

Decentralization of Forest Management, Local Institutional Capacity and its Effect on Access of Local People to Forest Resources: the Case of West Sumatra, Indonesia

Mahdi¹, Ganesh P. Shivakoti² and Makoto Inoue³

¹Faculty of Agriculture, Andalas University, Kampus Limau Manis Padang, West Sumatra 25163, Indonesia;

²Natural Resources Management, School of Environment, Resources and Development, Asian Institute of Technology, PO Box 4, Klong Luang, Pathumthani, 12120 Thailand;

³Department of Global Agricultural Sciences, Graduate School of Agricultural and Life Sciences, The University of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan

ABSTRACT

This paper studies the capacity of local institutions to receive forest management right in West Sumatra, Indonesia, where local institutions have existed before the enactment of decentralization. We carried out focus group discussions to assess their capacity and a survey to learn its effect to households' access to forest. From these field works, we found that most local institutions are not ready to fully absorb forest management rights transfer. They lack capabilities to formulate regulation and negotiation processes against disputed issues which lead to conflict. The conflicts rose among people, among local institutions, and between local institution and local government after decentralization took place. Consequently, households are facing uncertainty in access to forest resources. Therefore, the powerful households get higher benefit than the poors indicating continuation of elite capture even after nearly one decade of implementation of decentralization policy.

Key words: *Decentralization, local institution capacity, forest management, livelihood, West Sumatra*

1. INTRODUCTION

Decentralization of natural resources management is believed to be a better way to accommodate diverse interests of people at the local level in the process of making resource management more sustainable. Decentralized policy guides policy makers in deciding the appropriate measures for decentralizing natural resources management in most developing countries (Agrawal and Gupta, 2005; Andersson et al., 2006; Larson, 2002; Pacheco, 2006; Ribot, 2002). The level and scope for decentralization are different for different places and time depending upon the political, social and development characteristics. While it is being viewed by several scholars that decentralization is rendered as to giving the property right and authority over natural resources management to local communities (Agrawal and Gupta, 2005; Agrawal and Ostrom, 1999; Enters and Anderson, 1999; Fisher, 1999; Lindsay, 1999). However, decentralization may not work in the absence of clear specific institutions that include mechanisms of accountability, oversight, and resource transfer (Andersson et al., 2004; Ostrom, 1990). Strong and dynamic local

¹ Correspondence authors: Mahdi, Faculty of Agriculture, Andalas University, Kampus Limau Manis Padang, West Sumatra 25163, Indonesia.
E-mail: kuteihmahdi@yahoo.com

institutions are the prerequisite for successful implementation and good performance of decentralization (Ostrom, 1990; Uphoff, 1986).

Indonesian government launched decentralization to local level by enacting law no 22/1999 and then revised with law no 32/2002. The law was followed with new regulation regarding forest that emphasis decentralization of forest management. It recognizes the role of local institution in forest management (Mahdi et al., 2009; Yonariza and Shivakoti, 2008). West Sumatra province of Indonesia responses these laws, government and forest management decentralization, by transferring management right to the lowest level of local organization, the *nagari*, by introducing provincial regulation no 10/2000. *Nagari* is now the formal institution for the lowest level of government after it was restored by replacing *Desa* system of lowest level of uniform administration policy implemented throughout the country during the new order regime (Benda-Beckmann and Benda-Beckmann, 2001). Solok district of West Sumatra, issued district regulation no 4/2001 regarding the local government that mandates transferring natural resources management to *nagari*.

Nagari is the lowest-level political unit of the Minangkabau ethnic group who practice the matrilineal system. *Nagari* is composed of several neighboring hamlets which represents a clan (*suku*). A clan has several lineages (*kaum*) (Mahdi et al., 2009). Each *nagari* has its own rules and laws because *nagaris* are independent institutions. The *nagari* has a democratic, autonomous, and informal structure, with the clan and hamlet leaders placed on top (Naim, 1984). In West Sumatra province of Indonesia, *Nagari* had been the village organization of local government during the colonial and post-colonial time until 1983, when it was replaced with a system based on smaller administrative villages, *desa*. *Nagari* had been put as the informal institution since 1983 until the enacting of the provincial regulation no 10/2000 (Benda-Beckmann and Benda-Beckmann, 2001).

In this paper, we assess the capacity of the *nagari* in regulating sustainable use of resources and resolving the conflict in natural resources management. The capacity of local institutions in receiving management right transfer affects access of local people to forest resources for their livelihood. Changing in local institution for natural resources management directly affects the changing local livelihood (Batterbury and Fernando, 2006; Mahdi et al., 2009; Sunderlin et al., 2005; Tacconi, 2007). While forest resources are the main sources of livelihood for the people who are living in and around the forest, especially for the poor (Sunderlin et al., 2005; Yonariza and Webb, 2007), changing access to forest resources gives significant effect to poor household livelihood. We continue the assessing of the local institution capacity with its effects to local livelihood.

2. DECENTRALIZATION, LOCAL INSTITUTION AND LIVELIHOOD

Decentralization of natural resources management is taken place in two ways. First is to devolve property rights over natural resources to local communities. Second is to hand over the formal powers of government to its own subunits. Both ways of decentralization claims that outcomes will be more efficient, flexible, equitable, accountable, and participatory (Andersson et al., 2004). In some publications, decentralization is rendered as to giving the property right and authority over natural resources management to local communities (Agrawal and Gupta, 2005; Agrawal and Ostrom, 1999; Enters and Anderson, 1999; Fisher, 1999; Lindsay, 1999). However, decentralization may not work in the absence of

institutions which specify mechanisms of accountability, oversight, and resource transfer (Andersson et al., 2004; Ostrom, 1990). Strong and dynamic local institutions are the prerequisite for successful implementation and good performance of decentralization (Ostrom, 1990; Uphoff, 1986). To develop strong and dynamic local institutions it takes time and effort (Lam, 2001).

Local communities are the main actors in decentralization of natural resources management. They can play key role in shaping the outcomes and will be the beneficiaries of positive outcomes as well as the victim of the negative ones (Agrawal and Gupta, 2005; Agrawal and Ostrom, 1999). Local institutions, those are policies, institutions, and processes that are found in a specific geographical area and are more likely to directly affect the households living there (Messer and Townsley, 2003), play important roles in decentralized natural resources management. It can be a bridge between decentralization and resources users. Linkages between local institutions and livelihood is taken to mean any way in which an institution influences or affects a livelihood strategy undertaken by a particular group or individual, or, vice versa, any way in which a livelihood strategy influences or affects an institution. By controlling access to assets, local institutions affects different livelihood assets or capitals that people use for their livelihoods. Furthermore, an institution may change the context or interact with other institution in which people live in a way that affect their vulnerability.

Decentralization may affect people at local level individually or collectively to pursue their own interests regarding resources utilization (Holling et al., 2002). Individually, resource users will try to get benefits for their own livelihood security and improvement. Collectively, they will find new agreement among themselves and with other stakeholders. Therefore, decentralization will lead to changes in local communities' livelihood and local institutions, and it will uncover latent conflicts among local people and between local communities and other stakeholders.

Decentralization also affects the livelihood of local people (Dupar and Badenoch, 2002). Change of rules at the macro level has an influence on how local people manage resources (Lam, 2001). Theoretically, the connection between decentralization and change in local livelihood is initially assessed through the change of local institutions. Decentralization should ideally include the handing over of rights and authority to manage resources to local communities, often through the agency of local government (Andersson et al., 2006; Larson, 2002; Sunderlin, 2006).

3. RESEARCH METHOD

3.1. Rural rapid appraisal (RRA) and household survey

Rapid Rural Appraisal (RRA) and household survey were carried out at three nagaris within Lembang sub-watershed, Nagari Selayo Tanang Bukik Sileh, Nagari Koto Laweh, Nagari and Dilam. RRA was carried out to identify local institutions and their dynamism. In the course of RRA, in-depth interviews and focused group discussions (FGD) were carried out. In-depth interviews were carried out with key informants, such as local leaders and forest and water related government officials who served as nodal point for FGD. The FGDs were organized at *nagari* and district level. Household survey was carried out by clustering households into three groups based on their recent income: low, middle and high. In each group, household

samples were taken randomly. Table 1 shows the household sample characteristics by area and income groups.

Table 1 Household samples characteristics

No	Household characteristics	Income group			Total
		Low	Middle	High	
1	Household number (N)	94	41	25	160
2	Average age of the head of household (year)	45.85	45.73	49.40	46.38
3	Average monthly household income per capita (Rupiah)*	149,438.86	349,378.05	994,963.47	332,786.50
4	Average household size	5.27	3.88	3.40	4.62
5	Average years of formal education	6.45	7.32	6.60	6.69

Note: * during the study period, 1 US dollar was equal to 9,000 Indonesian Rupiah

3.2. Data analysis

Both qualitative and quantitative analyses were done to achieve the objectives. Qualitative analysis was done to identify local institutions for forest management, and to study their changes during last ten years, their interaction with other institutions, and the problems they have faced. The RRA was carried out in three steps: preparatory activities; field activities; and validation forum. Preparatory and field activities were carried out to collect data and information. The researcher then organized the data and information, and brought them to validation forum. The validation fora were organized for three purposes: first to clarify data and information that were gathered in RRA field activities; second to confirm differences, conflicts and overlapping of rules and organizations tasks on forest and water management in the nagari; third to analyze data and information, and to make conclusions in a participative way. The same techniques were employed to learn about problems of resources management among stakeholders at district level.

Statistical analyses including t-test and one-way ANOVA test were carried out to examine the significance of differences in access to resources at two point of time, before and after decentralization (1996 and 2006). One-way ANOVA test was done to examine differences in resources access among the three income groups. Access to resources was measured by developing the index, comprising combined indices of variables i.e. access to forest and land as shown in table 2.

Table 2 The variables for indexing

No	Variable	Index
1	Access to forest resources	the percentage family income from forest product gathering both timber and non timber forest product (NTFP)
2	Access to land	Security of land ownership. Private land is given 1 Lineage land 0.5 and Rent/sharecropper 0.2 Quality of land. Paddy field is given 1, dry land 0.5 and other 0.2

4. STUDY SITE OVERVIEW

As shown in figure 1, Lembang sub-watershed is part of Sumani watershed, the most important watershed in the central part of West Sumatra. It is situated in the southern part of the watershed, and is under Solok District administration. In the

upland part of the study site lies Talang Mountain, the most active volcanic mountain in Sumatra. The lowland consists of plains area and is the centre of West Sumatra's rice production. Its altitude ranges from 400 to 1,700 meters above sea level with 7,768 mm average rainfall with a range of 34 – 212 rainy days in a year. The lowest rainfall is usually recorded in July, while November to February receive the higher amount of rainfall. Temperature ranges between 12.5oC to 24.60oC. The population density in the study area is the highest compared to other sub-watersheds: 329 persons per square kilometers. The population has grown at about 1.3% annually during the last five years (BPS, 2005).

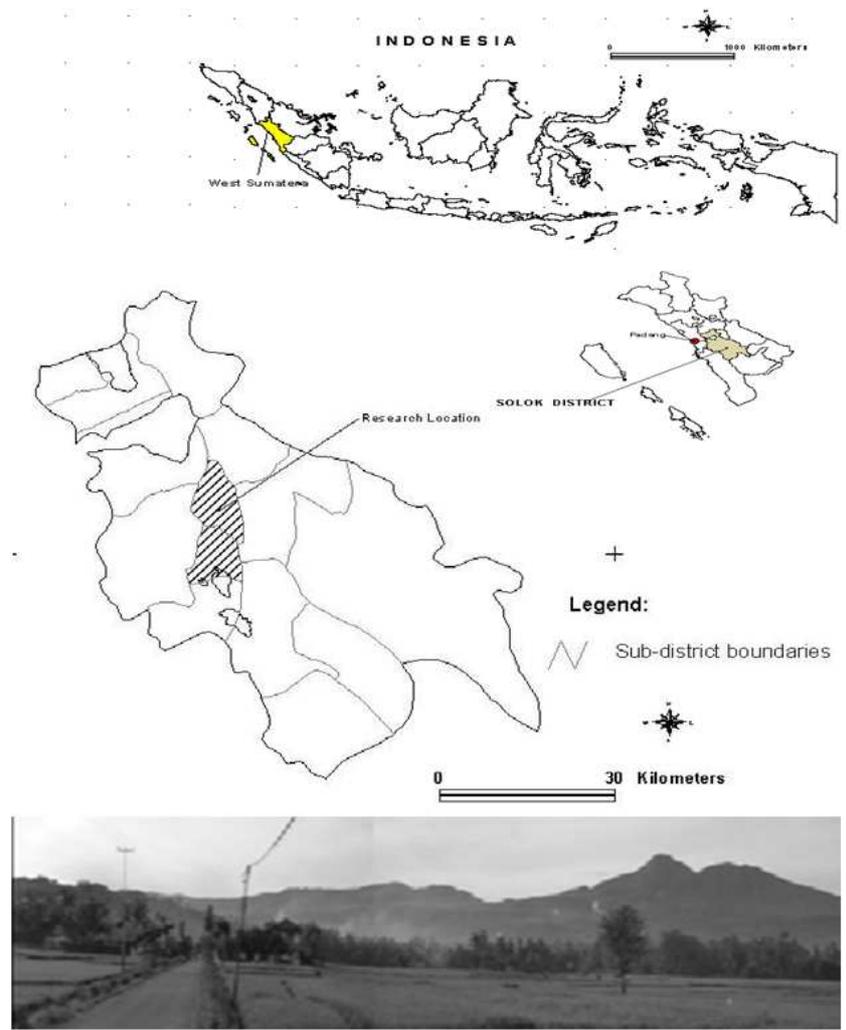


Figure 1. Research site

Almost all of the people belong to the *Minangkabau* ethnic group. This ethnic group has the matrilineal lineage system, which involves four characteristics (Kato, 1982). First, the descent and descent groups are organized according to the female line, thus, all children belong to the mother's clan. Second, a lineage possesses communal properties such as agricultural land, ancestral treasures, and miscellaneous *adat* titles. Third, the residential pattern is uxorilocal, i.e. the husband resides in the house of his wife's kin after marriage. And fourth, authority within a lineage is in the hand of the *mamak rumah* (mother's eldest brother), and not in the hand of the father.

This is an intricate and unique socio-political system. Most sociopolitical units in West Sumatra are formed as a result of interactions among families and clans. *Mamak rumahs* of the same lineage choose a leader whom they call *Mamak Barih*. Then, from among the *Mamak Barih* within a clan, *Datuk* is elected. Many clans, then, form hamlets and many hamlets form *Nagari*. A *Nagari* is led by a *Wali Nagari*. A *Nagari* has a democratic, autonomous, and informal structure dominated by the clan and hamlet leaders (Naim, 1984). Because of independent institutions, each *nagari* has its own rules and laws, which can be different from others.

5. DECENTRALIZATION PROCESS IN INDONESIA AND RESTORATION OF THE NAGARI

The Indonesian government decided to decentralize its political and governmental administration after the economic crisis of 1998 that led to social and political turmoil. Decentralization of the regional government was implemented in 2000 based on the law no 22/1999 for regional government autonomy (replacing the law no 5/1974). Bahl (2001, cited by Esden, 2002) described the decentralization in Indonesia as “one of the largest decentralization programs that has been seen, it was done quickly, and there still is not a detailed transition plan”.

In 2004, the government further changed the law at the regional level that is regional government law no 32/2004. The main highlight of this law is the specification of resource, revenue and role-sharing mechanism among central, provincial and district governments (Cahyat, 2005). Previously, the law no 22/1999 gave wider role for district government and less power for provincial government both in governmental administration and natural resources management while the law no 32/2004 has assigned balanced role among central, provincial and local government (Cahyat, 2005). The new law gives a greater opportunity for local government to get higher income share from natural resources management, provided the local government takes over the management task. With respect to the lowest level of governmental administration, the new law gives more power to the head of village. The law no 32/2004 ended the controlling function of the village legislative bodies (*badan perwakilan desa*).

In addition, the central government formulated forestry law no 41/1999 to replace the law no 5/1967, and launched the law no 7/2004 regarding water resources to replace the law no 11/1974. The new forest law authorizes the partial transfer of forest authority to the local government and the recognition of local customary ownership and management systems. The new water resources law gives clearer instructions to farmers concerning their duties and responsibilities to finance, to operate and to maintain tertiary irrigation canals under government or local government assistance. The two laws give more attention to watershed resources conservation and protection.

During field research, some changes in resources management at local level were identified. Governmental decentralization programs were responded by returning to *nagari* as the main local institution. Consequently, local people, in West Sumatra were given a chance to apply their customary laws in governance and resources management of natural resources. In forest management for instance, *nagari* recently made the rules concerning the harvesting of forest products with the *nagari's* government performing evaluation and monitoring. However, in three

nagaris of the upland research site, small forest plots owned by *nagari* were found to suffer from lack of attention.

Changing the national law has also affected the *nagari's* legislative body (*badan perwakilan nagari*). The body can not control the wali *nagari* (the head of *nagari*), but it can work collaboratively in drafting *nagari* regulations. *Nagari's* natural resources management, actually, can not be intervened, because the ownership in *adat* law is in the hand of board of *nagaris* clan leader (KAN).

5.1. Local property rights

The land tenure system of West Sumatra still follows traditional (*adat*) principles (Balzer et al., 1987; Yonariza, 1996). Complex land rights and ownership existed in a society based on matrilineal cultural background. There are four main type of land status (Balzer et al., 1987; Kato, 1982; Yonariza, 1996). First, *nagari's* land (*tanah ulayat nagari*) refers to land that is controlled by *nagari*. All members of *nagari* have a right to access. Second, clan land (*tanah ulayat suku*) which can only be accessed by members of the clan and only they can withdraw benefit from the land. Third, lineage land (*tanah ulayat kaum*) refers to land that is collectively controlled by the lineage. In many publications, clan and lineage land are also called "high inherited land" (*tanah pusako tinggi*) because these lands are inherited through more than two generations from the ancestors. Fourth, private or individual land refers to the land owned by individuals or groups privately. Private land can be procured in two ways; first is to buy the land by an individual and second is to inherit from parents. The latter is also called "low inherited land" (*tanah pusako rendah*). Our analysis will focus on the *nagari's* land or *tanah ulayat nagari*, because land management change has mostly affected this kind of land ownership.

The utilization of *nagari's* land is decided collaboratively among *nagari's* clan leaders in the forum that is called board of *nagari's* clan leader (*kerapatan adat nagari/KAN*). *Nagari* people can either utilize or cultivate a plot of land if no one else does. KAN can give the utilization right of the land to some one else, if he or she has not cultivated the land for four or six years (each *nagari* has different time range). The land utilization right is like open access for the *nagari's* people. When someone cultivates a plot of land, the utilization right of the land is in his/her hand and can be inherited to his/her children as well as his/her nephews/nieces. Because of population growth, most of *nagari's* land is utilized and land use tends to get more intensive. Because of such pressure, forest cover in the entire area of Lembang sub-watershed has been reduced significantly.

There are three categories of forestland ownership and utilization rights in the studied *nagaris*. First is *nagari's* forest where utilization right has not yet changed and which is still covered by forest. It is a tiny part of the area and most of it is infertile land in the high slopes. Some of the land was left by the people and re-greened by the government during the last 30 years by planting *Pinus merkusii*. Second is the *nagari's* land that is either covered by forest, or cultivated for agriculture, or consists of degraded land. Most of *nagari's* land is in this category. Third is clans'/lineage's land that is covered by forest or cultivated for agriculture, or consists of degraded land.

Table 3 shows land use change in Lembang sub-watershed since 1890. In 2004, forest cover was only 2.98% compared to 24.25% in 1890, 8.07% in 1976 and

7.74% in 1993. Land for settlement has increased rapidly due to high population growth. The highest cumulative change of settlement at a record 565% was from 1890 to 1976. This trend was due to high in-migration to this zone because of its fertile soil. Volcanic soil is the main soil type here and is very suitable for horticulture in upland and for paddy cultivation in lowland.

Table 3 Lembang sub-watershed land use change 1890, 1976, 1993 and 2004

Land use	1890		1976		% cumm. change	1993		% cumm. change	2004		% cumm. change
	Ha	%	Ha	%		Ha	%		Ha	%	
Forest	4,142.67	24.25	1,379.29	8.07	-66.71	1,322.36	7.74	-68.08	509.71	2.98	-87.70
Shifting cultivation	1,628.30	9.53	661.47	3.87	-59.38	5,666.33	33.16	248.00	940.94	5.51	-42.21
Bush	2,851.06	16.69	1,488.34	8.71	47.79	443.90	2.60	-84.43	3,158.78	18.49	10.79
Settlement	713.91	4.18	4,750.92	27.81	565.48	1,983.30	11.61	177.80	3,907.74	22.87	447.37
Paddy field	423.40	2.48	472.34	2.76	11.56	522.57	3.06	23.42	597.96	3.50	41.23
Degraded	7,326.84	42.88	8,333.82	48.78	13.84	7,147.72	41.83	-2.44	7,971.06	46.65	8.79
Total	17,086.18	100.00	17,086.18	100.00		17,086.18	100.00		17,086.19	100.00	

Source: Istijono, 2006

High intensity of shifting cultivation during the same period led to land degradation. The percentage of degraded land (that occupied by *imperata cylindrica*) is the highest among other land use, ever since Dutch colonial era. Degraded land occupied 42.88% of land in 1890 and increased to 48.78% in 1976. It reduced to 41.83% in 1993 and increased again to 46.65% in 2004.

5.2. Forest management within the nagari

The main idea of return to nagari is to empower adat law by implementing it through formal regulation within nagari both for governance and management of natural resources. Based on adat law, natural resources owned by nagari were employed in a sustainable way for nagari sustenance.

In order to effectively implement *adat* law within the *nagari*, there are two challenges of forest resources management. On one hand, *adat* leaders tend to retain their role and right over forest resources and land after return to *nagari*. They like to re-administer the *nagari's* land and impose their own regulation upon it. On the other hand, most of the land utilization right is either in the hand of *nagari's* people or some even in the hands of outsiders. Based on the *adat* rule, KAN can not take over the *nagari's* land if people continue to live and use it for longer than four to six years (different *nagari* has different range) even though they have not cultivated it for productive purposes. KAN only can take it for public purposes such as for public infrastructure construction, public open space, etc, if it provides compensation to these people.

This situation has two implications for forest management within the *nagari*. First, administering forestland causes conflict either with neighbors or with *nagari's* people. Conflicts with neighboring *nagari* are linked with two conditions: the absence of definitive borders among *nagaris* when return to *nagari* was implemented, and the recent increase of the real value of land and forest resources. Traditionally, each *nagari* has an oral story/legend about *nagari's* border. Each *nagari* has different

versions of such stories so that in the field the claimed areas are overlapping. Second, most of the land is degraded and difficult to rehabilitate. Even though people do not cultivate it, they still keep their right by planting something to signal that the land is still utilized and should not be taken.

5.3. Conflict over forest resources management

The earlier period of decentralization implementation in Indonesia faced some conflicts and our study area also experienced it. Table 4 recapitulates the conflicts within Lembang sub-watershed due to changes in the rules of government administration related to natural resources management. There were three conflicts recorded on issue related to forest and land resources management, and three others in water and irrigation management. Conflicts have been recorded among communities, between communities and nagari, between nagari, nagari and local government and between nagaris and others resources users group. Until recently, the conflicts are not yet resolved completely because of absence of conflict resolution channels, in particular the conflicts involving more than one nagaris.

There are two main roots of conflict; increasing resources scarcity and unclear rules of the game with respect to resources utilization. Conflicts are caused by population growth on the one hand and resources depletion on the other. Population has increased sharply and, therefore, the sub-watershed has the highest population density in Sumani watershed. Rapid land use changes produce big portion of degraded land. Because of depletion of upland forest, high fluctuation in water availability and quality is a common phenomenon in the entire sub-watershed. (Istijono, 2006) reported that the sub-watershed has high degree of soil erosion as well.

Table 4 Conflicts on forest and water management within Lembang sub-watershed

No	Type of conflicts	Root of conflict	Stakeholders involved
1	Forest and land resources		
	• Land titling	• unclear ownership	• Among communities
	• Forest resources exploitation	• unclear ownership	• Among communities
	• <i>Nagari's</i> border	• local customary law allows people from other <i>nagaris</i> to obtain forest land in their neighboring <i>nagari</i> • Ancestor's agreement on <i>nagari's</i> border are not formally documented	• Between <i>nagaris</i>

All these issues are not yet tackled because of weak and in some cases due to absence of effective local institutions. When central authoritarian power declines and new institutions are not yet established, conflict is the consequence. However, during the FGD at district level, where all stakeholders participated, a wish to establish a new forum for conflicts and problems solving was expressed. Local government officials have initiated facilitating this aspiration.

6. HOUSEHOLD ACCESS TO FOREST RESOURCES

6.1. Household participation in forest management

Table 5 recapitulates the distribution of households by their expressed personal interest in the involvement of managing forest in upland area. In general, most households participated in forest management to get short term job from forest protection and land rehabilitation project, followed by preventing natural disaster, maintaining social relationship and making water more available in the future. Although, forest resources contribute to household income, fewer and fewer local expect to get more benefit from forest resources. Different interests are found among the different income group. The high income group participated in forest management within their nagari mostly to prevent natural disaster, while low income group would like to get short term economic support from government project for rehabilitation and protection of forest and land.

Table 5 The distribution of household by their interest to participate in forest management within the *nagari*

No	Vested interest to participate in forest management	Low income	Middle income	High income	Total
1	to get job forest protection and rehabilitation project	41.67	26.67	21.43	33.70
2	to make water more available in the future	14.58	13.33	14.29	14.13
3	to get more benefit from forest resources	10.42	13.33	-	9.78
4	to maintain social relationship	20.83	13.33	21.43	18.48
5	to prevent natural disaster	12.50	33.33	42.86	23.91
Total		100.00	100.00	100.00	100.00

During the last five years, the government has launched forest and land rehabilitation programs within this area, by involving local communities in replanting degraded forestland. Their motivation to participate was to get the economic incentive from the project. This is the main reason for participating in forest management for more than one-third of the respondents. To prevent natural disaster is the second reason why locals participated in forest management (23.91%). When the government of *nagari* asks them to work voluntarily (*gotong-royong*) to re-plant degraded forest and land, they participate because they want to maintain social relationships. This reason is in the third priority for 18.48% of the respondents.

When we look at income groups, there are different interests in different groups. For locals in low-income group, their top most interest is to get short-term job from forest protection and rehabilitation project (41.67%) and maintaining social relationship and making water more available in the future are in the second and third reasons respectively. The richest group, on the other hand, participate in forest management within the *nagari* mostly because the want to prevent natural disaster (42.86%). It means the low-income group needs alternative sources of income to secure their livelihood.

6.2. Access to forest resources and land

Although it is difficult to claim that the changes of resource access in research site are due to decentralization alone; decentralization, followed by institutional changes both at the national and local levels, seem to be the main factor that propels resources access change. The dynamics of local people's access to natural resources before and after decentralization is shown in table 6. The table shows differences in access to resource indexes in 1996 and 2006 in upland as well as the differences in access among different income group. Generally, upland people experienced a huge change in resources access during last ten years. The differences in 1996 and 2006 of resources access indexes in upland are statistically significant.

There was no significant change in forest resource access in upland in general among different income groups, the people from middle-income group obtained more forest resources from upland in 1996, 15% of their income came from it, while the low and high income got 9% respectively. These differences were statistically significant. However, the people from low and high-income groups have taken a bigger portion of resources during last ten years than the middle group. In 2006, forest extraction contributed 15% of income of the people from low-income group and 13% of high-income group, while the middle-income people have gotten less than before. Briefly, we can conclude that the people from low-income group got higher access to forest in upland area during last ten years.

Table 6. The average of resources access indexes in 1996 and 2006, its change and statistical test

Household access to resource	Year/change	Income group				One-way ANOVA	t test
		Low	Middle	High	Total		
Forest resources	1996	0.09	0.15	0.09	0.10	3.0006*	1.9484
	2006	0.15	0.11	0.13	0.14	0.9989	
	change	0.06	-0.05	0.04	0.03	4.2053*	
Land	1996	0.40	0.29	0.45	0.38	1.8753*	7.9330*
	2006	0.59	0.66	0.73	0.63	4.5440*	
	change	0.19	0.37	0.28	0.25	3.0810*	

Note: * significant at 95% confidence

The distribution of land access index shows a significant difference among income group in upland, where the people from middle-income group have received the highest benefit. The variation of access among income group is also substantial, with the middle-income groups enjoying high and increasing access. The low and high-income groups accessed 0.40 and 0.38 of index respectively, while the middle income accessed 0.29 in 1996. Then, in 2006, middle-income group access index increased to 0.66, the highest change among other income groups. At the same period, people from low and high-income access index increased to be 0.59 and 0.73 respectively. In summary, access to land resources increased significantly and middle-income group have received a greater benefit. In summary, access of upland people to forest resources has increased significantly during last ten years. The middle-income and high-income groups received more benefit from the change in access to land resources.

Changes in local institution due to decentralization of forest management lead to changing access of local people to forest resources for their main livelihood. Due to weak local institution, the elites, high- and middle-income groups, within the nagaris occupied more land for their livelihood enhancement. While, the low-income groups extracted more forest resources for surviving against economic shock and less job during last ten years.

These findings provide two important implications for future forest management within the context of Indonesian decentralization. First, income disparities among groups would increase. With less forest resources, the low-income group is facing difficulties to exploit more forest resources to support their livelihood. On the other hand, the high- and middle-income groups are enjoying more land for their investment in intensive agriculture for higher livelihood security. Second, pressure to forest resources is becoming higher especially from low-income group. It is becoming worse since capacity of local institution is still weak to formulate and implement regulation regarding resources use.

7. CONCLUSION

Decentralization has been the main political and administrative decision in most developing countries during last three decades. In many countries, decentralization in forest resources management means transfer of part of the authority and right of management to people at the local level. Most attention has been paid to the effect of such decisions on management. A wealth of publications concerning the pros and contras of decentralization has been produced. However, less attention has been paid to the capacity of existed local institutions to receive it.

Decentralization, which has been implemented during last eight years in Indonesia, and which is continuing to be implemented, still causes uncertainty to people at local level. On the one hand, local institutions have changed the institutional arrangement in forest management, but confusion and conflicts between central government and local customary rule still exist. On the other hand, conflicts over resources extraction have become more rampant because of absence of prior agreement among stakeholders. Coupled with high tension from growing population and economic development, this situation has led to accelerate resources depletion. In conclusion, local institutions are still weak to receive management right transfer at that time. Some adjustment and empowerment are needed to improve the capability of local institution to handle forest management effectively. Individually, people at local level respond to the new governance of resources by pursuing their own interests.

At local level within Lembang Sub-watershed, decentralization policy leads to changes in local institution that shift access local people to forest resources and land. Both changes eventually produce conflict in resources utilization, disparities income distribution due to different access among different income group, and increasing pressures of local people on forest resources.

8. POLICY IMPLICATION

The lessons that could be extracted from this study which could be the basis for policy implication include:

1. Similar to the study of (Lam, 2001) in Taiwan, this study also found that strong and dynamic local institutions need time and effort to evolve overtime. Although decentralization has been implemented during last eight years, the new local institutions have still not been able to tackle their collective actions, especially actions among two or more *nagaris*.
2. The facilitation from upper level institutions to establish and empower local institutions is needed in order to pursue effective decentralization implementation process in the future. *Nagaris* need to be empowered in strengthening and implementing their own regulation for forest resources use and access.
3. Creating alternative income sources, especially for the low-income group, is a way to reduce pressure to forest resources.
4. Rising conflict among local communities, provincial and district government is the main problem to develop collective action in forest management within the study area. Assisting local institution in adoption of alternative dispute resolution is the way to encourage them finding agreement and develop institution for sustainable foresta management.

ACKNOWLEDGEMENTS

This study was funded by a grant of Ford Foundation-Jakarta Office made to the Andalas University and Asian Institute of Technology which is duly acknowledged. We are grateful to local residents of Lembang sub-watershed for their participation in interviews and surveys. Special thanks are also extended to the head of the *nagaris* for their help. The earlier version of the paper was the poster note presented at international conference on Poverty Reduction and Forests: Tenure, Market and Policy Reforms in Bangkok, Thailand, 3-7 September 2007.

REFERENCES

- Agrawal, A., and Gupta, K. (2005). Decentralization and Participation: The Governance of Common Pool Resources in Nepal's Terai. *World Development*, 33 (7), 1101-1114.
- Agrawal, A., and Ostrom, E. (1999). *Collective action, property rights, and devolution of forest and protected area management*. Paper presented in International Conference : Collective Action, Property Rights and Devolution of Natural Resource Management: Exchange of Knowledge and Implications for Policy. Puerto Azul, The Philippines. 21-25 June, 1999.
- Andersson, K. P., Gibson, C. C., and Lehoucq, F. (2004). The Politics of Decentralized Natural Resource Governance [Electronic Version]. *PSOnline*, 421-426. Retrieved May 18, 2006 from www.apsanet.org.
- Andersson, K. P., Gibson, C. C., and Lehoucq, F. (2006). Municipal politics and forest governance: Comparative analysis of decentralization in Bolivia and Guatemala. *World Development*, 34 (3), 576-595.
- Balzer, G., Deipenbrock, N., Ecker, R., Eisenbeis, M., Focken, V., and Gihl, K. (1987). *Shifting cultivation in West Pasaman, Sumatra*. Berlin: Centre for advanced training in agriculture development. Institute of socio-economics of agriculture development, Technical University of Berlin, Berlin.

- Batterbury, S. P. J., and Fernando, J. L. (2006). Rescaling Governance and the Impacts of Political and Environmental Decentralization: An Introduction. *World Development*, 34 (11), 1851-1863.
- Benda-Beckmann, F. v., and Benda-Beckmann, K. v. (2001). *Recreating the nagari: decentralisation in West Sumatra* (Working Paper No. 31). Max Planck Institute for Social Anthropology, Halle.
- BPS. (2005). Sumatera Barat Dalam Angka 2004 (West Sumatra in Figures 2004). Badan Pusat Statistik Sumatera Barat (BPS), Padang.
- Cahyat, A. (2005). *Perubahan Perundangan Desentralisasi Apa yang berubah? Bagaimana dampaknya pada upaya penanggulangan kemiskinan? Dan apa yang perlu dilakukan?* (No. 22). Centre for International Forest Research (CIFOR), Bogor, Indonesia.
- Dupar, M., and Badenoch, N. (2002). *Environment, Livelihoods, and Local Institutions Decentralization in Mainland Southeast Asia*. World Resources Institute, Washington, DC.
- Enters, T., and Anderson, J. (1999). Rethinking the decentralization and devolution of biodiversity conservation. *Unasylva. An international journal of forestry and forest industries*, 50 (199), 6-11.
- Fisher, R. J. (1999). Devolution and decentralization of forest management in Asia and the Pacific. *Unasylva. An international journal of forestry and forest industries*, 50 (199), 3-6.
- Holling, C. S., Gunderson, L. H., and Ludwig, D. (2002). In a Quest of a Theory of Adaptive Change. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding Transformations In Human And Natural Systems*. Island Press, Washington.
- Istijono, B. (2006). *Konservasi Daerah Aliran Sungai dan Pendapatan Petani: Studi tentang integrasi pengelolaan daerah aliran sungai. Studi kasus DAS Sumani Kabupaten Solo/Kota Solok, Sumatera Barat*. Unpublished Dissertation, Universitas Andalas, Padang.
- Kato, T. (1982). *Matriliny and Migration: Evolving Minangkabau Traditions in Indonesia*. Cornell University Press, Ithaca.
- Lam, W. F. (2001). Coping with Change: A Study of Local Irrigation Institutions in Taiwan. *World Development*, 29 (9), 1569-1592.
- Larson, A. M. (2002). Natural Resources and Decentralization in Nicaragua: Are local government Up to the Job? *World Development*, 30 (1), 17-31.
- Lindsay, J. M. (1999). Creating a legal framework for community-based management: principles and dilemmas. *Unasylva. An international journal of forestry and forest industries*, 50 (199), 28-34.
- Mahdi, Shivakoti, G., and Schmidt-Vogt, D. (2009). Livelihood Change and Livelihood Sustainability in the Uplands of Lembang Subwatershed, West Sumatra, Indonesia, in a Changing Natural Resource Management Context. *Environmental Management*, 43 (1), 84–99.

- Messer, N., and Townsley, P. (2003). *Local Institutions and Livelihoods: Guidelines for Analysis*. Rural Development Division of Food and Agriculture Organization of the United Nations, Rome.
- Naim, M. (1984). *Merantau: Pola Migrasi Suku Minangkabau (Merantau: Migration Pattern among Minangkabau Ethnic)*. Yogyakarta: Gajah Mada University Press
- Ostrom, E. (1990). *Governing the Commons: the Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge.
- Pacheco, D. (2006). *Opening Common-Property Forests to Timber Production: Bolivia 's Community Forestry Policies, Indigenous Timber User Groups' Performance and Local Perceptions of Forests' Livelihoods*. Paper presented in IASCP 2006 Conference. Bali, Indonesia. June 2006.
- Ribot, J. C. (2002). *Democratic Decentralization of Natural Resources: Institutionalizing Popular Participation*. World Resources Institute (WRI), Washington DC.
- Sunderlin, W. D. (2006). Poverty alleviation through community forestry in Cambodia, Laos, and Vietnam: An assessment of the potential. *Forest Policy and Economics*, 8, 386-396.
- Sunderlin, W. D., Angelsen, A., Belcher, B., Burgers, P., Nasi, R., Santoso, L., and Wunder, S. (2005). Livelihoods, Forests, and Conservation in Developing Countries: An Overview. *World Development*, 33 (9), 1383-1402.
- Tacconi, L. (2007). Decentralization, forests and livelihoods: Theory and narrative. *Global Environmental Change*, 17 (3-4), 338-348.
- Uphoff, N. (1986). *Local Institution Development: An Analytical Sourcebook with cases*. Kumarian Press, West Hartford Connecticut
- Yonariza. (1996). *Agricultural transformation and land tenure systems: A study of a shifting cultivation community in East Rao Pasaman district, West Sumatra, Indonesia*. Ateneo de Manila University, Manila.
- Yonariza, and Shivakoti, G. P. (2008). Decentralization policy and revitalization of local institutions for protected area co-management in West Sumatra, Indonesia. In E. L. Webb & G. P. Shivakoti (Eds.), *Decentralization, Forests and Rural Communities: Policy Outcomes in South and Southeast Asia*. New Delhi: Sage. pp. 128-149
- Yonariza, and Webb, E. L. (2007). Rural household participation in illegal timber felling in a protected area of West Sumatra, Indonesia. *Environmental Conservation*, 34 (1), 73-82.