changes, and the dynamics within the settings of action research sites and in the external environment of local government, changes in perceptions of macro-economic conditions also affect governance structures in the overall organization.

3. Study Sites

The study sites were focused on Sumber Jaya Subdistrict, which was first officially inaugurated by President Soekarno in 1952, as a destination of the Transmigration Program from West Java. The program was under the Administration of National Reconciliation Bureau (BRN=*Biro Rekonsiliasi Nasional*), which was also responsible for regional development. Sumber Jaya developed rapidly, with well-known coffee producers in North Lampung. As a new growth center, the subdistrict attracts more migrants, mostly from Java and neighboring regions, for coffee cultivation, forest-product extraction and agricultural intensification. The topography of Sumber Jaya is hilly and mountainous at 700-1700 meters above sea level (masl). At the time of study, Sumber Jaya was part of the new district of West Lampung, which was previously included administratively in the district of North Lampung. In 2000, the old subdistrict of

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.

Therefore, the total area of the new Sumber Jaya is only 35,646 ha, a significant decrease from the old Sumber Jaya of 54,194 ha. Total population in old Sumber Jaya was nearly 90,000 people, while the population of new Sumber Jaya is possibly nearly 50,000 people. Major agricultural land use in Sumber Jaya is coffee cultivations on the upper portions of watersheds (44.6%) and paddy rice on the lower portions (5.13%). The rest of land use is mostly protection forest; the ultimate function of the Way Besai sub-watershed. Coffee farmers in Sumber Jaya are practicing coffee monoculture on about 20% of the total watershed area; and coffee-agroforestry, also known as multistrata coffee, on about 24.5% of the total watershed area.

3. Institutions found in the sites

Based on classes of institutions, major stakeholders in Sumber Jaya have adopted the norms and conventions based on (economic) values of migrant, frontier and forest-pioneer characters. Military operations in the 1990s to overcome the misuse or encroachment of protection forests led to major evictions out of the forest of small farmers practicing coffee gardens and mixed agroforestry. These evictions were a nightmare and very hard to forget for the majority of Sumber Jaya's population. The villagers or providers (and beneficiaries) realized that if they were united in an organization, they could obtain rights to use the forestland for a 25-year period with probationary rights of five years under community-based forestry management (CBFM or HKM).

Farmers in Sumber Jaya grow Robusta species of coffee, where shaded coffee and monoculture coffee practices mixed with agroforestry systems are also very common. Conventions to justify land for crop cultivation from the forestry boundary are normally based on

the "original control" in the forest clearing and tree crop planting. As commonly practiced in the forest frontier community, the HKM community in Sumber Jaya follows the norms of "first come first serve," where individuals who opened up the forest in the early 1970s or prior to that date, could legitimately claim "possession" of forestland (not necessarily "rights" or "ownership") and could grow any crops necessary to generate economic returns. Based on the conservation values strongly adopted by the HKM organizations, members of the organizations closely monitor economic activities within the protection block of the conservation forest, mainly from encroachers and illegal loggers. Each HKM group in Sumber Jaya has claimed to capture two to three encroachers and illegal loggers within its own group jurisdiction.

The following institutional environments are a summarized result based on a face-to-face interview with 37 respondents using a 12-page questionnaire in two villages of Simpang Sari and Gunung Terang in the Subdistrict of Sumber Jaya. In additions, more structured interviews with resource persons and key informants in the field such as head of the farmer groups, extension agents, informal leaders, officials of local governments, head of power-plant company of PLTA Besai, traders and businessmen and other members of the society.

The level of norms and conventions adopted by the society living around the watershed is very much determined by the characteristics and historical figures of the community. For example, the migrant character of community in Sumber Jaya leads to a majority feeling (62%) that everybody can have access to grow crops in forest land. The role of farmers' groups as a significant agent in growing crops in forestlands is not as important as their function to improve social cohesiveness in the community. The majority of respondents (78%) are members of local organizations such as farmers' groups (CBFM of HKM group). People want "more freedom" in growing cash crops such as multistrata coffee and tree crops in the protection forests, assuming

more sustainability principles are adopted in these farming practices. In this case, the main reason farmers in Sumber Jaya join these organizations is to obtain more secure property rights in land use practices, particularly in response to the recent rules and regulations about HKM and/or policies of social forestry in general. Regarding the understanding of rights, benefits, and responsibility in joining the farmers' association, the majority of respondent in all Sumber Jaya study sites were confident about their decision to join at least one local association or farmers' organization.

4. Estimated Transaction Costs of Providing Rewards

Transaction costs are estimated based on the: (1) costs of initiation/information searching, ranging from the costs of group establishment, lobbying costs, obtaining permits, etc.; (2) costs of coordination/organization, consisting of the costs of overhead, regular meetings, and opportunity foregone to attend meetings, etc.; and (3) costs of enforcement, including the costs of guarding the crops from encroachers, "parcel maintenance," dispute settlement, etc. It should be noted that the range of these costs 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 or to prevent encroachers from entering the parcels, and the real "transaction costs" such as the time allocated to guard the crops from encroachers.

Another possible cause is that the time allocation being reported is actually overestimated, as commonly found in farm-budget analysis, where the revenues are normally underestimated, while expenses are usually overestimated. Nonetheless, 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 foregone for HKM members to attend meetings,

plus additional transport costs from their residences to the meeting room. For a more rigorous quantitative analysis, the total costs of participation in the meeting as a component of coordinating costs could be extrapolated from the proportion of farmers participating.

Table 1. Transaction Costs of HKM Groups in Sumber Jaya (Rupiah 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/organization		
	(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 crops from encroachers	4,000	0.79
	(b) Kebun or parcel maintenance	6,521	1.29
	(c) Dispute settlement	6,000	1.19
	Sub Total	16,521	3.28
	Total Transaction Cost	503,591	100.00

Source: Calculated from field observations.

The estimated transaction costs to establish, manage and run the HKM group are quite high according to rural standard. An amount of Rp 504 thousand per household (about US$ 55 at the current exchange rate) is considered expensive, especially when the average annual income of farm household in Sumber Jaya is Rp 1 million or less. The highest elements of transaction costs is the costs of initiation or search of information, reaching about 70 percent of total costs; and the costs of coordination or organizing the group of 27 percent; and the cost of monitoring or enforcement on the existence of the group is only 3 percent. As has become the general concerns, the establishment of HKM group, the procedures to obtain the permit and any other

lobbying process of permit HKM application take extremely long, averaging about 4 years. An exceptional case of obtaining the HKM tenure was also found when the first HKM group has obtained the permit for less than six month of application process. At that time, an intensive consultation and possibly good lobbying with the line agencies in the Ministry of Forestry speeded up the application process. After the regional autonomy, when the power of issuing the permit was transferred to district authority of local government, the procedures have taken extremely longer than expected. Therefore, simplified and clear procedures, predictable costs of application, and the time required for approval could obviously reduce the important components of transaction costs that have to bear by household members of HKM organization In additions, three main requirements to obtain the HKM permits – participatory mapping of the area managed, rules of the game of the group, and five year clear planning and development of the forest land – have taken much energy and resources of farm households and the leaders in submitting tenure applications.

Creating participatory mapping of the area managed by the group has not been easy, assuming high accuracy, transparency and objectivity in the process in determining the border of the parcel of each household. Putting more resources in such "investment" steps – time, energy, money, marathon meeting and ground surveying and measurements is probably beneficial for future generations, at least to prevent and reduce land conflicts both horizontally with neighboring farmers and vertically with the authorities. As can be also expected, setting up the rules of the group that could encourage sense of ownership, responsibility, and participation have taken much time, several meetings, ups and downs of enthusiasms, and good social relations and society cohesiveness at local level. Existing societal collective actions such as *arisan, yasinan, gotong royong*, etc. have played important roles in maintaining spirits among members of the

group. Similarly, formulating five-year action plan on the resources has not been easy because of limited capacity of the members and the leaders of HKM group alike, as well as the sense of mistrusts from these farmers to the authority. Therefore, the roles of intermediaries such as NGO (national and international) in this stage are extremely important, especially if the HKM will be prospected to serve as a reward mechanism for the poors living in the upstream who have adopted sustainable resource management, contributing to good ecosystem services of the watershed.

The costs of coordination and running the group as a solid organization are also not cheap, as commonly found elsewhere. Other cost components such as overhead to run the group and the costs of meeting to maintain the solidity of the group are not very high and quite normal for an organization. The opportunity forgone among group members to attend the group meeting, especially during the day, at the village and at subdistrict levels is really costly, because farmers could lose their time and expected revenues on that day. Some members have to spend a day-long for a trip from their residents up in the forest area and have to pay a very expensive transportation cost by rented motorcycle because of bad quality of rural roads. Normally, many farmers are happily willing to participate in the meeting, not only to socialize and share their daily problems and progress, but also expect to obtain more and 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 meeting. The holders of HKM tenure rights are also expecting to hear new information about the future status of the rights and other relevant information such as opportunity to participate in the currently reforestation GNRHL program, a national movement program encouraging more participatory approach in land rehabilitation to prevent forest degradation. Some members are only interested in attending informal gatherings

such as *yasinan* and *arisan*. Improving the road quality and infrastructures could reduce the transaction costs, but clarity and secure property rights such as the future of the HKM status also could substantially lower costs and the intensity of transaction.

Regarding the cost components of enforcement such as guarding their parcel of land from encroachers – and more importantly monitoring outsiders from infiltrating and taking benefits of the forest products at the expense of group credibility – could eventually increase in the future. The "incentives" of increasing demand of forestry products, despite of increasing timber prices at domestic markets and world market would increase the pressure to harvest forest products, especially the exotic timbers of best quality such as the one from protection forest of Sumber Jaya. By the time of field observation, these components of transaction costs were not very high, mostly because the problems are not very complicated and under controlled of HKM group. However, as the issues of sustainable resource management are growing modernized, world demand for coffee and timber products is increasingly more sophisticated, the cost components of enforcement would be higher in the future. Therefore, increasing the capacity of local government dealing with forestry and watershed management, such as empowering forest guards and local policemen could reduce the transaction costs of monitoring the group existence.

For the shake of formulating reward transfer mechanisms in other environmental services such as biodiversity and carbon sequestration, a more dynamic analysis of transaction costs in establishing, running and enforcing the HKM group should studied in the future. A snapshot analysis of transaction costs, which this study provides, is an important initial step, but cannot capture the dynamic relationship between economic transactions and policy decisions. Therefore, more rigorous analysis of the group dynamics and expected farm income in certain planning cycles is important to refine the formulation of policy reforms for rewarding upland farmers or

poor resource managers in Sumber Jaya or other countries with similar characteristics. For example, proper dissemination is very important in improving the level of understanding about Government Regulation No.34/2002 on Forestry Land-Use and Forestry Management Planning, Government Regulation No.35/2002 on Reforestation Funds, and the newly passed Government Regulation No.44/2004 on Forestry Planning.

5. Concluding Remarks: Lessons Learned

This paper has analyzed transaction costs occurred in the existing set-up of rewards for environmental services provided by the upland poors in Sumber Jaya watershed of Sumatra, Indonesia. Some lessons learned from this study include that the absence of incentive and disincentive systems could be a serious obstacle to develop reward mechanisms for environmental services. Therefore, a negotiation support system (NSS) bridging interests and compromised agenda among stakeholders should be developed accordingly to establish clear rewards and punishments for individual decisions and to create more respected value systems for participatory approach on rural and environment development.

For example, integrated social forestry development keeps appearing in public policy debates as conflict between the communities living within or around forest areas and the state apparatus or workers of forest concession companies. Several programs and projects on participatory forestry management have been initiated, especially after the fall of President Soeharto, but the outcome of these projects has not been tangible in terms of sustainable forest resource use. The newly formal collective action to govern the principles of social forestry is Minister of Forestry Regulation Number P.01/Menhut-II/2004 on social forestry. This new umbrella policy could be seen as a comprehensive approach that covers ideology, strategy and implementation, especially to support broader decentralization principles, which involves

empowering local people. The government should facilitate the process of strengthening local institutions, improve local people's capacity for business management, and assure sustainable and participatory forestry management. The main principles adopted in social forestry include: self-sustained benefits; partnership (integrated, gradual, sustainable); and local-specific and adaptive policy. The social forestry policy is implemented through the steps of setting-up "the pre-condition" at the local level to accumulate commitments from local, provincial, and central government, and to improve rules and regulations towards integrated social forestry development.

To develop reward mechanisms for watershed services such as in Sumber Jaya, the specific incentives and disincentives for communities who support protection, control and supervision of natural resources management (article 17 of Decree 31/2001), could be a basis for further investigation. Whether or not these opportunities for poor people around state forests to obtain a right to manage the state forest could be considered as a payment transfer, a more rigorous analysis on indicator and criteria should be conducted. As mentioned previously, community participation in sustainable forestry management among those living around the forest area is an entry point for developing environmental service markets. One might argue that the government (at the local, provincial or central level) could serve as a buyer of environmental services at the local scale, because the government has an interest in implementing successfully the policy of integrated social forestry. Meanwhile, the upland poor living around the protected forest could serve as sellers of environmental services by practicing land rehabilitation and reforestation. Therefore, the details of permit issuance, rights to manage forests and empowerment strategy for improving the capacity of these local people should be on the agenda for policy reform in the future.

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