The 'Five Million Hectare Reforestation Program' in Vietnam: An Analysis of its Implementation and Transaction Costs A Case Study in Hoa Binh Province

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Abstract

This research study uses a qualitative approach to examine the implementation of the 'Five Million Hectare Reforestation Program' (the 5MHRP) in Vietnam, and to explore the underlying reasons for local people's participation in the program. The study also uses a transactional model to examine the private transaction costs borne by farmers when carrying out forest management activities under the program. The study reveals that: (i) the implementation of the program was generally characterized by a top-down process, (ii) the principal contribution to household benefits derived from forest management activities was the collection and sale of non-timber forest products, not the subsidy provided by the government, (iii) the main challenges faced during implementation of the program were the low and fixed subsidies provided, the improper types of trees being planted, poor access to the forest, and a lack of awareness among local people towards the benefits to be derived from participation in the forest management program, and that (iv) under the program's community contracts, attending meetings (52%) and self-monitoring activities (35%) constituted the largest proportion of total time spent on forest management, while under the individual contracts, self-monitoring activities (98%) were the main component. Participating in the planting *and* protection of forests under the program brought greater benefits to households than when involved in forest protection activities alone. The main implications of this study are that an increase of payments under both types of contract, and especially the community contract, as well as the provision of higher quality seedlings and fertilizers, need to be taken into consideration in future initiatives. In addition, local communities and authorities should be further empowered, and their contribution should be taken into consideration in future programs.

Keywords: reforestation, forest management, contract implementation, transaction costs, cost benefit analysis
JEL: Q23, Q28, D61

1 Introduction

Recent forest management activities in Vietnam have gone through a transition, from a centrally planned to a more participatory social forestry approach (SAM and TRUNG, 2001; TAN et al., 2007) in which forest owners are given land use rights under the 'Redbook' (TAN et al., 2007). Genuine uplands reforestation and afforestation started in the early 1990s, with the support of the United Nation's Food Program (PAM), and through a national program entitled 'Greening the Barren Hills' (Program 327), as well as other regional reforestation programs. These programs have since helped Vietnam achieve some notable results in the forestry sector, especially in terms of increasing forest cover and forest product exports, and reducing poverty levels in mountainous areas (COI, 2012).

As a continuation of previous reforestation efforts, in 1998 the government of Vietnam launched the 'Five Million Hectare Reforestation Program' (the 5MHRP). The overall objective of this program was to establish five million hectares of new forest and protect 9.3 million hectares of existing forest, in order to increase national forest cover from 28% to 43% by 2010. To achieve this target, the program pursued the task of rehabilitating two million hectares of special-use and protection forest, and of planting one million hectares of new forest within watershed areas. Three million hectares was also set aside as production forest; two million hectares to produce the raw materials needed for manufacturing paper, timber and non-timber forest products (NTFPs), and the remaining one million hectares set aside for fruit trees and other perennial crops. As part of the program, 50 million seedlings were planted around houses, offices, schools, and along roads and canals each year, to help meet the demand for firewood and domestic furniture in local villages. The 5MHRP project went into implementation in 1999 (GOVERNMENT OF VIETNAM, 1998).

The government wanted farmers to be part of the sustainable development initiative, so the majority of upland farm households were given financial incentives to undertake reforestation activities. Contractual arrangements were concluded between the government and the farmers, with the farmers being the sellers and the government the buyer of environmental goods and services. However, there were significant transaction costs associated with participation in the program, these being incurred both by public parties such as government bodies and implementing agencies, and also the participants (FALCONER, 2000; METTEPENNINGEN et al., 2009). Transaction cost analysis is con-

sidered an effective tool within development policy analysis for evaluating the effectiveness of institutional arrangements within the natural resources management sphere (ADHIKARI and LOVETT, 2006; BLORE et al., 2013; KUPERAN et al., 2008; MBURU et al., 2003) and also for determining divisions of power and access (MESHACK et al., 2006). Furthermore, a transactional perspective can be of value when seeking to assess the effectiveness of a functioning program scheme (FALCONER, 2000). The omission of transaction costs from policy considerations and decision-making processes can result in sub-optimal policies being designed and implemented (FALCONER and SAUNDERS, 2002). Despite the important role transaction cost methodologies can play, this aspect of resource use management is often neglected in policy analysis (FALCONER, 2000; PEARSON et al., 2013; RØRSTAD et al., 2007). Relatively few empirical studies on private transaction costs associated with natural resources management activities have been carried out (ADHIKARI and LOVETT, 2006; FALCONER, 2000; FALCONER and SAUNDERS, 2002; FOUNDJEM TITA et al., 2011; KUPERAN et al., 2008; LEFFLER and RUCKER, 1991; WIDMARK et al., 2013), and few comparative estimates of the costs and benefits involved have been done (BLORE et al., 2013; MBURU et al., 2003). As local knowledge and co-management can reduce information asymmetries and exploit advantages in terms of reducing the costs of managing information (OSTROM, 1990; OSTROM et al., 1999) and the sharing of development practices (SINGLETON, 2000), the research literature tended to emphasize the importance of collaborative processes within natural resource management activities. However, relatively little research on the transaction costs incurred by small holders as a part of such collaborative resource management schemes has been undertaken.

This paper seeks to address this research gap, using a transactional perspective to examine the private transaction costs borne by farmers when carrying out forest management activities, and explore the underlying reasons for their participation in the 5MHRP. The study further analyzes the difficulties faced by stakeholders when implementing the program.

2 The Research Framework

2.1 Transaction Costs: Definition and Measurement

Transaction cost analysis within the natural resource management field is a growth area (WIDMARK et al., 2013). The key challenge faced by empirical studies when estimating transaction costs is the lack of a clear-cut definition of such costs (BLORE et al., 2013; FALCONER, 2000; MESHACK et al., 2006; ROYER, 2011; WÄRNERYD, 1994). A number of useful definitions are available in the literature. According to GORDON

(1994), transaction costs are the expenses incurred when organizing and participating in a market or implementing a government policy (MCCANN et al., 2005). In the context of natural resources management, transaction costs can be understood as the costs incurred by management processes such as gathering information, negotiating, monitoring and coordinating activities related to the management and use of resources, and the costs of enforcing property rights (ADHIKARI and LOVETT, 2006; BLORE et al., 2013; HANNA, 1995; MCCANN et al., 2005; RAY and BHATTACHARYA, 2011; VAN HUYLENBROECK et al., 2005). In the area of community-based resource management in particular, MESHACK et al. (2006) define transaction costs as the costs incurred by individual households when attending meetings and implementing property rights agreements related to local resources. HANNA (1995) gives a broader definition of the term by also including monetary expenditures on information management, travel and communications. In their study of 2006, ADHIKARI and LOVETT point out that there is a helpful way to distinguish appropriation costs and production costs from transaction costs. Accordingly, resource appropriation costs refer to the time spent collecting, processing, and transporting forest products from the forest to the house, while production costs are costs incurred on infrastructure activities such as building and repairing fences, fire breaks, forest trails and footpaths, as well as the costs arising from the damage to crops and livestock caused by wild animals (ADHIKARI and LOVETT, 2006).

The measurement of transaction costs can be difficult for the following reasons. First, as stated earlier, there is no common understanding of what transaction costs actually are (BLORE et al., 2013; FALCONER, 2000; MESHACK et al., 2006; WIDMARK et al., 2013); moreover, it may be difficult to separate production costs from transaction costs (MUSOLE, 2009; ROYER, 2011). Second, transaction costs are often complicated to observe or quantify (VAN HUYLENBROECK et al., 2005). Third, if transaction costs turn out to be very high, some transactions might not even take place. In this case, the "opportunity costs of alternatives would preferably have to be taken into account and these costs are not easily identifiable" (ROYER, 2011: 173). Fourth, differences in individual characteristics means that not all agents face the same transaction costs (ROYER, 2011), plus not all studies apply the same criteria when estimating such costs. As a result, estimated transaction costs are not always directly comparable across studies (RØRSTAD et al., 2007). However, a clear grouping of transaction costs can help to compare empirical studies (MCCANN et al., 2005). Fifth, whether the relevant transaction costs are sufficiently included in a study depends on a researcher's knowledge of the relevant political and natural system (KUPERAN et al., 2008; MARSHALL, 2013; MCCANN et al., 2005), and of the realities in terms of how policies are developed and implemented (MCCANN et al., 2005). This, in turn, influences the design of the data collection activities that take place (MARSHALL, 2013) and also the policy recommendations that result (MCCANN et al., 2005).

The literature suggests that transaction costs can be categorized as *ex ante* and *ex post* – reflecting in turn those that occur before and after the actual transaction has taken place (MBURU et al., 2003; MCCANN et al., 2005). Such costs may be represented as dynamic and static (ABDULLAH et al., 1998), and as fixed and variable (ADHIKARI and LOVETT, 2006; HANNA, 1995; MBURU et al., 2003; MUSOLE, 2009; RAY and BHATTACHARYA, 2011). HANNA (1995) indicates that there are four different resource management stages during which variable transaction costs are incurred: the description of the resource context, regulatory design, implementation and enforcement. At the community level, transaction costs can arise from the coordination of activities among community members, and from the interactions between local communities and state agencies on activities such as lobbying and bargaining, among others (ARIFIN, 2006; MBURU et al., 2003). The extent of transaction costs at the community level is therefore influenced by the physical characteristics of a resource and the social capital held by community members (ADHIKARI and LOVETT, 2006; RAY and BHATTACHARYA, 2011), thus the benefits generated by collective action might be exceeded by management costs (HANNA, 1995).

As already stated, defining transaction costs is not straightforward (MCCANN et al., 2005), but in the context of this study, we define transaction costs as the costs incurred when implementing the project's forest management contracts, and covering activities such as searching for information, monitoring and coordinating tasks related to the management and use of resources, and enforcing property rights. As some activities only occur during the start-up phase, while others were incurred on an annual basis, we separated the transaction costs into costs at the initial stage (i.e. start-up costs) and recurrent annual transaction costs (ADHIKARI and LOVETT, 2006). The former are based on start-up activities, and include learning about the program, attending the necessary training, establishing groups and obtaining contracts. The latter include the recurring, annual activities that occurred, such as regular meetings on forest management, performance updates and contract renewals, self-monitoring and enforcement activities – such as guarding the forests from encroachers and settling disputes, and joining-in with the official monitoring and verification activities. The transaction costs incurred reflect the hours spent on each of these activities (FALCONER and SAUNDERS, 2002; MCCANN et al., 2005), with the costs added up over the course of the project to produce the final transaction costs.

2.2 Setting-up the 5MHRP in the Context of Existing Forest Types and Forestland Policies in Vietnam

The Law on Forest Protection and Development 2004 (CONGRESS OF VIETNAM, 2004) defines three categories of forest, namely special-use forest (e.g. national parks, natural conservation areas and historical areas), protection forest (e.g. watershed and

shoreline forest), and production forest (e.g. timber and non-timber forest product forest) (SAM and TRUNG, 2001). In practice, each type of forest may include either natural forest or planted forest, or a mixture of the two. The Forestland Allocation Policy was implemented in 1994/1995 at our research sites, and under this policy, land used for both protection and production forest, with or without trees, was allocated to individuals and organizations. However, land within special-use forest areas was only allocated to government bodies.

The 5MHRP offered four types of contract; the first three covering protection forests, the fourth production forests (Table 1).

Table 1. Contract types under the 5MHRP

Contract Type	Name of Contract	Duration (years)	Contract Target
Protection forests			
Type 1	Planting *and* protection of new forests	9	Individual households
Type 2	Zoning for protection of existing, natural forests	5	Village communities
Type 3	Zoning for regeneration and protection of existing, natural forests	6	Individual households
Production forests			
Type 4	Planting of forests	1	Individual households

Source: own data, interviews 2012

Contracts developed for protection forests differed from those used for production forests in terms of the benefits-sharing mechanisms used, and the duration and level of monetary subsidy provided. Among the protection forest contracts, type 3 contracts were not used in the study area. Contract type 1was divided into two time-stages, of which the first four years was set aside for planting, tending and nurturing new forests, and the next five years covered the protection of those forests. This contract mainly covered barren forestland allocated to individual households. Planting a certain proportion of woody trees per hectare for protection purposes was compulsory under contract type 1. The two common planting options available to the villagers under this contract were woody trees and acacia, or woody trees and bamboo. Type 2 contracts were used for the protection of natural forest plots, and were as well originally allocated to individual households. However, due to conflicts arising, as discussed later in this paper, households decided to manage this type of forest communally, regardless of who the real forestland owners or Redbook holders were, setting up their own community-based forest management mechanisms.

We focus in this study on contract type 1 (hereafter referred to as an 'individual contract') and type 2 (hereafter referred to as a 'community contract').

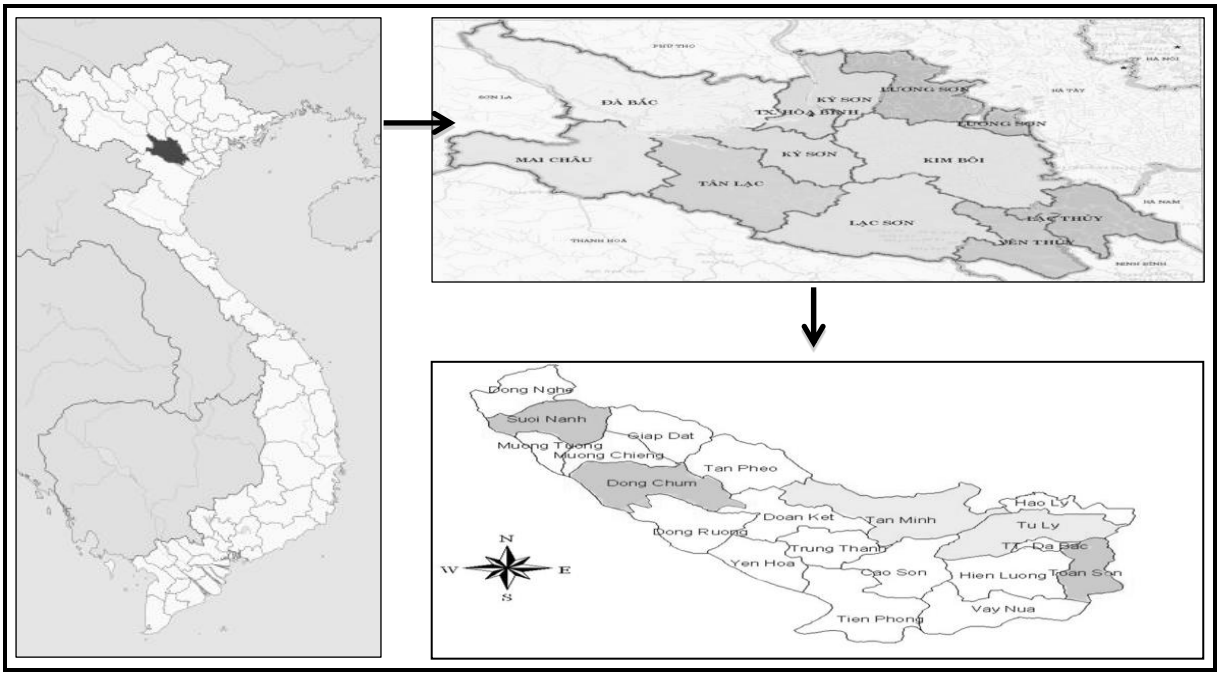
3 Empirical Study

3.1 Study Site and Sample Size

Da Bac, an upland district of Hoa Binh province, was selected as the site for the fieldwork project (Figure 1). The district is about 20 km northwest of Hoa Binh city and about 92km from the national capital Hanoi, and is located within the catchment of Hoa Binh hydropower dam. In total, the district's forest land accounts for 83.6% of its total land area (DA BAC DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT, 2011). As a result, it is important to know the costs and benefits accruing to farmers as a result of participating in the forestry program, as it is a mountainous district in which the local people depend heavily on the forests. Five communes were chosen from the 20 in the district (Figure 1), and these communes were chosen for two reasons. First, they represented three socio-ecological regions which differed from the normal terrain and agro-forestry practices to be found in the district. Region 1, in the east of the district and close to the main town in Da Bac district, is focused on traditional agriculture production, animal husbandry, the production of handicrafts, and services. Meanwhile, regions 2 and 3 specialize in planting and protection of forests, and planting and management of fruit and industrial trees. Region 2 also has potential for aquaculture, as it is located near Hoa Binh reservoir. Region 3, which is characterized by steep hills and mountains, is rather suitable for diversified and large-scale agro-forestry production (DA BAC DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT, 2011). Second, they were under two different forest management boards: the District Management Board of Protection Forest (hereafter MB1) and the Management Board of Da River Protection Forest (hereafter MB2).

One village was then randomly selected from each commune, each reflecting well the institutional and socio-ecological diversity to be found in Da Bac district, including all the institutional forms used within the 5MHRP program. Two out of the five villages chosen are located in region 1, another two villages in region 2, and the last village is located in region 3. With regard to the presence of different management boards, two of the villages are under the management of MB1, while the other three villages are managed by MB2. For the purpose of this study, we named the villages Co1 and Co2 (under the management of MB1), and Da1, Da2 and Da3 (under the management of MB2) to protect the identities of the data sources (MESHACK et al., 2006). Among the farmers with individual contracts, five households that joined the program at different times were selected from each village for in-depth interviews. The only exception was village Da3, as individual contracts were not used there.

Figure 1. Map of study sites



Map of Vietnam
Source: Wikipedia

Map of Hoa Binh province
Source: http://www.vietnamonline.com

The fieldwork was conducted during August and September 2012, and in total, 39 individual in-depth interviews and 15 focus group discussions with 6-8 participants per each were held. Key informants were the managers, departments' heads, and those officials directly involved in the project implementation across various governance levels. Accordingly, two interviews were conducted on provincial level and seven on district level; five interviews and five focus group discussions were held on commune level, five interviews with village headmen and ten focus group discussions were conducted on village level, and finally twenty interviews were carried out with households. Two main research hypotheses were explored in this research. First, under the program's policy framework, variations in transaction costs when carrying out forest management activities resulted in different net benefits generated among the two contract types and across study areas. Second, the high level of transaction costs and other difficulties during implementation acted as constraints on farmers participating in the program. Main research questions to the key informants were: how was the program implemented? Who was involved in/responsible for which type of activities during the implementation process? What were the underlying reasons for farmers to participate in the program? What were the transaction costs incurred by and benefits accruing to the participating farmers during the project?

3.2 Data Collection and Analysis

We mainly adopted a qualitative approach in this study. Participatory Rural Appraisal (PRA) and Net-Map were used for gathering data. PRA is composed of numerous approaches and methods that enable local people to share, enhance and analyze their knowledge of life and conditions, to plan and to act (CHAMBERS, 1994). PRA is applied in natural resources management, agriculture, and poverty and social programs (CHAMBERS, 1994). Net-map is an interview-based mapping tool that helps people understand, visualize, discuss, and improve situations in which many different actors influence outcomes (SCHIFFER, 2007).

In this study, PRA tools as mapping, community historical profile, and Venn diagram were carried out in each village during the initial stages, to learn about the communities' histories and the rural livelihoods there, as well as to identify any problems that emerged during the forest resource management program while Net-Maps were used to find out the involved stakeholders and their roles in the implementation of the project, as well as the formal and informal links between them. Both focus group discussions and individual in-depth interviews were employed, using semi-structured questionnaires. Respondents from government departments at different levels were also interviewed, to find out more about the implementation process, the stakeholders involved and the stakeholders' roles in implementing the program. Respondents at the village level were interviewed individually and in groups, to obtain information on their forest management activities, such as timber extraction and NTFPs collection, and their opinions on the management board officials in the villages. The interviews also asked about the difficulties faced during the program's implementation.

Transaction costs and benefits information was collected from different points in time for the different implementation stages. Furthermore, as the duration of the contracts was more than one year, the costs and benefits generated were extrapolated up to the end of the implementation stage (FALCONER and SAUNDERS, 2002). Ideally, the information would have been collected while the program was still running (MCCANN et al., 2005); thus, we faced difficulties, since we had to ask the respondents to recall unrecorded information from the past. To reduce the risks of this approach, we spent more time with each respondent than would normally have been the case, as suggested by MESHACK (2006).

The interviews carried out during the data collection phase were transcribed word-for-word. Each transcription was coded using predefined nodes, that is, nodes determined by the researcher before the fieldwork took place, and also new nodes for information that emerged during coding. These nodes were then grouped together under broad

categories. The coding process was carried out with the help of NVIVO10. We also took notes during the survey, and these were integrated with the respondents' direct quotes during the final analysis stage.

4 Results

4.1 Command Structure, Monetary Flows, and the Administration Costs within the Five Million Hectare Reforestation Program

4.1.1 Command Structure

A schematic diagram showing the stakeholders involved in the 5MHRP is shown in Figure 2. Each Provincial People's Committee was responsible for the program within its jurisdiction, and a Provincial Executive Committee was assigned to formulate long- and medium-term plans, plus monitor the progress and results of the program. Provincial Project Management Boards, after consulting with the Executive Committee, issued program implementation guidelines and monitored the performance of the District Management Boards. Below this, technical departments at the provincial level; for example, the departments of Agriculture and Rural Development, Natural Resources and Environment, and Planning and Investment, provided assistance with certain tasks as and when needed. The Nature Conservation Area Management Board (hereafter referred to as MB3) and the District Management Board of Protection Forest (MB1) contracted directly with the households and communities over forest management activities, made payments to them and monitored their performance. Another separate Management Board (MB2) was responsible for implementing the same activities as MB1 and MB3, but only in communes belonging to the Da River Reservoir. The Commune People's Committee and village headman there coordinated with other agencies to facilitate implementation on the ground.

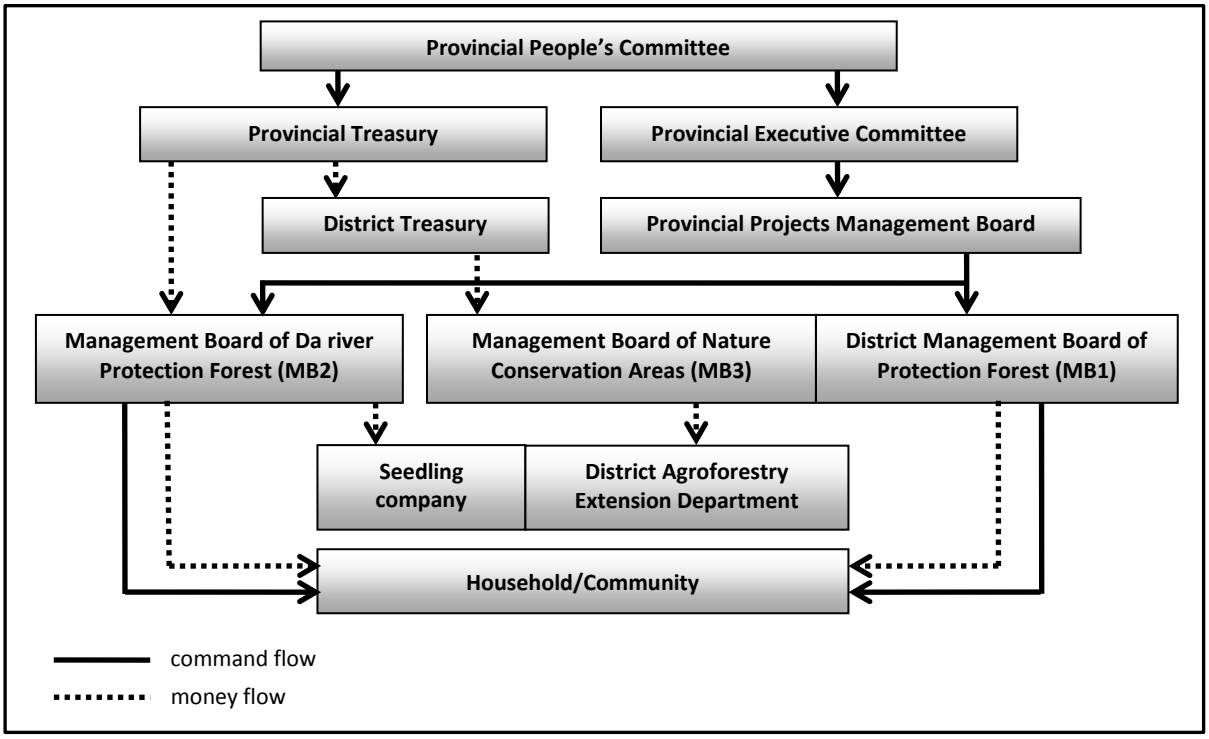
4.1.2 Monetary Flows and the Administration Costs

Since MB2 implemented the program across all communes in the Da River Reservoir catchment area, which covers many different districts, it received its money directly from the provincial treasury, while MB1 and MB3 received their money from the district treasury. All three types of management boards were responsible for transferring government subsidies to households and communities, to support their forest management activities, plus paid for the use of technical experts and for seedling supplies (Figure 2).

The administration costs at different governance levels accounted for 10% of the total national budget invested in the project. The 0.7% was kept at the central level, while the provincial level and project management boards at district level were allowed to

keep at 1.3% and 8%, respectively (MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT; PLANNING AND INVESTMENT; AND FINANCE, 2009). Commune governments were given no fee for their administration, although they were assigned to coordinate with relevant agencies to facilitate the implementation on the ground.

Figure 2. The Five Million Hectare Reforestation Program: command structure and monetary flows



Source: own data, focus group discussions 2012

4.2 Village Profiles and Characteristics of the Household Respondents

4.2.1 Village Profiles

In the five communities studied, the average forest area per community contract was 146.2 hectares. Four of the five communities had finished their 5-year contracts, while the last one was still in its fourth year. The number of households in the villages ranged from 58 to 84, with Da2 being the biggest village with 380 people, and Co2 the smallest with 242 people. On average, there were 73 households and 313.4 people per village. Three of the five communities were mono-ethnic, with the Dao group living in Da1, the Tay in Da2 and the Muong in Da3. Villages Co1 and Co2 were ethnically more diverse; here Tay people accounted for 95% and 80% of the population, respectively. The rest of the population in these villages was made-up of minority ethnic groups such as the Kinh, Muong and Dao. According to the national poverty

line of 2011 (GOVERNMENT OF VIETNAM, 2011), the highest percentage of poor households, at 72.3%, was found in Da1, while the lowest was 31% in village Da2. Village Co1 had the longest stretch of road accessible by trucks all year-round, at 5 km in length, while Da1 had none at all. Of the five communities studied, village Da2 was the furthest from the district center (73km), followed by villages Da3 (72km), Co1 (33km), Da1 (9km) and Co2 (5km).

4.2.2 Characteristics of the Household Respondents

Under the project, the average forest area per individual contract was 1.6 hectares. Out of the 20 households interviewed, 45% of the respondents said they planted woody trees and acacia, while 55% reported that they planted woody trees and bamboo. These households were at different stages of implementation when the interviews took place, with 47% in the first 4-year stage, 29% in the second 5-year stage (i.e. the protection of newly planted forest), and 24% having already finished the contract. On average, it took farmers 24 minutes by foot to reach the nearest forest plots, and 50 minutes to reach the furthest.

4.3 Forest Management Transaction Costs

4.3.1 Transaction Cost-days in the Communities

Table 2 provides a breakdown of the average time spent on the various forest management activities in the five communities. Participants in the focus group discussions confirmed that the operational activities had been more or less similar over the years of the project, except for the first, start-up year. The respondents were therefore asked to recall the time they invested during the start-up and latter stages of the program. The total transaction cost-days were separated into two groups, based on whether costs at the initial stage or recurrent annual transaction costs were involved, the former representing start-up activities and the latter calculated by multiplying time spent on recurrent annual activities by the length of the contract. The total transaction costs per average year were the highest for village Co1 (263 days), followed by Da1 (138 days), Da2 (53 days), Da3 (45 days) and Co2 (15 days). Since the forest areas belonging to the villages varied in size, table 2 also shows the labor days used per hectare. Those villages with the larger forest areas tended to have lower labor intensity rates per hectare per average year, as can be seen for villages Da1 and Da3. Co1 is the only exception, as it invested the highest amount of time in forest management activities compared to other villages.

Since the villages agreed the natural forest be managed by the whole community, household members had to send one representative to participate in all common activities. The amount of time spent on start-up activities therefore include the number

of days an entire community spent attending the introduction program, formulating general village regulations and sanctions with regard to forest-related violations, forming the Forest Guard Groups or Village Forest Management Board, or both, and determining the operational regulations required. All the communities were similar in terms of the number of activities they participated in and their attendance at the two-hour discussions held during the start-up period, but varied in terms of the total number of days spent on project activities, due to differences in household numbers in each village. Among the five communities studied, start-up activities accounted for a large proportion of the total transaction costs for villages Co2 and Da2 – at 23.1% and 10.3%, respectively. This indicates that the amount of time spent on collective activities during the start-up phase did not depend much on the size of the forest areas being managed. As a result, these start-up activities tended to represent a bigger proportion of the total time spent in those communities with smaller forested areas.

Recurrent annual transaction costs were incurred due to the regular village meetings held, and the self-monitoring, conflict resolution and management board activities that took place. Regular meetings required the attendance of at least one representative per household, to assess progress on and plan forest management activities. These activities included providing updates on the activities of the Forest Guard Groups and the Village Forest Management Boards, managing changes in membership, contract renewals, and the distribution of government subsidies. The time spent at these regular meetings depended on the frequency and length of the meetings, as well as the number of households in each community. In general, most of the communities spent a relatively large proportion of time attending these regular meetings.

Forest monitoring was periodically conducted by Forest Guard Groups, with the exception of village Da3, which neither had a Forest Guard Group nor a Village Forest Management Board. Therefore, a commune level Committee for Fire Prevention, which included the village headmen, took over that responsibility. This means that only the village headman spent time on self-monitoring activities in Da3, and as a result, a large proportion of time (78%) was instead spent on regular meetings in this community, but only a small amount of time (12%) was spent on monitoring activities. In comparison, villages Co1 and Da1 spent more time monitoring when compared to Co2 and Da2. In fact, monitoring accounted for about 68% and only 7% of time spent on project activities in Co1 and Co2, respectively, within an average year, monitoring being conducted every ten days in village Co1; each monitoring activity taking the Forest Guard Group half a day. On the other hand, in village Co2, monitoring was only carried out once a year, whereas the constituted observations were made from the local main road.

Table 2. Transaction costs: number of days' labor spent on forest management activities among the five study communities

Village	Natural forest area (ha)	Total TCs per average year (labor days)	Total TCs per hectare per average year (labor days)	% of total TCs per hectare per average year				
				Start-up cost-days	Recurrent annual TCs-days			
					Regular meetings	Self-monitor-ing	Conflict resolu-tion	Joining monitoring and verification
Co1	179	263	1.5	2.9	23.4	68.4	4.0	1.3
Co2	11	15	1.4	23.1	64.5	7.4	0.0	5.0
Da1	330	138	0.4	3.8	24.9	70.8	0.0	0.5
Da2	31	53	1.7	10.3	68.1	19.0	2.4	0.2
Da3	180	45	0.3	7.0	78.4	11.6	1.9	1.1

Source: own data, focus group discussions 2012

Conflict resolution refers to the amount of time the community spent dealing with violations, such as illegal logging, the opening of new fields, and NTFPs collection activities. The time spent on conflict resolution was relatively small in general, and such activities were not even required in villages Co2 and Da1. In four of the study areas, limited enforcement powers were given to the local communities, meaning they could resolve small violations themselves. Otherwise, violations had to be reported to the higher authorities at the commune or district levels. For example, village Co1 could impose sanctions for the illegal logging of less than one cubic meter of timber, with a fine of 100,000 VND (US$4.9 in 2011) for the first offense, and 200,000 VND (US$9.8 in 2011) for the second. Any subsequent violations, however, had to be reported to the commune. With regard to the illegal opening of new fields, village Co1 was given the power to impose a fine of 300 VND/m^2 if the violation involved less than 1,000 m^2. Village Da3 was the only study area with no enforcement rights for its villages, as all violations had to be reported to the commune.

Participating in management board activities meant that village representatives were required to participate in monitoring and verification processes on the ground, and these activities took up 5% of the time spent on forest management activities in village Co2, but much less in the other villages.

4.3.2 Transaction Cost-days: A Comparison between Individual and Community Contracts

Table 3 shows the difference in labor days spent on forest management activities among the individual contract and community contract areas. Villages with a 5-year community contract spent much more time on forest management activities per

average year (103 labor days) than those with 9-year individual contracts (16 labor days), because the communities spent more time on coordination activities and collective action. However, the total time spent per hectare per average year was much higher for individual contracts, at about 13 labor days. It is likely that the individual contracts entail a higher level of commitment in terms of forest management activities when compared to the common ownership model.

Table 3. Transaction cost-days spent on forest management activities for individual and community contracts

Type of contract	Average area per contract (ha)	Total TCs per average year (labor days)	Total TCs per hectare per average year (labor days)	% of total TCs per hectare per average year				
				Start-up cost-days	Recurrent annual TCs-days			
					Regular meetings	Self-monitor-ing	Conflict resolu-tion	Monitoring and verification
Individual	1.6	16	12.7	1.0	2.3	93.2	0.1	3.4
Community	146.2	103	1.0	9.4	51.9	35.4	1.7	1.6

Source: own data, household in-depth interviews and focus group discussions 2012

The proportion of each component within the total time spent varied considerably across the different contract types. For example, start-up activities accounted for 9.4% of time spent under the community contracts, as they involved not only attending the introduction program, as with an individual contract, but also taking part in other collective actions, such as the formulation of general village regulations and the formation of Forest Guard Groups and Village Forest Management Boards. Furthermore, regular meetings and self-monitoring were key activities under the community contracts, representing the bulk of total time spent at 52% and 35%, respectively. In contrast, under the individual contracts, self-monitoring activities accounted for about 93% of time spent. The reason for this is that other than the monitoring activities, households usually attended only one meeting a year to receive their payments. However, households using both types of contract were not active in terms of joining in with official monitoring or with verification activities on the ground.

4.4 Benefits of Forest Management

A breakdown of the benefits obtained by villagers from the forest management activities, using both individual and community contracts, is shown in Table 4. Government subsidies and the value of NTFPs collected represented all of the benefits accruing to communities using the community contracts, with firewood and bamboo shoots being the principle NTFPs collected in the study areas. Community members

were prohibited from extracting timber in natural forests as of the government regulations, but allowed to collect NTFPs, freely and individually. The basic assumption used was that every household collected NTFPs from the common forest. On average, about 9% of total firewood and 25% of the total number of bamboo shoots collected came from the common forest, though these proportions varied among communities due to their varying distances from the forests, the availability of NTFPs in those forests, and the availability of NTFPs from other sources like the households' own forests and gardens. The value of NTFPs collected by each community under the community contract was therefore calculated by multiplying the average volume of NTFPs each household collected from the common forest by the number of households, and by the average prices of NTFPs in the local market. Members of all communities also had the chance to extract a limited volume of timber from the common forests for the construction of new houses. However, this happened little over the past 5 years of the project, so was not included in this analysis. In general, all the communities derived the same set of benefits from their forest management activities.

Table 4. Monetary benefits per hectare per average year derived from project forest management activities: individual and community contracts

	Individual contract		**Community contract**	
	Value in 2011 (US$)	Share (%)	Value in 2011 (US$)	Share (%)
Government subsidy	56.0	17.5	6.9	18.0
NTFPs	203.4	63.4	31.5	82.0
Auxiliary tree extraction	61.5	19.1	-	-
Total benefits derived	320.9	100.0	38.4	100.0

Source: own data, household in-depth interviews and focus group discussions 2012

When asked about the benefits gained from participating in the forest management program, one farmer in village Co2 said, "Without forest protection, everyone loses, such as water for production and consumption activities. With forest protection, then as well as retaining our water sources, we can also collect firewood" (G_DCTL2). In addition, a farmer in village Da3 stated the following about the function of the forest: "Those who live near the rivers and springs would be washed away due to floods if there were no forests. In recent years, almost no households have been forced to move, except those who live on steep hillsides" (G_CSN). One government official – a village headman – stated, "Forestland was protected, and the environment was also protected. There was less erosion and landslides. Furthermore, we received subsidies from the government. At the end of each year, households received about 200,000 to

300,000Dong. With this money, we did not have to contribute to the security fund and the village fund for flood prevention using our own money, meaning we did not have to sell chickens to contribute to the fund" (G_ETM).

In contrast to the limited access to natural forests under community contracts, households derived more benefits when operating the individual contracts, as they were allowed to extract both auxiliary trees and a certain proportion of woody trees on their own contracted planted forests. Income sources when using these contracts included the government subsidy, firewood consumption, which was later converted into monetary value based on its price in the local market, and the sale of bamboo shoots, adult bamboo and acacia. No woody trees extraction took place during the program, because it takes 30 to 40 years for woody trees to mature. Bamboo had been planted for three years, and was extracted annually. The benefits derived from acacia were extrapolated based on the findings of a study in Da Bac district in 2012, as this tree is not harvested until it is nine years-old (MANASBOONPHEMPOOL and ZELLER, 2012)[1]; meaning that none had been harvested among the interviewed households. Average revenue per hectare was used in this study to estimate the benefits derived among households who planted woody trees and acacias.

In general, NTFPs consumption and sales accounted for a large proportion of the total benefits derived under both types of contract; 63% and 82% under the individual and community contracts, respectively. The fact that NTFPs contributed a large proportion of the overall benefits implies that the forest is a principal source of firewood for those who live nearby.

4.5 Benefits and Costs of Forest Management

Figures 3 and 4 give a comparison of the costs and benefits of forest management activities across the five study communities, and between the two types of contract.

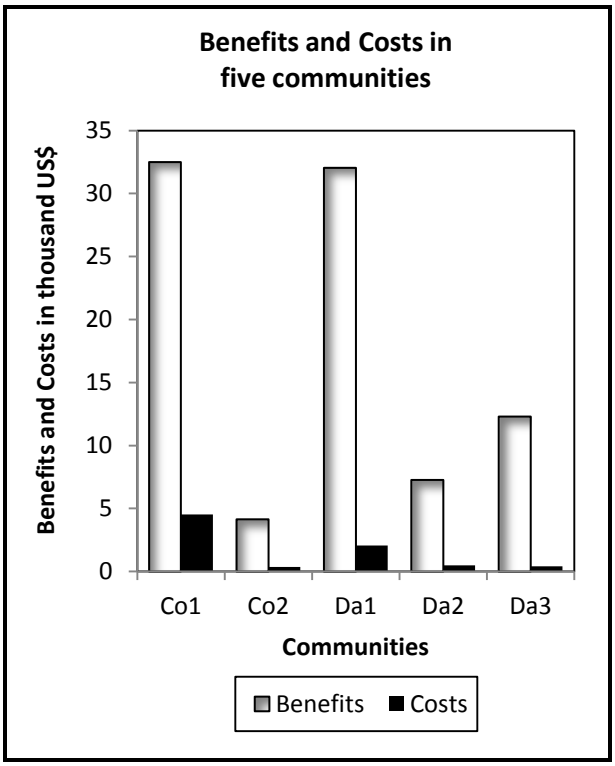
These data were obtained by multiplying the transaction cost days for forest management activities by the average monetary value of a labor-day over the whole year (MANASBOONPHEMPOOL and ZELLER, 2012)[2]. The opportunity costs of labor in each village, however, were adjusted based on the assumption that the chance of obtaining off-farm work varied among the five villages, depending on their distance from the district center and the quality of the roads. Accordingly, the five communities were classified into three groups, with each group given a different proportion of the total

[1] These data were obtained from a study conducted in Da Bac district in 2012, and the authors have allowed us to use the data in our article.

[2] These data were obtained from a study conducted in Da Bac district in 2012, and the authors have allowed us to use the data in our article.

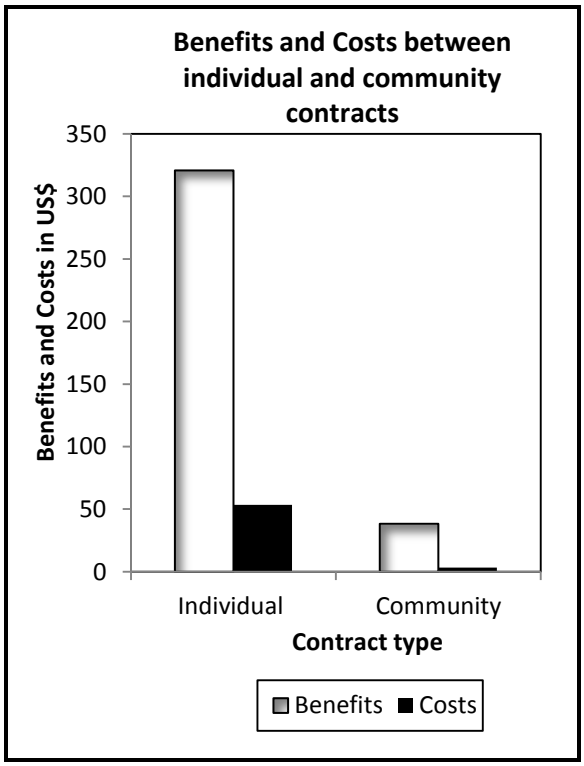
labor-day value. Specifically, if the monetary value of a labor-day in Co1 was considered as 1, it valued at 0.5 in Co2 and Da1, and at 0.3 in Da2 and Da3. All communities showed a positive net benefit, but the values varied significantly among the study communities. The total net benefits for the 5-year contracts were the highest for village Da1 (US$29,983.2), followed by Co1 (US$27,966.8), Da3 (US$11,899.3), Da2 (US$6,798.6) and Co2 (US$3,783.6). The variation found was due to the significant differences in (i) the magnitude of transaction costs, (ii) the size of government payments, which depended on the size of the forest area managed, and (iii) the value of NTFPs taken from the common forests.

Figure 3. Benefits and costs under the 5-year forest management contract across the five communities



Source: own data, household in-depth interviews and focus group discussions 2012

Figure 4. Forest management benefits and costs per hectare per year by contract type



Source: own data, household in-depth interviews and focus group discussions 2012

The average ratios between benefits to transaction cost were relatively high under both types of contract; at an average of 18 and 15.9 for the individual and community contracts, respectively (Figures 3 and 4). This means that participating in forest management activities brought benefits to the households, regardless of whether they used individual or community contracts. These figures also reflect that the real value

of government monetary payments and NTFP benefits under the collaborative management framework were lower than under the individual contracts. In other words, the benefits derived from planting *and* protecting a one-hectare new forest were larger than those from individually protecting a one-hectare natural forest.

4.6 The Net Present Value of Forest Management Activities

Table 5 provides a summary of the Net Present Value (NPV) per household and per hectare of forest under the community contracts. These data were obtained in the following ways. First, the benefits and transaction costs for each year of the entire contract were converted to US Dollars using exchange rates from the World Bank (WORLD BANK, 2012a). Second, a constant discount rate was used to derive the present value of both past and future net benefits at the start of the contract in each community with a time horizon of 5 years. As the communities started the program at different points in time, those NPV values were then discounted to the values existing in 2011, to allow comparison between communities. According to World Bank statistics, the average annual inflation rate over the period of 1999 to 2012 in Vietnam was 7.7% (WORLD BANK, 2012b). Therefore, a constant discount rate of 10.7%, 3% higher than the average inflation rate, was used to calculate the NPV for this study, to take into consideration the opportunity cost of money in addition to inflation. This value is close to the lending interest held at bank in Vietnam during the years under consideration.

Table 5. Net Present Value of forest management activities under the community contract

Village	Area (ha)	NPV per average year (US$)	NPV per household per average year (US$)	NPV per hectare per average year (US$)
Co1	179.1	5,593.4	74.6	31.2
Co2	11.0	756.7	13.1	68.8
Da1	330.0	5,996.6	84.2	18.2
Da2	31.0	1,359.7	16.9	43.9
Da3	180.0	2,379.9	39.4	13.2
Average	146.2	3,217.3	45.7	35.1

Source: own data, household in-depth interviews and focus group discussions 2012

The forest management NPV per household per year under the community contract was relatively low for all the communities, or about US$46 on average (Table 5). This

indicates that participating in the project forest protection activities alone brought relatively few monetary benefits to the participants. For example, the NPV per household per year was about US$84.2 for village Da1, the highest among the study areas. As the communities differed a lot in terms of areas under forest, those managing smaller forest areas tended to generate higher NPVs per hectare. For example, the NPVs per hectare per year amounted to approximately US$69 and US$44 in villages Co2 and Da2 respectively. On average, the NPV per hectare per year for a 5-year contract was US$35.

A comparison of the NPVs generated between individual and community contracts is given in Table 6.

The Net Present Value per hectare of forest per average year under the individual contracts across communities were obtained in the same way when calculating this figure under the community contracts with the exception of a 9-year time horizon. Returns under the individual contracts were much higher than under the community contracts, with an average NPV per year per hectare of forest at US$267.4 under individual contracts, but only US$35.1 under the community contract framework. This means that participating in both planting and protection of forests brought much greater benefits than only participating in forest protection.

Table 6. Net Present Value (in US$) per year per hectare of forest, by type of contract and by type of trees planted

Village	Community contracts	Individual contracts	Under individual contracts	
			Households planted woody trees and acacia	Households planted woody trees and bamboo
Co1	31.2	315.9	104.9	456.5
Co2	68.8	315.4	278.7	339.8
Da1	18.2	289.7	156.8	334.0
Da2	43.9	77.0	77.0	-
Da3	13.2	-	-	-
Average	35.1	267.4	144.4	376.8

Source: own data, household in-depth interviews and focus group discussions 2012

Table 6 also shows a comparison between NPVs for the two types of trees planted under the individual contract. However, individual contracts were not used in village Da3 and only started in Da2 in 2008. Furthermore, Da2 was only offered the choice of planting woody trees and acacia. On average, the NPV per hectare for those planting

woody trees and bamboo was higher than for those planting woody trees and acacia. For example, the NPV per hectare for those planting bamboo was about US$377, but only US$144 for those planting acacia. The main reason is that planting bamboo brought higher annual revenues from bamboo shoots collection and adult bamboo extraction activities, while acacia can only be harvested once, around nine years after initial planting. In addition, the harvesting of both bamboo shoots and adult bamboo can go on for more than ten years. As a result, it is not surprising that most farmers we interviewed preferred bamboo over acacia.

4.7 Assessment of Contract Monitoring and Verification

Table 7 gives a summary assessment of the contract monitoring and verification processes carried out by the management boards. Our assessment of the monitoring activities concentrated on the frequency of monitoring and the methods used. About 83% of respondents said that monitoring had not been well organized, due to the low frequency (53%), in some cases its discontinuance (21%), a lack of thoroughness (21%), and even no monitoring at all in some cases (5%).

Concerning the low frequency of monitoring, a farmer in Co2 said*, "The officials monitored the situation only from their office. They brought us money and papers to sign at the end of the year, but we were never told by the management boards that they wished to visit the forest and check on its condition"* (G_DCTL2). In village Co1, a farmer reported, *"They just visited our forest once a year. They needed to visit more often to be up-to-date with the condition of the forest, as sometimes damage was caused by the weather, and not due to the carelessness of farmers, and this might have affected the amount of money the farmers received at the end of the year"* (I_TDC9).

With regard to the lack of thoroughness in the monitoring process, a farmer said, in a group discussion in village Co1, that, *"The officials visited only the village headman. They asked him whether there had been any changes, and if not, they left. Sometimes they rode their motorbikes a bit further from the village center towards the forest, but usually did not go into the forest"* (G_ETM). Another farmer from village Co2 said, *"The village headman always brought the officers to visit the best forest plots, while the bad ones were ignored"* (I_TE1).

In contrast, 17% of the respondents said that the management board had organized their monitoring activities well, as relevant stakeholders were present and the monitoring frequency was sufficient. In these cases, the involvement of relevant stakeholders meant that the management board officials invited households to participate in their monitoring, together with representatives from the commune and village. This process reflects a form of participatory monitoring, as "*households were*

allowed to join the officers in the monitoring process" (I_DNL16). Concerning the frequency of monitoring, a farmer mentioned that, "*monitoring was done at the end of every year and that was enough*" (I_DNL15).

Table 7. Assessment of the monitoring and verification processes used

	Monitoring (%)	Final verification (%)
Well organized	17.4	34.8
Not well organized	82.6	65.2

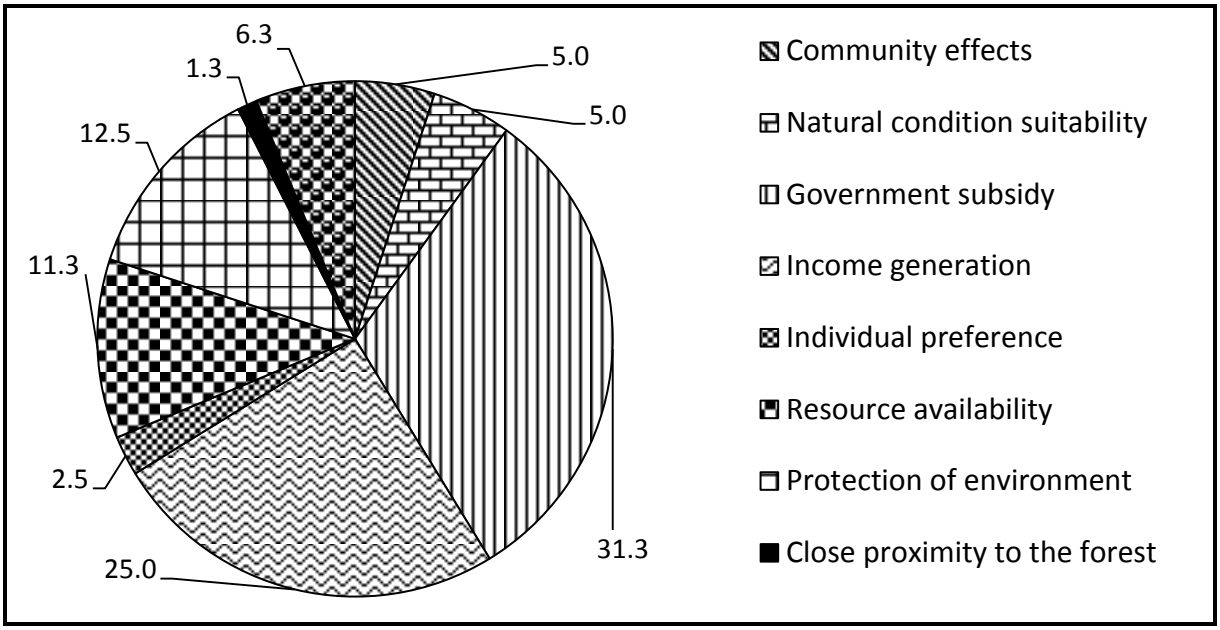
Source: own data, household in-depth interviews and focus group discussions 2012

On the subject of the annual final verification process, 35% of respondents said it was well organized, meaning households were invited to participate, and that the frequency of once a year was enough. For example, a farmer in Da1 felt that "*the process was quite good because many people were involved, such as the officers, village headman, commune representatives and households*" (I_TP12). However, about 65% of respondents mentioned that the verification process was not well organized, due to its lack of frequency (47%), it being discontinued at times (27%), and its lack of thoroughness (26%). Regarding the thoroughness of the verification process, a farmer in Co1 said that, "*the process took place only in the easily accessible plots, like those near the road*" (I_TE3). Another farmer in village Co2 spoke about the verification process stropping at times, saying, "*I was only allowed to join the process only in the first year. I do not know whether it took place in the following years, though I wanted to participate because I wished to know whether my planted forests were doing well*" (I_TDC14).

4.8 Reason for Participating in the 5MHRP

Villagers were asked the reasons why they participated in the program, and a summary of their responses is given in Figure 5. In total, 31% of respondents said they participated in the program to get hold of the government subsidy for seedlings and money. One farmer in Da1 said, "*I received the seedlings and money from the government, knowing I would be left with my own trees later*" (I_TP13). About 25% of respondents mentioned that they could supplement their income by selling forest products. One farmer in village Co2 said, "*Bamboo shoots could be harvested from the third year onwards, and I was able to earn money by selling them*" (I_TDC7). Some villagers also joined the program as it offered them the opportunity to collect NTFPs such as bamboo shoots, vegetables and medicines, for their own consumption.

Figure 5. Reasons for participating in the 5MHRP



Source: own data, household in-depth interviews and focus group discussions 2012

About 13% of the respondents said they participated for environmental protection reasons, in order to ensure the local area would have fresh air and clean water sources for both production and consumption purposes, and to avoid floods and landslides. For instance, a farmer in Da2 talked about the improved environmental quality of the village, saying "*When travelling to Hoa Binh city I notice immediately that the air there is not as fresh as it is in my village. People there may have to use a fan or an air-conditioner the whole day. When the weather forecast says the temperature will reach 37°C or 38°C, it stays so cool here we still have to use blankets at night. If there were no forest, the environment would not be so pleasant*" (I_DNL18).

4.9 Difficulties in the Implementation of the 5MHRP

Table 8 summarizes the difficulties faced when implementing the program, at all levels. About 32% of respondents said that the difficulties they faced were related to policies, followed by natural conditions (25%), local people's awareness levels (18%), administrative processes (13%), the operations of the market (8%), the education provided by the local authorities (2%), and illegal logging (2%).

Subsidy-related complaints included insufficient cash subsidies from the government, no cash given to the communes, and that the geographical distance had not been taken into consideration when determining the amount of the cash subsidy. About 18% of

respondents mentioned the subsidies to be a key issue. For example, a district government official said, "*The monetary subsidy from the government was low. At the beginning, it was 50,000 Dong per hectare per year for natural forest protection, then it was increased to 100,000 Dong, and to 200,000 Dong by the end, but was still too low*" (D_MB21). In addition, about 11% of respondents at the commune level said there was no monetary subsidy given to the commune. One commune government official talked about this lack of compensation issues, saying "*We participate in all management board activities on the ground, such as contract monitoring and verification, distributing payments to households and communities, and signing the related documents, but we did not receive an allowance*" (C_TM).

Table 8. Difficulties faced when implementing the 5MHRP

Difficulties faced	Province and district (%)	Commune (%)	Community and household (%)	Average (%)
Policy	36.8	21.1	36.4	31.7
Subsidies	21.1	10.5	22.7	18.3
Types of tree	15.8	10.5	13.6	13.3
Natural conditions	21.1	15.8	36.4	25.0
Distance and terrain	15.8	15.8	31.8	21.7
Weather	5.3	-	4.5	3.3
Administration	15.8	21.1	4.5	13.3
Local people's awareness	21.1	26.3	9.1	18.3
Local authority education provision	5.3	-	-	1.7
Market activities	-	15.8	9.1	8.3
Illegal loggers	-	-	4.5	1.7

Source: own data, interviews 2012

The types of trees planted reflects the challenges faced when combining the growing of woody trees for long-term protection purposes with trees grown for a shorter-term economic purpose, with some trees being inappropriate for the local conditions. Fourteen percent of respondents at the province and district levels mentioned the challenges faced when mixing tree types. One district government official, for instance, told us that "*theoretically, the hard woody trees should be good for use in the protection forests, but they grow slowly. From the second year onwards, the auxiliary trees grown for economic purposes, such as bamboo or acacia, came to dominate the forest area as they grow fast. The government wanted to create protection forests that consist of only hard woody trees, but local people did not plant these, as they would*

have to wait a long time, usually thirty to forty years, before they could extract them" (D_MB21). In addition, 8% of respondents said that the trees planted were not suitable for their village areas. One farmer in village Co1 said, "*If we had continued to plant acacia, the result would not have been a good one, because the trees were often eaten by mice and squirrels. In addition, they died due to cold weather during the project and we had to plant trees all over again*" (C_TM).

In Table 8, 'distance and terrain' refers to the poor levels of access people had to the forests due to their distance from the village, or due to mountainous terrain with steep and high hills, fragmented forest plots or dangerous and poor quality roads. About 32% of respondents at the village level spoke about the distance of the forests from their homes and the steep hills they had to overcome. An experienced forestry official in one commune elaborated upon this particular difficulty, stating: "*There were 200 bundles of bamboo seedlings per hectare and each weighed 2 to 3kg. People could carry a maximum of 10 bundles, about 30kg, each time. The distance from the point of seedling delivery to their houses was about 6km, plus about 3km to the forest. Bamboo is difficult to carry and, furthermore, people had to climb hills. It was hard work. There were also difficulties faced with the harvesting. For example, the thick bamboo trees grown by the village policeman had not been harvested since 1999, because the forest was too far. Throwing the bamboo trees from the top of the hill after harvesting usually broke the bamboo, reducing the price fetched at the market. It would have been better if the road had reached the forest. As a result, most villagers only harvested bamboo shoots, and the price of bamboo shoots was quite low during the project*" (C_DC2). One district government official shared his opinion from the point of view of an implementing agency: "*During the initial stages it was hard for us to travel to the forests, and there was no road to the communes. We mainly used boats. The distance from the boat landings to the commune offices was 10 km in some areas, so we had to walk through the forests and climb up hills*" (D_MB21).

Administration problems included the frequent changes in policy that took place, plus the large number of documents that had to be produced, weak coordination among different administrative levels, boundary conflicts due to differences between the land areas shown on paper and in practice, an asynchronous implementation system, and weak village regulations. Another district government official said, "*We had to use many documents; for example, just for making payments to each household or community, we needed five different documents and six to seven copies of each. We managed about 7,000 households so we had to carry with us two big bags of documents each time we went to a commune*" (D_MB23). Regarding the village regulations on forest management, a farmer in village Co2 said that the "*village sanctions are not strong enough to deter people from violating the laws*" (G_DCTL2).

The *lack of awareness* among local people of the project led to uncooperative responses and behaviors, and to a lack of commitment from local people regarding project activities. Finally, there were difficulties faced with regard to the *market*, as forest products such as bamboo and bamboo shoots tended to fetch a low price.

5 Discussions

5.1 Implementation of the 5MHRP

The implementation of the 5MHRP involved a top-down process; a cumbersome system, which operated from the constitutional right down to the operational levels (Figure 2). Both formal and informal institutional arrangements co-existed within the implementation framework, leading to varying forest management practices among the communities and villages, due to the differences in customary laws, norms and rules in place.

The contribution of commune governance was ignored during implementation of the program, so its role in forest management activities was not acknowledged (sections 4.1.2, 4.3.1, and 4.9). Our interviews with the stakeholders indicated that the communes were effective facilitators, with one provincial government official stating that, "*it is impossible for outsiders to work effectively with local people without the participation of the local authorities"* (P_CCLN). As a consequence, a proportion of the subsidies given to households under the community management scheme was used to compensate the commune government officials in some of the study areas, a move that went against the provisions of the 5MHRP, which meant that households had to bear the costs of such payments.

As distance and terrain were the major difficulties faced when implementing the program (Table 8), criteria such as geographic distance, availability of forestland resources, and the awareness of local people, became important factors when selecting communes or villages to be included in the program's scope. Both district and commune government officials acknowledged this by stating that "*there were only a few potential areas nearby the project area and with easy access after 2006. The remaining sites, those not in the program, were basically in very remote areas*" (D_MB21). Another officer mentioned that villagers' knowledge had played a role in helping to identify the suitable sites, because "*in 1995/1996, we were encouraged to plant chukrasia (i.e. lát), but the local people were unaware of the benefits of planting such a species, so many of them threw the seedlings away. These experiences led us to select villages more carefully after that*" (C_DC2). This implies that the more remote areas had little chance of being selected, meaning that not all local people had an equal opportunity to participate in the program.

The amount of subsidy given was the same regardless of differences in geographic distance, or natural and socio-economic conditions, which in turn discouraged the management boards from implementing the program in remote areas, due to the high transportation costs incurred when delivering seedlings, and when conducting subsequent project activities. Thus, the opportunity for remote areas to participate in the program was further reduced. The selection inequality also negatively affected the quality of the forests planted, as seedlings varied in terms of the soils and climatic conditions they preferred. This last point was mentioned by one provincial government official, who said that "*after the end of the program, there were only a few densely planted protection forests standing; the others were scattered and fragmented. As a result, it was not a clear success"* (P_CCLN). Planting unsuitable tree types also led to an increase in opportunity costs and lowered household returns.

The management boards did not pay much attention to their responsibilities on the ground, such as contract monitoring and the verification process, even though they received administration fees for these activities. For example, a high percentage of respondents (83%) complained about the monitoring conducted by the management boards, and about 65% of respondents were not satisfied with the final verification process, since they felt these activities were not well organized (Table 7).

The monetary subsidy provided by the government was the decisive factor in persuading many local people to participate in the program, with the potential income they could earn a close second (Figure 5). This shows the importance of providing cash subsidies in any future programs introduced. In practice, there was also another, hidden reason why local people decided to join the program. People realized that their livelihoods were being threatened by increasingly strict government policies (such as no more open access to timber for logging), changes in the environment (e.g. floods and landslides), and an increasing scarcity of NTFPs. Therefore, local people felt that they had to do something to prevent the situation from getting worse. A commune government official confirmed this: "*In the past, apart from logging, people could also collect non-timber forest products quite easily. Now, the natural forests are shrinking and people are having to protect what remains or even plant new forests*" (C_TL). This indicates that, prior to the project implementation, local people had started to appreciate the environmental value of the local forests, so the reason for their participation went beyond simple short-term production gains.

5.2 Forest Management Transaction Costs

The time spent attending regular meetings (WIDMARK et al., 2013) and carrying out monitoring activities formed the bulk of the total time spent by all communities involved in the project (Table 2). However, differences in the frequency of monitoring

and the monitoring methods used, the time spent on each visit, and the characteristics of the forests (such as size, access levels and distance from the village) resulted in variations in the time spent for monitoring among the communities. This variation also reflected the diverse institutional forest management arrangements in place in the study areas. For example, three of the five communities conducted monitoring by going into the forest, while a fourth observed from outside and a fifth simply posted a person at the entrance of the forest. In addition, some villages paid more attention during certain periods (such as during the crop cultivation season or before the New Year holidays), in addition to carrying out monthly monitoring. Others only monitored once every three months, or even just once a year. Village Co1, for instance, monitored forest activities as often as once every ten days, because its forests were close to the commune and there had been cases of illegal timber extraction and the unauthorized opening of new fields prior to the project implementation. Despite these differences, the number of people involved in each monitoring visit was similar across all communities, because, as one villager put it, "*You need a group of people when entering the forests. Mountains and forests are craggy, so it is very dangerous to go alone*" (G_CSN).

Smaller forest areas per household (less than 1.6 hectares) led to high transaction costs among households operating under individual contracts (Table 3). On average, such households spent about 13 labor-days per year managing one hectare of forest, however, if they had managed larger forest areas, less or the same amount of time would have been spent, as some management activities carried out were required regardless of the size of the forest.

The local people acted as foresters instead of forest owners under the benefits-sharing policies in place, but under both types of contracts, households had limited rights in terms of logging, as the trees still belonged to the state (GOVERNMENT OF VIETNAM, 2001). The forest management benefits flowing from the community contracts mainly had the form of government subsidies and the collection of NTFPs, and the very limited rights given to households regarding conflict resolution and sanctions dis-empowered the relevant communities. Households, therefore, received greater benefits under the individual contracts for planting *and* protecting new forests (Table 4); particularly those households with the rights to harvest auxiliary trees (e.g. acacia or bamboo), as this activity contributed significantly to overall benefits.

Relatively high benefit-to-cost ratios were experienced under both types of contract (Figure 4). The compensation payments ideally should have covered all extra costs borne by the households on forest management activities (METTEPENNINGEN et al., 2009), in order to give them an incentive to work hard. These costs included the operational costs involved in producing the environmental goods and services,

the production activities and profits foregone, private transaction costs, and the investments that had to be made to enable production of the desired outputs (METTEPENNINGEN et al., 2009). In the study area; however, the government payment was not enough to cover the transaction costs incurred in some areas, particularly if the value of NTFPs was not taken into account (Tables 2 and 4).

The NPV for households per year under the community contracts was low; the highest NPV per household per year was about US$84 for village Da1 (Table 5). This means that the program participants received relatively little in return for their efforts. The low level of return made it hard for them not to carry out illegal logging and field clearance activities – to support additional crop cultivation, in turn threatening the long-term sustainability of forest management in the area. The NPV per hectare per year under the individual contracts was much higher than under the community contracts (Table 6), whereas the NPV per hectare for planting woody trees and bamboo was higher than for planting woody trees and acacia. These findings reflect local people's preferences for planting bamboo rather than acacia because the former generated annual revenues from the selling of bamboo shoots and adult bamboo after the third year, while acacia could only be harvested once, and only nine years after being planted.

The community-based management scheme introduced under the program helped to minimize conflicts among villagers. For example, the monetary subsidies given by other forestry programs in the past had only been given to those who possessed a Redbook, leaving the natural forests under the control of individual Redbook holders. Local people realized that such forest management practices would be problematic over time, due to boundary conflicts among Redbook holders (as natural forest plots were usually contiguous with each other), illegal logging by non-Redbook holders, and little or no support coming from non-Redbook holders during fires. As a consequence, under the study program, the forests were managed by entire villages, irrespective of whether villagers held a Redbook or not. In addition, benefits had to be shared equally among villagers.

Community-based natural forest management is a time consuming process, so it will only be effective if less time is spent on collective action than on conflict resolution activities with individual contracts. Despite a lower NPV per hectare per year under the community contracts in the study areas, we believe that community-based management is the optimum solution in terms of conflict resolution and maintaining the sustainability of a management program when the natural forest is made up of large, contiguous pieces. This argument is predicated on a benefits-sharing mechanism to be implemented across all communities and local people to be aware of the benefits flowing from environmental protection activities. The presence of an intangible,

cohesive strength within a community also helps make collective action a success. For example, one respondent said, "*Illegal loggers are mainly outsiders. Villagers do not fell trees illegally, because we are afraid of being judged and sanctioned by the others in our community*" (C_TL).

However, due to the much higher NPVs per hectare per year under the individual forest management scheme, individual contracts may still be the preferred option if forest plots are fragmented, for in such cases, boundary disputes among individual Redbook holders would be less of an issue.

6 Conclusion and Policy Implications

The Five Million Hectare Reforestation Program, which was implemented throughout Vietnam in 1998, reflected the government's commitment to the introduction of sustainable forest management in the country. Our study used a transactional approach to quantify the time and costs incurred, and benefits obtained, by households participating in the program. The study also applied a qualitative approach to understand: (i) the principal stakeholders and their roles in the implementation, (ii) the underlying reasons for local people's participation in the program, (iii) the constraints experienced during implementation, and (iv) the performance of the management boards from the point of view of local people.

The main findings from our research are as follows. First, the diversity of informal institutional arrangements resulted in a big variation in transaction costs among communities in the study areas. Second, the transaction costs per hectare per average year were relatively large for households with individual contracts, due to the relatively small size of the forest areas planted and managed. Under the community contracts, regular meetings (52%) and self-monitoring activities (35%) constituted the greatest proportion of total transaction costs, while in the case of individual contracts, the main transaction cost component was self-monitoring activities, at 93%. The time spent on conflict resolution and official monitoring and verification activities was relatively small for these households. Third, although both types of contracts had relatively high benefit-to-cost ratios, the benefits mainly came from the collection and sale of NTFPs such as bamboo shoots and firewood, and not from the government's subsidy. Fourth, the NPV per hectare per year was higher for households under the individual contracts than for those under the community-based contracts. Fifth, our empirical study indicates that the low level and fixed form of the subsidy, the trees' lack of suitability for local conditions, the long distances from the villages to the forests, and the issue of conflicts and a lack of awareness among local people, were the principal difficulties faced during the program's implementation. These difficulties

occurred at all levels and increased the transaction costs incurred by program activities.

The main limitation of our study was that neither resource appropriation nor production costs were included in the analysis. Accordingly, the time spent collecting, processing, and transporting forest products from the forest to the house, and production costs like building and repairing fences, fire breaks, forest trails and footpaths, and the costs arising from the damage to crops and livestock caused by wild animals had been excluded. The benefits enjoyed by households might have been lower if these costs had been considered.

Our research shows the importance of transaction costs analysis when dealing with natural resource management activities, and particularly when evaluating policies, as already highlighted by METTEPENNINGEN et al. (2009). High transaction costs can become a barrier to households participating in environmental management programs (FALCONER and WHITBY, 1999), and can also reduce the real benefits derived. A full understanding of the different transaction cost components and their roles can help policymakers develop alternative approaches in order to increase the net benefits passed-on to participants. For example, in order to promote community-based forest management using community contracts, a larger government subsidy should be provided, to match the amounts derived from individual forest management contracts. The government should also increase payments under the individual contracts, to improve the quality of the forests and to encourage the use of woody trees. These payments would compensate farmers for having to forego the more lucrative auxiliary trees, such as acacia or bamboo, in the short term. The subsidy package could also be improved by providing better seedlings and fertilizers. In the context of a limited national budget, investment should be focused on the most fragile locations, such as watersheds and steeper slopes. In addition, natural and socio-economic conditions should be taken into account when deciding on which types of trees to provide and grow, and the size of the subsidy offered.

One policy implication from this study is the need to empower local communities (section 4.3.1) and local authorities (sections 4.1.2 and 4.9). Recognizing their key role and giving them more autonomy with respect to natural resources management, would encourage their participation and a sense of responsibility among local people. For example, benefits-sharing policies should be considered; to give more rights to local people and encourage them to become forest owners. Communities should also be given more power in terms of imposing fines, as this would not only strengthen their role, but also contribute to village funds. Similarly, the local authorities should be given a fee for their involvement in the project's implementation on the ground.

Another implication of this study is related to future research. Implementation of the Five Million Hectare Reforestation Program reflected a typical structure for forestry policies in Vietnam, in which government bodies at different levels were involved throughout the process (Figure1). Employing a cumbersome system like this can lead to high transaction costs within the public sector, an often neglected aspect of policy evaluations, but one that may be as important for efficiency as direct production costs (RØRSTAD et al., 2007). Furthermore, such analysis would help identify the scheme or combination of schemes that best minimizes total transaction costs (FALCONER and WHITBY, 1999). Therefore, it is recommended that studies which focus on the implementation of a national forestry program include the transaction costs borne by the public sector in their analyses, as this will allow that a more comprehensive understanding regarding the effectiveness of forestry policies and programs be developed.

References

ABDULLAH, N.M.R., K. KUPERAN and R.S. POMEROY (1998): Transaction costs and fisheries co-management. In: Marine Resource Economics 13 (2): 103-114.

ADHIKARI, B. and J.C. LOVETT (2006): Transaction costs and community-based natural resource management in Nepal. In: Journal of Environmental Management 78 (1): 5-15.

ARIFIN, B. (2006): Transaction cost analysis of upstream-downstream relations in watershed services: Lessons from community-based forestry management in Sumatra, Indonesia. In: Quarterly Journal of International Agriculture 45 (4): 361-376.

BLORE, M.L., G. CUNDILL and M. MKHULISI (2013): Towards measuring the transaction costs of co-management in Mkambati Nature Reserve, Eastern Cape, South Africa. In: Journal of Environmental Management 129 (15 November 2013): 444-455. Available at http://www.sciencedirect.com/science/article/pii/S0301479713005136.

CHAMBERS, R. (1994): The origins and practice of participatory rural appraisal. In: World Development 22 (7): 953-969.

COI, L.K. (2012): Forest Governance Monitoring in Vietnam. Workshop on Forest Governance Assessment and Monitoring, January 2012, Ha Noi, Vietnam.

CONGRESS OF VIETNAM (2004): The Law on Forest Protection and Development 2004. Ha Noi.

DA BAC DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT (2011): Report No. 231/BC-NN&PTNT dated 1.11.2011 on Final Report of Agricultural and Forestry Production in 2011. Da Bac District People Committee, Hoa Binh, Vietnam.

FALCONER, K. (2000): Farm-level constraints on agri-environmental scheme participation: A transactional perspective. In: Journal of Rural Studies 16 (3): 379-394.

FALCONER, K. and C. SAUNDERS (2002): Transaction costs for SSSIs and policy design. In: Land Use Policy 19 (2): 157-166.

FALCONER, K. and M. WHITBY (1999): The invisible costs of scheme implementation and administration. Countryside Stewardship: Farmers, Policies and Markets. Elsevier Science Ltd., Kidlington, Oxford: 67-88.

FOUNDJEM TITA, D., M. D'HAESE, A. DEGRANDE, Z. TCHOUNDJEU and P. VAN DAMME (2011): Farmers' satisfaction with group market arrangements as a measure of group market performance: A transaction cost analysis of Non Timber Forest Products' producer groups in Cameroon. In: Forest Policy and Economics 13 (7): 545-553.

GOVERNMENT OF VIETNAM (1998): Decision No. 661/QD-TTg dated 29.07.1998 by Prime Minister on the objectives, tasks, policies, and organizations for the establishment of five million hectare of new forest. Ha Noi, Vietnam.

– (2001): Decision No. 178/QD-TTg dated 12.11.2001by Prime Minister on regulations of benefit-sharing and the obligations of the households and individuals allocated or contracted forest and forestland. Ha Noi, Vietnam.

– (2011): Decision No. 09/2011/QD-TTg dated 30.01.2011 by Prime Minister on Poverty Line in 2011-2015. Ha Noi, Vietnam.

HANNA, S. (1995): Efficiencies of user participation in natural recource management. In: Hanna, S., M. Munasinghe: Property Rights and the Environment: Socal and Ecological Issues. The Beijer International Institute of Ecological Economics and The World Bank, Washington, D.C.

KUPERAN, K., N.M. RAJA ABDULLAH, R.S. POMEROY, E.L. GENIO and A.M. Salamanca (2008): Measuring transaction costs of fisheries co-management. In: Coastal Management 36 (3): 225-240.

LEFFLER, K.B. and R.R. RUCKER (1991): Transactions Costs and the Efficient Organization of Production: A Study of Timber-Harvesting Contracts. In: Journal of Political Economy 99 (5): 1060-1087.

MANASBOONPHEMPOOL, A. and M. ZELLER (2012): Data from livelihood survey in Da Bac district, Hoa Binh province, Vietnam, in 2012. Personal communications.

MARSHALL, G.R. (2013): Transaction costs, collective action and adaptation in managing complex social-ecological systems. In: Ecological Economics 88 (April 2013): 185-194. Available at http://www.sciencedirect.com/science/article/pii/S0921800913000141.

MBURU, J., R. BIRNER and M. ZELLER (2003): Relative importance and determinants of landowners' transaction costs in collaborative wildlife management in Kenya: an empirical analysis. In: Ecological Economics 45 (1): 59-73.

MCCANN, L., B. COLBY, K.W. EASTER, A. KASTERINE and K.W. KUPERAN (2005): Transaction cost measurement for evaluating environmental policies. In: Ecological Economics 52 (4): 527-542.

MESHACK, C.K., B. AHDIKARI, N. DOGGART and J.C. LOVETT (2006): Transaction costs of community-based forest management: empirical evidence from Tanzania. In: African Journal of Ecology 44 (4): 468-477.

METTEPENNINGEN, E., A. VERSPECHT and G. VAN HUYLENBROECK (2009): Measuring private transaction costs of European agri-environmental schemes. In: Journal of Environmental Planning and Management 52 (5): 649-667.

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT; PLANNING AND INVESTMENT; AND FINANCE (2009): Circular No. 70/2009/TTLT/BNN-KHDT-TC dated 04.11.2009 on revising circulars No. 58/2008/TTLT/BNN-KHDT-TC dated 02.05.2008, and No.

28/1999/TT-BTC dated 13.03.1999 on guidance on management of national budget for implementation of program 5MHRP. Ha Noi, Vietnam.

MUSOLE, M. (2009): Property rights, transaction costs and institutional change: Conceptual framework and literature review. In: Progress in Planning 71 (2): 43-85.

OSTROM, E. (1990): Governing the commons: The evolution of institutions for collective action. Cambridge University Press, Cambridge, United Kingdom.

OSTROM, E., J. BURGER, C.B. FIELD, R.B. NORGAARD and D. POLICANSKY (1999): Revisiting the commons: local lessons, global challenges. In: Science 284 (5412): 278-282.

PEARSON, T.R.H., S. BROWN, B. SOHNGEN, J. HENMAN and S. OHREL (2013): Transaction costs for carbon sequestration projects in the tropical forest sector. In: Mitigation and Adaptation Strategies for Global Change 19 (8): 1209-1222. This article is publihed with open access at Springerlink.com. DOI 10.1007/s11027-013-9469-8. Published online: 12 May 2013. Available at http://www.link.springer.com/article/10.1007/511027-013-9469-8.

RAY, B. and R.N. BHATTACHARYA (2011): Transaction costs, collective action and survival of heterogeneous co-management institutions: Case study of forest management organisations in West Bengal, India. In: Journal of Development Studies 47 (2): 253-273.

RØRSTAD, P.K., A. VATN and V. KVAKKESTAD (2007): Why do transaction costs of agricultural policies vary? In: Agricultural Economics 36 (1): 1-11.

ROYER, A. (2011): Transaction costs in milk marketing: A comparison between Canada and Great Britain. In: Agricultural Economics 42 (2): 171-182.

SAM, D.D. and L.Q. TRUNG (2001): Forest policy trends in Vietnam. In: Policy Trend Report 2001: 69-73. Institute for Global Environmental Stategies (IGES), Miura, Japan.

SCHIFFER, E. (2007): Net-Map toolbox introduction. Paper was presented at the Sunbelt Conference of the International Network of Social Network Analysis, Corpu, May 2007.

SINGLETON, S. (2000): Co-operation or capture? The paradox of co-management and community participation in natural resource management and environmental policy-making. In: Environmental Politics 9 (2): 1-21.

TAN, N.Q., N.B. NGAI and T.N. THANH (2007): Forest Tenure Reform in Viet Nam: Experiences from Northern Upland and Central Highlands Regions. International Conference on Poverty Reduction and Forests, Bangkok, Thailand.

VAN HUYLENBROECK, G., M. D' Haese and A. VERSPECHT (2005): Methodology for analysing private transaction costs. ITAES deliverable WPG P3D5 (2005), vol. 5. Integrated Tool to Design and Implement Agro Environmental Schemes. National Institute of Agronomic Research, Paris, France. Available at https://w3.rennes.inra.fr/internet/ITAES/website/Publicdeliverables/Methodology%20for%20analysing%20private%20transaction%20costs.pdf.

WÄRNERYD, K. (1994): Transaction cost, institutions, and evolution. In: Journal of Economic Behavior & Organization 25 (2): 219-239.

WIDMARK, C., G. BOSTEDT, M. ANDERSSON and C. SANDSTRÖM (2013): Measuring transaction costs incurred by landowners in multiple land-use situations. In: Land Use Policy 30 (1): 677-684.

WORLD BANK (2012a): World Development Indicators. URL: http://search.worldbank.org/all?qterm=exchange+rate+of+vietnam&title=&filetype= (accessed 30.9.2014).

– (2012b): World Development Indicators. URL: http://search.worldbank.org/all?qterm=inflation%20rate%20of%20vietnam (accessed 30.9.2014).

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