

Community Participation in Decentralized Management of Natural Resources in the Southern Region of Mali

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Abstract

Decentralized governance of natural resources is considered one of the key strategies for promoting sustainable management of natural resources at local level. Effective decentralized natural resource management requires strong local natural resource institutions. Therefore, strengthening local institutions governing the management of natural resources is one of the core principles of decentralization reforms in Francophone West Africa countries. This study assessed the existing local institutions (rules, norms and or local conventions) governing the management of natural resources and forms of community participation in the development of these natural resource institutions. Our findings showed significant variation within the study sites regarding the level of knowledge of existing local rules and norms governing the management of natural resources by the respondents. Results showed that the level of knowledge of local conventions was significantly ($P < 0.05$) higher in the district of Bougouni than in the district of Koutiala (a score of 3.16 compared to 1.70 on a scale of 0 to 4). This study shows also that participation was dominated by a small group of individuals, often community leaders and elites. The results suggest that women are marginalized. Presently, the big challenge that faces the institutions governing natural resource use in the study area is the system of representativeness in the community in the development of local rules and norms as community leaders and household heads often dominate, which does not encourage active participation of community members. Therefore, for effective implementation of local natural resource institutions, the interest of key natural resource users should be taken into account. It is also important to promote rules and norms that attempt to protect or strengthen women's access to natural resources in the community.

Keywords: decentralization, land use plan, local institutions, Mali, Sudano-Sahelian zone

1. Introduction

In West Africa, as in most of sub-Saharan Africa, natural resources (land, grazing/ rangelands, water, forest) form the basis for livelihoods of rural poor as they depend almost exclusively on agriculture and livestock production (Benjamin, 2004). Many factors, such as the rapid increase in human population, declines in cropland fertility and increase in livestock populations have resulted in growing pressure on the natural resources in the region (Hilhorst, 2008). Given these changing pressures on resource management, these natural resources are facing problem of over-exploitation and degradation, and consequently decline in their quality and productivity (Ribot, Agrawal, & Larson, 2006). Therefore, responsive resource management institutions are much needed. In this sense, decentralization is now put at the center of a good management of natural resources.

In the context of decentralization, local authorities are key actors in the management of natural resources as the state delegates management of community resources to local authorities. Community-based management of natural resources has been advocated by many technical and development practitioners in West Africa (Benjamin, 2008; Ribot, 2002; Gibson, McKean, & Ostrom, 2000) as indispensable for sustainable natural resource management (NRM). According to Benjamin (2008), decentralized management is the key to achieving a more equitable and sustainable natural resource management. Moreover, the same author observed that

decentralized natural resource management in West African Sahel is often characterized by legal pluralism, that is, the coexistence and interaction of several normative orders with different sources of legitimacy and authority. Benjamin (2008), and Agrawal and Ribot (1999) also remarked that the traditional and customary structures are often ignored in the delegation of power over natural resources to local districts and prefecture by the state though the effects of the degradation of natural resources are most apparent at village level. To this end, in recent years, there has been emphasis in the literatures on the local participation in natural resource management in Africa (Kellert, Metha, Ebbin, & Lichtenfeld, 2000; Barrett, Brandon, Gibson, & Gjertsen, 2001; Ribot, 2002). Several of these authors have shown that community participation is an essential component of efforts to bring about positive economic and environmental change in African communities. Strengthening local institutions in the management of their natural resources is therefore essential to maintain a healthy natural resource base for sustainable intensification of crop and livestock production systems.

In this context and to reduce the increasing pressure on natural resources and the associated degradation of ecosystems, in southern region of Mali, some local authorities and village communities have taken initiatives to develop and formalize rules governing the management of natural resources such as local conventions with the support and advice of the national administrative and technical services, and financial partners (Djiré, 2003). However, the ambiguous legal status of local conventions has slowed down the effective implementation of decentralized natural resource management (Benjamin, 2008).

Although significant work has been conducted on natural resource institutions and decentralized natural resource management in Mali, and generally in West African Sahel, for example Ribot's work (Ribot, 2004) on the accountability of local customary authority to community members, participation of community members in the development of these local rules has not been addressed adequately despite the importance of community members as custodians and users of the natural resources. Given that the local populations are directly affected by the implementation of decentralization reform, there is need for adequate representation of the community members in the decentralized natural resource management. Therefore, we included community members in this study in order to know and assess their understanding of the existing natural resources institutions and their level of participation in the elaboration and implementation processes. Then, this study is based on the following strands of argument: A strong representation of the community members is essential for strong local institutions. For these institutions (rules, norms, governing bodies) to be effective, the following basic features are required: (1) Community members who are using the resources are aware of these institutions; and (2) Community members view these institutions as legitimate which is often tied to the community members' level of involvement in their formation. The purpose of this study was to document and analyze the existing natural resource institutions in mixed crop-livestock systems of southern Mali and to examine the factors that influence the level of participation of farmers in elaborations of natural resource institutions.

In addressing the above objective, we looked at the following research questions: What are the type and characteristics of existing natural resource institutions in the study sites? To what extent are community members aware of these institutions? Are community members adequately engaged in the development of these local natural resource institutions, including women? Addressing these questions will help to identify innovative options that will facilitate better participation of community members in the development and enforcement of the local natural resource institutions and consequently, proper use and management of natural resources in Sudano-Sahelian zone of West Africa.

2. Theories and Trends in Decentralized Natural Resource Management (Note 1)

Since the early 1990s, many West African countries have introduced political, economic, and institutional reforms, one of the most important of which is decentralization reform (Manor, 1999; UNCDF, 2000). Through decentralization reform, the government transfers some decision making power and responsibilities to sub-national institution at the provincial, district, city, town and village levels with the objective of promoting public participation in local governance (Crook & Manor, 1998). Basically, the key thrust of decentralization is rooted in democratic principles of representation and accountability that allow constituencies to effectively express their needs and preferences to local government officials and to hold these officials accountable. This accountability was distinguished as downward and upward accountability by Agrawal and Ribot (1999). These authors refer to downward accountability as situations where local bodies can be held to account by the populace through positive or negative sanctions (this is often referred to as true decentralization) while they refer to upward accountability as the case where power is transferred to low level actors who are accountable to their superiors in an hierarchy (this is referred to as deconcentration).

Given the important role that natural resources play in the livelihoods of local population, particular attention has been given to the decentralization of natural resource management. According to Agrawal and Ostrom (2001), decentralized governance of natural resources is considered one of the key strategies for promoting sustainable management of natural resources at local level. The rationale behind decentralization of natural resources is that local populations are both better situated and more highly motivated than outside agencies to manage the resources in an ecologically and economically sustainable manner given the importance of these resources in their daily lives (Benjamin, 2004). The latter stresses again that by moving decision making closer to the local level, decentralization seeks to correspond with the interests and priorities of local population and thereby improve the efficiency and equity of government.

There is a body of literature that has emerged in the past two decades suggesting that decentralization reform has created opportunities for collective actions (Brinkerhoff, 1995; Thomson, 1994; Gibson et al., 2000; Ostrom, 1990; Ostrom, 1999) over natural resource management. In addition, several studies (Agrawal & Gibson, 2001; Ostrom, Gardner, & Walker, 1994) have shown that institutions are a critically important tool for both explaining and influencing human behavior around natural resource use. An important facet of the institutions is the right they confer on those who use, manage and own natural resources. Institutional theory stresses the dynamic nature of institutional arrangements as complex adoptive systems which are continuously adjusted by resource managers in response to contextual changes (Ostrom, 1990; Thomson, 1992; Young, 2002). However, it has to be emphasized that institutions alone cannot ensure the successful outcome of decentralization. Besides, the outcomes of decentralization depend very much on details of what power is transferred to whom, by what means, and how the decisions on natural resource use and management are made (Agrawal & Ribot, 1999; Ribot, 2002). In addition, the effective implementation of decentralization also depends on how well the specific institutional arrangements fit the sociological and ecological environments, and on the interplay of multiple institutions at different scales (Young, 2002).

Though decentralization reform in Mali is often cited as a particularly successful example in West Africa (Charlick, 2001; Clark, 2000; Smith, 2001), Mali is still confronted with many challenges as its Sahelian neighbors such as institutionalizing the balance of power between central and local governments, establishing effective local government with limited technical and financial resources, and reconciling traditional and modern legal traditions, including those related to natural resources. Analysis by Benjamin (2008) shows that while decentralization in Mali has created structures for increasing local participation in governance and natural resource management, it has undermined many of the traditional structures that organize social life in rural communities and the traditional authorities appear to be threatened by the elected "conseils communales", in such way that in some parts of Mali, many rural people perceive decentralization as a threat that may transfer existing power to control their community resources from their hands to the local government ("commune rurale"). Furthermore, some authors have suggested the capture of decision-making mechanisms over the community resources by local elites, which has been reported to derail decentralized natural resource management (Ribot, 2004; Béné et al., 2009). Based on the concerns expressed in the literature above on lack of local participation in development of local natural resource institutions, there is a strong need to understand the awareness and understanding of non-elites about existing institutions. In this regard, Agrawal and Ribot (1999) argue that "downward accountability" is not simply dependent on local election but it depends on the non-elites to engage and demand/expect "downward accountability" and this can only happen if non-elites are aware of local institutions and recognize them as legitimate.

To strengthen local participation in decentralized natural resource management, the importance and pertinence of natural resource institutions have been emphasized (Benjamin, 2008). This author explained that these local rules and norms provide a mechanism for managing local specificities through negotiated rules and management principles and reconciling legal ambiguities not adequately addressed in national legislation. His arguments support the idea that the local conventions and rules governing natural resource management present an opportunity to secure customary right by engaging local government, and state authorities under legally binding constraints.

3. Materials and Methods

3.1 Description of the Study Area

The study was conducted in six communities in Koutiala and Bougouni districts in the Sikasso region of Mali (Figure 1). The two study sites are located in the southern part of Mali with a Sudanian climate characterized by an alternation of dry and rainy seasons that last about six months each. Annual precipitation varies between 750 - 1100 mm and 900 - 1200 mm for Koutiala and Bougouni, respectively. The main ethnic groups in Bougouni are

the Fulani, the Bambara, the Sarakolé, the Malinke, the Dogon and the Bozo with dominance of Bambara and Fulani. Generally, the Bambara are autochthones populations while others ethnics, especially Fulani ethnic, are immigrant populations who came to settle in the South. Koutiala is a cosmopolitan city with dominance of Minianka which constitutes more than 50% of the population of Koutiala followed by Bambara (20%) and Sarakolé (10%) ethnic groups. Miniankan and Bambara are considered as indigene ethnics. The livelihood strategies of both districts are mainly based on agro-silvo-pastoral activities. Maize, millet, sorghum, groundnut and cowpea are the main food crops and cotton is the main commodity crop in both study sites. In fact, Koutiala is the capital of cotton production in Mali followed by Bougouni. Livestock play an important role in the rural economy, especially through animal traction and income generation to meet household needs. The main livestock species raised in the study sites are cattle, sheep, goats and poultry. Bougouni district is traversed by many rivers which provide opportunities for irrigation and fishing. Forest area in Bougouni is much larger than in Koutiala. Secondary livelihood activities in Bougouni included gold mining and handcrafts. Given the dependence of farmers in both study sites on natural resources for their livelihoods, the demand for these resources are high which lead to over-exploitation and in many times to several conflict among different stakeholders with competing interests.

The two study sites were selected in terms of different current status (availability and the quality) of natural resource base. Whereas the level of natural resource degradation in Koutiala is high due to greater cropping intensity, natural resource is still relatively abundant in Bougouni. As a result of relatively abundant natural resources in Bougouni, there are multiple natural resource users with sometimes conflicting interests. So, by selecting two districts with different natural resource status we are able to test the assumption that local populations tend to be more aware of the rules and norms that govern their natural resources when there are increased pressure through competing multiple users.

3.2 Methods

Surveys on existing local natural resource institutions including local conventions and the level of participation of community members in the development process were conducted using group discussions (Duggleby, 2005) and individual interviews of key stakeholders (Creswell, 2014). Focus group discussions were used to collect information on participants' view and experiences on natural resource institutions while interviews were used to explore the views of individuals on participation in elaboration of NR institutions and to collect quantitative information which will support the qualitative information. Data collection was carried out between November, 2013 and January, 2014, in the dominant local language (Bambara) and French by the survey team including the first author of this paper and five field assistants. The data collection involved three types of informants: crop-livestock farmers (indigenous and immigrant populations), community and traditional authorities as well as administrative authorities and technical services.

3.2.1 Group Discussions

Eight group discussions were carried out, consisting of two group discussions with administrative and technical services (one in each district with 27 participants in total), and six group discussions with community and traditional authorities (one in each community with 53 participants in total). Table 1 outlines the socio-professional profile of the participants in the focus group discussions conducted in the two districts on natural resource institutions including local conventions. During these group discussions we focused on identifying and recording details on existing rules, norms and or local conventions governing natural resource management in the study sites. The level of knowledge of the different groups on these local natural resource institutions was also assessed.

During the focus group discussions, participants were asked to name and describe the existing local rules, norms and or local conventions governing natural resource management in their communities. In addition, the participants were asked to provide the key features of the mentioned local natural resource institutions in terms of the natural resources addressed, the date of establishment (if known), the key elements of the rules/norms and the area of coverage (village, inter-villages or district). Furthermore, the respondents in each group discussion were asked to assess their level of knowledge of the existing local natural resource institutions on a scale of zero (none) to four (well informed of the existing rules and norms). The score was recorded at individual level, and then the average was calculated to get the average score for the whole group.

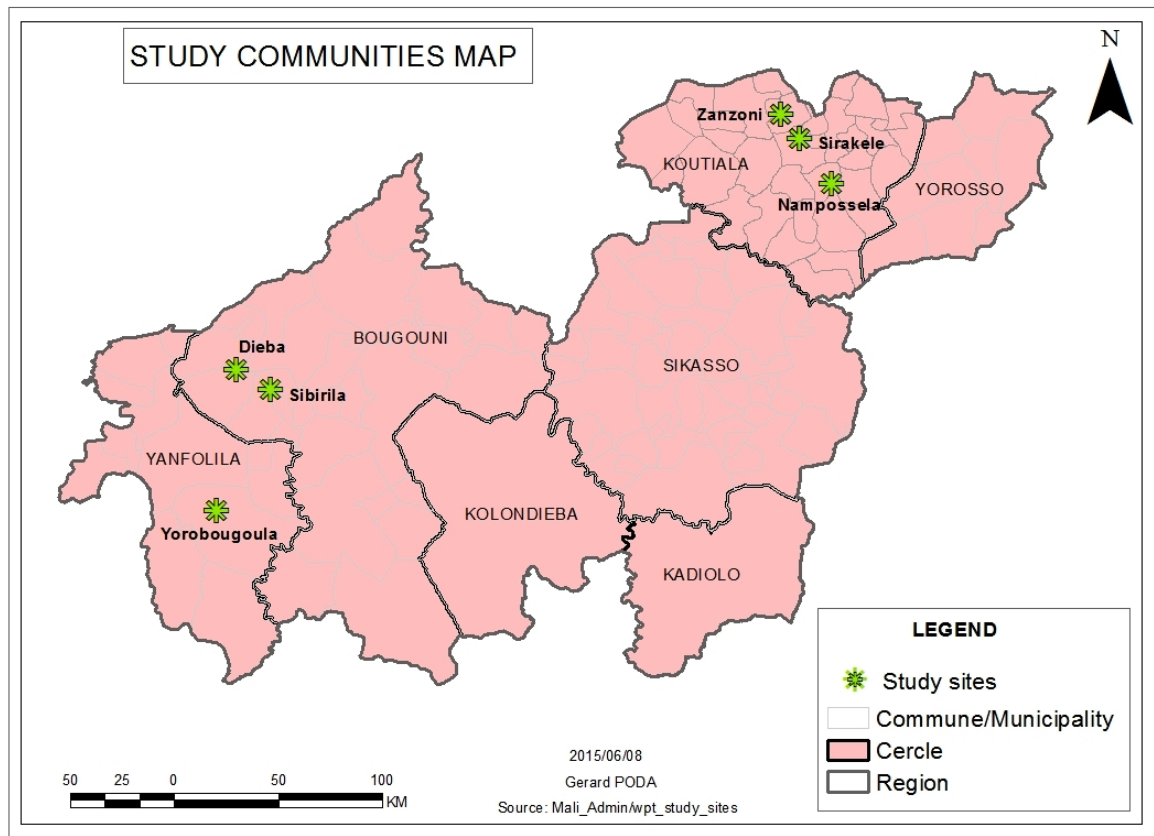


Figure 1. Map of study sites in southern Mali

3.2.2 Individual Interviews

A total of 165 farmers were interviewed on local natural resource institutions in the two districts comprising of 76 (52 men and 24 women) and 89 (59 men and 30 women) crop-livestock farmers in Bougouni and Koutiala, respectively. Stratified random sampling on the basis of gender and status of residence (indigenes and immigrant) in the village was adopted to select the farmers interviewed. Status of residence in the village is important in terms of access, control and use of the community's natural resources.

Information gathered during these interviews included farmers' perception on types of local rules and norms governing NRM, level of knowledge of existing local rules and norms and participation in the development of the local natural resource institutions. To assess the interviewees' knowledge of rules and norms governing the management of natural resources, each interviewee was first asked to mention the natural resources (land, pasture, forest, river etc.) in the community that he/she knows. This was then followed by a question if the interviewee knows rules or agreement between the community members or between community members and outside users for access, use and management of each resource he/she mentioned. If the interviewee answered that he did not know any existing rules and norms, we then mentioned the rules, norms and or local conventions already identified by the community leaders during the focus group discussions and asked if he/she is aware of any of them. Some of the interviewees responded that they are not aware of any existing rules and norms governing NRM while others said yes. Based on this response, we scored the level of knowledge of the interviewees as: 0 = not aware of any of the existing local rules and norms; 1 = aware of the existing local rules and norms but do not know the substance (details); 2 = aware but has limited understanding of some of the local rules or norms governing NRM; 3 = aware of all the existing local rules and norms governing NRM and has a good understanding of most of them; 4 = aware of all the existing local rules and norms governing and know in details their key elements.

Table 1. Socio-professional profile of the participants of the focus group discussions on local rules, norms and or local conventions in the study sites

District	Group	Community	Male	Female	Profile
Bougouni	Local administrative authorities		9	0	Technical services (Agriculture, rural extension agents, animal production and industries, veterinary service, forestry official, social development workers -Local administrative authority (district)
		Local community leaders	Diéba	10	3
		Sibilira	10	2	
		Yorobougoula	6	2	
Koutiala	Local administrative authorities	-	9	1	Technical services (Agriculture, rural extension agents, animal production and industries, veterinary service, forestry official, social development workers) Local administrative authority (district)
		Local community leaders	Namposséla	9	2
		Sirakéle	9	2	
		Zanzoni	9	2	

3.2.3 Data Analysis

Quantitative data were analyzed using SAS software (SAS, 1987). PROC MEANS was used to calculate means and standard errors for each variable. PROC REG was used to perform regression analysis to evaluate the relationship between the independent variables (age; years of residence in the community; sex: female and male; livelihood type: herder, farmer-herder and farmer; education: formal (primary, secondary school), koranic and informal education (adult education) and land owning status and the response variables (level of participation in the development of existing local rules and norms governing NRM). In the regression analysis, variables sex takes 1 if sex is female, and 0 if not; the variable livelihood type takes 1 if the respondent is either herder or farmer-herder, and 0 if not; the variable education takes 1 if level of education is either a formal education or a koranic education and 0, if otherwise and the variable landowning status takes 1 if the respondent is not land owning (non- indigenous), 0 otherwise. T-test of means was used to compare the mean values of different parameters obtained from the two districts. Level of statistical significance was declared at $P < 0.05$.

4. Results

4.1 Variation in the Knowledge of Existing Natural Resource Institution in the Study Areas

In Table 2, we presented a summary of the different types of existing natural resource institutions in the six study communities in Koutiala and Bougouni. Local natural resource institutions existed in all communities studied. Expectedly, most of these local rules and norms existed in an informal or oral form as only three of the over twenty local natural resource institutions we identified in all study communities were formal (formal refers to rules that are generally written and sanctioned/recognized by the state). Formal local conventions tended to cover a very large area even extending to two or more villages and or districts while the main coverage of almost all informal existing rules governing NRM was limited to the village. In addition, our results revealed most informal rules governing NRM were established as far back as the establishment of the villages. They are mostly the initiative of community leaders who decided to set regulations to better manage the resources in their territories and protect them against external users. However, sometimes, with changing demographic and socio-cultural context, the rules are revised or updated by the communities to accommodate the realities of their times.

The level of knowledge of community members differed from one individual to another; and from one community to another depending on sex, age and ethnic group. Overall, the level of knowledge of local rules and norms governing NRM was significantly ($P < 0.05$) higher in Bougouni than in Koutiala. The average score for the level of knowledge (on a scale of 0 to 4) of rules and norms governing NRM was good (3.16 in Bougouni but relatively low in Koutiala, an average of 1.70). Results presented in Figure 2 showed that men had a higher

knowledge of local natural resource institutions compared to women. Specifically, 67% of men as against 38% of women interviewed in Bougouni responded to have a very good knowledge of local rules and norms. This percentage was 12% for men as against 7% for women in Koutiala.

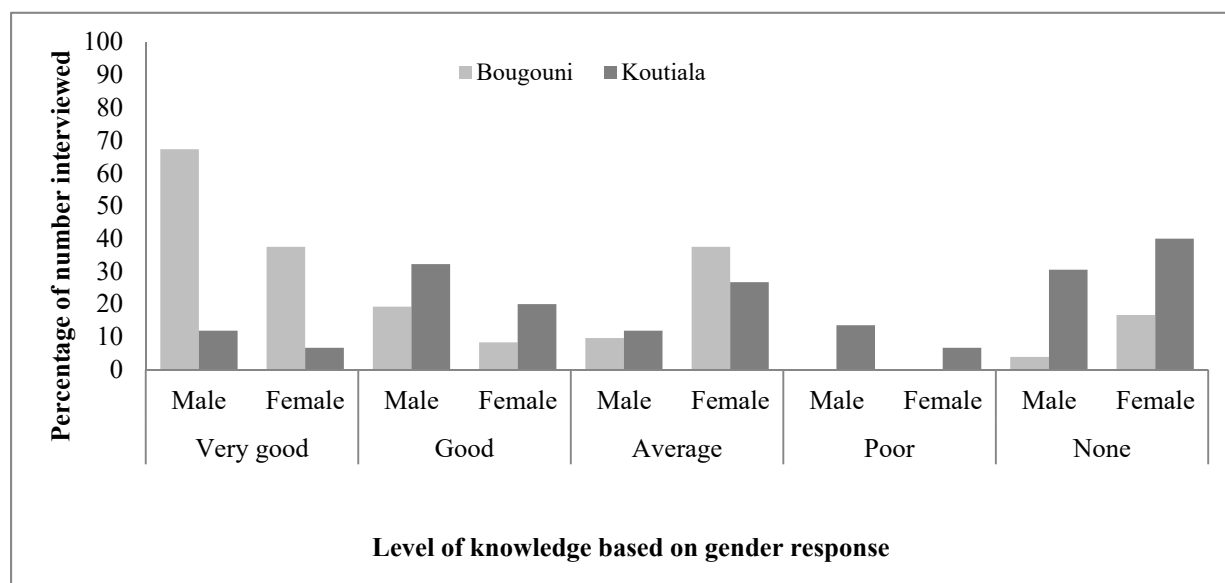


Figure 2. Level of knowledge of local rules or norms governing NRM according to gender in Bougouni and Koutiala

The results of focus group discussions showed that the level of knowledge of local natural resource institutions by administrative authorities and technical services was generally low compared to that of community (traditional) leaders (Figure 3). Generally, the technical services from the government agencies had knowledge of formal (written) natural resource institutions because they were often heavily involved in their establishment. Expectedly, the technical services had almost no knowledge of many existing non-formal rules and norms in the communities as they are largely oral.

Table 2. Summary of the different types of existing natural resource institutions in the study sites

District	Interviewed Group	Name of the local natural resource institutions/ local convention	Written/Oral	Date of establishment	Natural resources addressed and key conventions issues	Coverage
Koutiala	Local administrative authority Sirakelé Community	SIWAA	Written	May 1997 (formalization date)	Land, common pasture, forest, transhumance, conflict management, bush fire, hunting	Inter-District
		CPC	Oral	Since the creation of the village	Forest - protection of sacred trees and community forest, regulation of harvesting of tree products by indigenes and foreigners, rules for harvesting Néré and shea butter, periods for harvesting wild fruits	Village
		CGC	Oral	Since the creation of the village	Conflict over land, pasture, transhumance - processes for mediation and resolution of conflict among the indigenes and foreigners over land, water and grazing, fines and sanctions for the offenders, permission for grazing crop residues after harvesting whether	Village

				for transhumant herders or community members, conditions of accepting transhumant herders in the community, duration of stay of transhumant herders in the territory, period for entering grazing lands, protection of livestock corridors.	
	CGPE	Written	2007	Water – rule of access to the watering point, management of watering point and charges for use by foreigners, processes for conflict mediate over watering point	Village
Namposséla Community	SIWAA	Written	1989	Land - rules of land ownership, rules of access to community land and acquisition by foreigners, protection of sacred land, organization and clearing modalities. Communal pastures – rules of access and use, management of communal pastures, protection from cropping. Forest – rules for cutting and sale of wood, quotas for harvesting forest resources for use as timber and fire wood. Transhumance - Demarcation of livestock routes in the community, arrival date of transhumant herders and duration of stay in the community. Conflict management – processes for mediation and resolution of conflict among the indigenes and foreigners over land, water and grazing. Bush fire - agenda for controlled bush fire and prohibition of uncontrolled bush fire, fine for uncontrolled bush fire Hunting - protection of some wildlife species, precision about species that could be hunted, date for community group hunting	Inter-District
	KOMO	Oral	Since the creation of the village	Fishing: Protection of fish species, restriction of fishing in certain period of the year, fixing of the period of fishing by community leaders and communication to community members	Village
	CAT	Oral	Since the creation of the village	Land use and management - land tenure and security, condition of access to land by foreigners, and transfer of land among the community members	Inter-Village
Zanzoni Community	CGT	Oral	Since the creation of the village	Transhumance – protection of livestock routes in the community, conditions for receiving transhumant herders in the village territory, arrival date and duration of stay in the community, resolution of conflict between herders and the community members, permission to graze crop field by the transhumant herds	Village
	CGC	Oral	Since the creation of the village	Conflict over land use, communal pasture and water - processes for mediation and resolution of conflict among the indigenes and foreigners over land, water and grazing; fines for the offenders and compensation for the victims in case of damage to crops	Village
	CTT	Oral	Since the	Land use and management - land tenure and	Village

				creation of the village	security, condition of access to land by foreigners, and transfer of land among the community members	
		CGF	Oral	2003	Forest - conditions of cutting and sale of fuelwood, rules and roles for monitoring of community forest	Inter-district
Bougouni	Local administrative authority	CGRN	Written	November 2010	Land, common pasture, forestry, water, conflict, bush fire, wild resources (fauna and flora, wild fruit)	Inter-district
		CPC	Oral	Since the creation of the village	Wild fruit harvest	Inter-village
		CAP	Oral	2006	Land use and forest - land tenure and security, condition of access to land by foreigners, protection of sacred forest, rules for cutting of trees in community forest and protection of certain tree species	Inter-Village
	Sibilira Community	CGF	Oral	1993	Forest – rules for cutting trees for fuel-wood and prohibition of sale of fuel-wood	Village
		CGPC	Oral	2011	Pasture - access and use of grazing areas, prohibition of cropping on grazing land conflict management - processes of conflict resolution, precision of sanctions.	Village
	Yorobougoula Community	CGRN	Written	November 2010	Land, pasture, forest – modalities for exploitation of forest resources, protection of pasture for animal, harvesting of forest product, rules for sale of woods, conditions of harvesting wild fruits and fixing of harvesting period of wild fruits.	Inter-District
					Water, conflict management, bush fire – access to watering points, processes for conflict mediation, rules for controlled bush fire, sanctions for uncontrolled bush fire.	
					Hunting - management modalities: hunting license, fixation of hunting period, and rules for ritual hunting)	
		CGF	Oral	2007	Forest - management of protected area. hunting, bush fire – rules for controlled bush fire	Inter-Villager
	Diéba Community	CGF	Oral	Since colonial period	Forest - conditions for cutting of fuel wood	Village
		CGP	Oral	In the 1960s	Pasture - access and use of grazing area	Village
		CGM	Oral	Since the creation of the village	Ponds with various fish species - management system, fixing period for fishing	Village

Acronyms: SIWAA (SIWAA Convention); CGPE: Conventions on management of watering points, CGT: Rules on land allocation - land tenure security, CPC: Rules on the regulation of wild fruits, CGC: Rules on conflicts management, KO-MO: Rules on collective fishing, CGT: Rules on transhumance management, CTT: Rules on land tenure, CGF: Rules on forestry management, CGRN: Convention on natural resource management, CAP: Rules on Protected Areas, CGPC: Rules on rangeland and conflicts management, CGP: Rules on rangeland management, CGM: Rules on standing pools management.

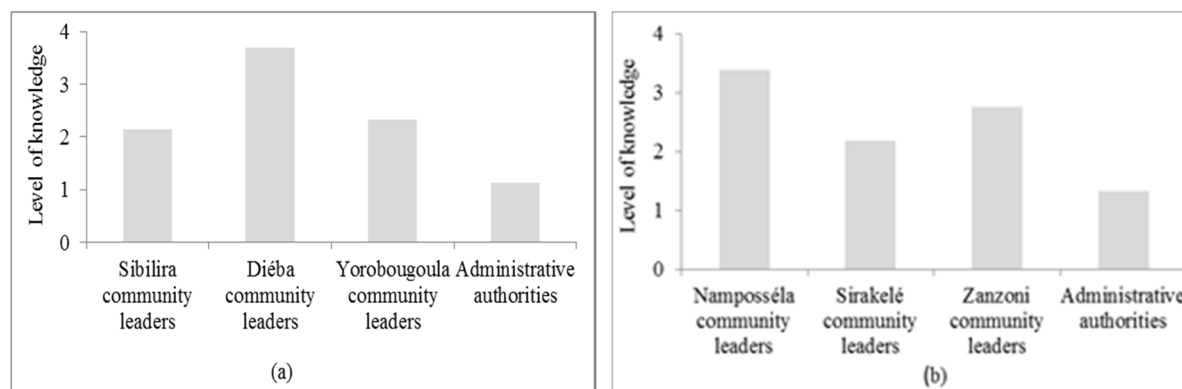


Figure 3. Level of knowledge of local rules, norms and or local conventions governing natural resources use by group interviewed (a) Bougouni, (b) Koutiala.

Level of knowledge: Score: 0= none, 1= low, 2= average, 3 = good, 4= very good

4.2 Local Participation in the Elaboration of Natural Resource Institutions in the Study Sites

There are no standard procedures for the elaboration of rules, norms or local conventions governing NRM as they differ depending on the type of natural resource institutions and strategies adopted by the different stakeholders. The level of community participation in the development of local rules or norms governing NRM was very low in both districts. According to the results, 72% and 77% of the respondents in Bougouni and Koutiala respectively, reported that they have not participated in development of existing local rules or norms governing NRM in their communities, while 21% and 16% had slightly participated, respectively.

Table 3 shows the degree of participation in development of existing local rules and norms by gender. The results showed that women's participation in development of existing local rules and norms in the study sites was generally low despite the fact that women are major users of natural resources in the communities. The lower level of participation by women compared to men suggested a domination of local institutions by men.

Table 3. Participation in the elaboration processes of rules and norms governing natural resource use in the study sites by gender

Factor	Variable	Bougouni		Koutiala	
		Means	s.e	Means	s.e
Gender	Male	0.56 ^a (N=52)	0.12	0.53 ^a (N=59)	0.12
	Female	0.04 ^b (N=24)	0.04	0.07 ^b (N=30)	0.05

The score for the level of participation was 0 = none, 1 = low, 2 = average, 3 = high, 4 = very high. Means in the same column with different superscript letters are statistically different at $P < 0.05$.

Table 4 shows the results of the regression analysis on the effect of independent variables on the level of participation by the respondents in the development of local rules and norms governing NRM in the study sites. The results showed that age, year of residence in the community, gender and formal education appeared to influence the level of participation of community members in the elaboration processes of rules governing natural resources management in Bougouni. The results suggested that a female was less likely to participate in the elaboration of rules governing NRM and that older people were more likely to be involved. Similar but less significant results were obtained in Koutiala where two factors namely female sex and formal education had a significant influence on the stakeholders' level of participation in the formulation of rules and norms governing NRM. A major difference is that the level of formal education had a positive influence in Koutiala while negative one in Bougouni.

Table 4. Results of the regression analysis of the level of participation of community members in the elaboration of rules and norms governing natural resources use in the study sites

Independent variable	Bougouni	Koutiala
Age	0.029***	0.004
Residence	-0.023***	0.010
Female	-0.575***	-0.389**
Herder	-1.098	0.189
Farmer-herder	-0.093	0.026
Formal education	-0.411**	0.340*
Koranic education	0.206	0.035
Non land owning lineage	-0.280	0.282
Constant	0.188	-0.258
R ²	0.317	0.117

*** Significant at the 1 % level, ** significant at the 5 % level, * significant at the 10 % level.

Values are regression coefficients for each independent variable.

5. Discussion

The existence of local natural resource institutions in all communities according to our results agrees with observations by Dicko (2002) and Tutu, Pregernig, and Pokorny (2015) that rural communities often put in place rules and norms to monitor the management of their resources and to protect from overexploitation. In this sense, Granier (2010) argued that local natural resource institutions have always existed in African society and the only difference today is the involvement of the government. With rapidly changing demographic, socio-cultural and institutional contexts in many rural communities, some authors (Tutu et al., 2015) observed that these informal natural resource institutions may no longer be appropriate for the current realities in many communities and this thought has encouraged the tendency to move from a status of informal local rules and norms to that of legal tool in form of formal local conventions (Granier, 2010).

5.1 Knowledge of Existing Local Natural Resource Institutions in the Study Areas

Even though local rules and norms exist in both study sites, the level of knowledge by the community members varied among groups according to their socio-professional profile and gender. Coulibaly and Sanogo (2006) confirm our results that all those involved in the use and management of natural resources do not have the same level of knowledge or the same perception on the local natural resource institutions. In addition, these results suggest a higher level of knowledge of natural resource institutions in Bougouni than in Koutiala. This could be explained by more pressure on natural resources being experienced in Bougouni which might have contributed to greater awareness of the natural resource institutions by the community members.

Despite their expected roles to support better management of natural resources at community level, the local administrative authorities and technical services had almost no knowledge of existing local natural resource institutions in the communities they are supposed to support as shown by our results. This may be an indication of disconnection and mutual distrust between the communities, and the state technical agents and administrative services as reported by Hilhorst (2008). To support this point, one of the community participants in our study sites said at one of the group discussions that: "*Forestry officials are our enemies, they do not mean good for us; what they want is money.*" Another participant added: "*The mayor of the local government came here to sow discord.*"

5.2 Community Participation in the Elaboration of Rules and Norms

The low level of participation in the elaboration of rules of access, use and management of natural resources in the communities reported in this study could be partly attributed to domination of the process by few individuals in the communities who are often the leaders and, elites in the communities (Bachir, Vogt, & Vogt, 2007). These local leaders and elites think that they represent others, and they can decide on their behalf knowing that none can contest their decision. This is closely linked to the concept of elite domination as observed by Poteete and Ribot (2011) in which powerful actors gain, build and maintain positions of dominance. Cases of elite capture in

decision over natural resource management have been reported in many studies on decentralized natural resource management (Shackleton, Campbell, Wollerberg, & Edmunds, 2002; Granier, 2010; Poteete & Ribot, 2011; Platteau, 2004; Béné et al., 2009). Elite capture is often considered as a problem with community based natural resource management as individuals use institutions to take advantage of them in order to further their own gains. Ribot (2004) argued that the incompleteness of recent attempts at decentralizing authority and functions to local and district level has led to strengthening of local elites and increasing vulnerability of the already marginalized rural people. The low participation of community member in decentralized natural resource management has been also reported in others studies (Béné et al., 2009). These authors added that even where participation of legitimate group of end users seem to have been more effectively achieved, a more thorough analysis reveals that the level of participation is often reduced to an instrument for implementation rather than an effective and empowering involvement in decision-making.

The significant different levels of participation of community members found between Bougouni and Koutiala could be partly attributed to the strong interest of the people in Bougouni to protect their resources from external users and this resulted in strong mobilization of the population. Bachir et al. (2007) argue that the biggest motivation for farmers in developing rules and norms governing NRM is the protection of their resources from external users. These authors added that more people tend to be involved in the development of local rules and norms in the areas experiencing a multiplicity and diversity of users of natural resources from outside as was the case in Bougouni.

Despite the fact that women are major users of natural resources, their level of participation in elaboration of local natural resource institutions is generally low in the study sites. This low level of participation by women can be partly explained by socio-cultural factors as in most African traditions including Malian culture where women are not considered responsible for management of natural resources in the community. In general, a man, as the household head, represents his spouse(s) and he is responsible for the actions of his wife (wives). In addition to socio-cultural factors, low level of participation of women can also be attributed to general low level of education among women, and lack of information and awareness of the elaboration processes of the local natural resource institutions. Results from the study by Coulibaly and Sanogo (2006) on the role of women in participatory management of natural resources in Southern Mali support our findings. These authors observed that women are not directly concerned by the management of natural resources and are almost excluded. To highlight the importance of women's active involvement in NRM and the change that can be brought if they are fully engaged in decision making over natural resources use, a recent study in Nepal attributed the success of forest management program to management of the community forest by the women (Tiwari & Joshi, 2015).

The results of regression analysis revealed that the level of participation in the elaboration of rules governing NRM depended on a number of factors and these factors varied between the two study sites. Expectedly age had positive effect suggesting that old people will likely to be engaged in the development of rules and norms governing NRM. This may not be far from the reality on the ground where old people are generally first to be consulted in most decision-making at the community levels. Another important factor reported in Bougouni is year of residence in the community which tends to have negative influence on the likelihood of participation in development of rules and norms. The likely explanation for this is that the people with long years of residence in the community enjoy rights of access and control of resources in the communities and may not be too concerned regarding their participation in the elaboration of local natural resource institutions. The effect of level education on involvement in development of local rules and norms for NRM is location-specific from the results.

The negative effect of being female on the level of participation confirms the argument that men are more likely to participate in decision-making over natural resource use and that women are generally marginalized in NRM in West Africa (Coulibaly & Sanogo, 2006). Livelihood types like being a herder or farmer-herder and having no land-holding status in the community do not play influential role regarding participation in local natural resource institutions elaboration. The lack of influence of livelihood type could be partly attributed to general marginalization of herders in the decision making process by the indigenous farming populations. To support this, leaders in one of the communities where we conduct this study stated in a focus group discussion that: *"herders do not live in our community, why do we have to include them in decision-making regarding the resources available in our community? What we do is to inform them of our decision"*.

6. Conclusion

This paper explores key features of existing local natural resource institutions, level of awareness of these local natural resource institutions by community members and their level of participation in the elaboration processes. Our results demonstrate that the level of knowledge of natural resource institutions by community members

differed from one individual to another; and from one community to another depending on sex, age and social group status. Our results suggest that level of awareness is closely interlinked with the level of participation in the elaboration processes of natural resource institutions and it could be stated that community with high level of awareness of local rules and norms will likely be associated with the high level of participation. This study further shows that natural resources decision-making is still under strong influence of traditional leaders and elites. Findings from this study also show that participation of community members in elaboration of natural resource institutions is low. Factors that influence the level of participation include age, year of residence in the community, gender and education level. For effective implementation of local natural resource institutions, the interest of key natural resource users should be taken into account. It is also important to promote rules and norms that attempt to protect or strengthen women's access to natural resources in the community.

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References

- Agrawal, A., & Gibson, C. C. (2001). *Communities and the Environment: Ethnicity, Gender, and the State in Community-Based Conservation*. New Brunswick, NJ: Rutgers University Press.
- Agrawal, A., & Ostrom, E. (2001). Collective action, property rights, and decentralization in resource use in India and Nepal. *Politics and Society*, 29, 485-514. <http://dx.doi.org/10.1177/0032329201029004002>
- Agrawal, A., & Ribot, J. C. (1999). Accountability in Decentralization: A Framework with South Asian and West African Cases. *Journal of Developing Areas*, 33, 473-502. <http://www.jstor.org/stable/4192885>
- Bachir, A., Vogt, G., & Vogt, K. (2007). *Les conventions locales au Niger: L'expérience de la forêt classée de Takieta*. Institut International pour l'Environnement et le Développement (IIED), London. Retrieved from http://www.iedafrique.org/IMG/pdf/CL._Niger.pdf
- Barrett, C., Brandon, K., Gibson, C., & Gjertsen, H. (2001). Conserving tropical biodiversity amid weak institutions. *BioScience*, 51, 497-502.
- Béné, C., Belal, E., Baba, M. O., Ovie, S., Raji, A., Malasha, I., ... Neiland, A. (2009). Power Struggle, Dispute and Alliance Over Local Resources: Analyzing Democratic Decentralization of Natural Resources through the Lenses of Africa Inland Fisheries. *World Development*, 37, 1935-1950. <http://dx.doi.org/10.1016/j.worlddev.2009.05.003>
- Benjamin, C. E. (2004). *Livelihoods and institutional development in the Malian Sahel: A political economy of decentralized natural resource management (Unpublished doctoral dissertation)*. University of Michigan, USA.
- Benjamin, C. E. (2008). Legal Pluralism and Decentralization: Natural Resource Management in Mali. *World Development*, 36, 2255-2276. <http://dx.doi.org/10.1016/j.worlddev.2008.03.005>
- Brinkerhoff, D. (1995). African state-society linkages in transition: the case of forestry policy in Mali. *Canadian Journal of Development Studies*, 16, 201-228. <http://dx.doi.org/10.1080/02255189.1995.9669593>
- Charlick, R. B. (2001). Popular participation and local government reform. *Public Administration and Development*, 21, 149-157. <http://dx.doi.org/10.1002/pad.155>
- Clark, A. F. (2000). From military dictatorship to democracy: the decentralization process in Mali. In R. J. Bingen, D. Robinson, & J. Staats (Eds.), *Democracy and Development in Mali* (pp. 251-264). East Lansing, MI: Michigan State University Press.
- Coulibaly, N'G., & Sanogo, J. L. (2006). Rôle des femmes dans la gestion participative des ressources naturelles en zone Mali-Sud. In J. S. Zoundi, I. Butare, J. Ndikumana & K. Adomefa (Eds), *Intégration agriculture Elevage : Alternative pour une gestion durable des ressources naturelles et une amélioration de l'économie familiale en Afrique de l'Ouest et du Centre* (pp. 314-327). Ouagadougou: INERA, Nairobi: ILRI, Dakar: CORAF /WECARD.

- Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches*. California, USA: Sage Publication, Inc.
- Crook, R., & Manor, J. (1998). *Democracy and Decentralization in South Asia and West Africa*. United of Kingdom, Cambridge University Press.
- Dicko, A. K. (2002). *Les conventions locales dans la gestion des ressources naturelles au Mali. Programme d'appui aux collectivités territoriales Etudes No.14, Bamako, Mali*. Retrieved November 10, 2014 from <https://rmportal.net/framelib/pact-etudes-n14.pdf>
- Djiré, M. (2003). *Les conventions locales au Mali outils de gestion durable des ressources naturelles. Revue de Littérature. Bamako, Mali: IIED*. Retrieved August 20, 2014 from http://hubrural.org/IMG/pdf/mali_conventions_locales_outils_gestion_rm.pdf
- Duggleby, W. (2005). What about focus group interaction data. *Qualitative Health Research*, 15, 832-840.
- Gibson, C. C., McKean, M. A., & Ostrom, E. (2000). Explaining deforestation: the role of local institutions. In C. C. Gibson, M. A. McKean, & E. Ostrom (Eds), *People and Forests* (pp. 1-26). Cambridge, MA: MIT Press.
- Granier, L. (2010). *Are local conventions effective tools for the joint management of natural resources? Pedagogic factsheets to gain understanding, ask the right questions, and take action on land tenure issues in West Africa. Bamako: "Land Tenure and Development" Technical Committee*. Retrieved June 15, 2014, from http://www.agter.org/bdf/_docs/ctf_granier_local_conventions_en.pdf
- Hilhorst, T. (2008). Local governance institutions for natural resources management in Mali, Burkina Faso and Niger. *KIT Working Paper Series G1. Amsterdam, the Netherlands*. Retrieved from <http://www.bibalex.org/>
- Kellert, S. R., Metha, J. N., Ebbin, S. A., & Lichtenfeld, L. L. (2000). Community natural resource management: promise, rhetoric, and reality. *Society and Natural Resources*, 13, 705–715.
- Manor, J. (1999). *The Political Economy of Democratic Decentralization*. World Bank, Washington, DC. <http://dx.doi.org/10.1596/0-8213-4470-6>
- North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, 5, 97-112.
- North, D. C. (2005). *Understanding the Process of Economic Change*. New Jersey: Princeton University Press.
- Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, Cambridge University Press.
- Ostrom, E. (1999). Coping with the Tragedy of the Commons. *Annual Review of Political Science*, 2, 493-535.
- Ostrom, E., Gardner, R., & Walker, J. (1994). *Rules, Games, and Common-Pool Resources*. Ann Arbor, the University of Michigan Press. Retrieved March 22, 2015 from <https://www.press.umich.edu/pdf/9780472065462-fm.pdf>
- Platteau, J-P. (2004). Monitoring elite capture in community-driven development. *Development and Change*, 35, 223–246. <http://dx.doi.org/10.1111/j.1467-7660.2004.00350.x>
- Poteete, A. R., & Ribot, J. C. (2011). Repertoires of Domination: Decentralization as Process in Botswana and Senegal. *World Development*, 39, 439–449. <http://dx.doi.org/10.1016/j.worlddev.2010.09.013>
- Ribot, J. C. (2002). *Democratic decentralization of natural resources: institutionalizing popular participation*. World Resources Institute, Washington, DC. Retrieved September 10, 2014 from http://pdf.wri.org/ddnr_full_revised.pdf
- Ribot, J. C. (2004). *Waiting for Democracy: The Politics of Choice in Natural Resource Decentralization*. World Resources Institute, Washington, DC
- Ribot, J. C., Agrawal, A., & Larson, A. M. (2006). Recentralizing While Decentralizing: How National Governments Reappropriate Forest Resources. *World Development*, 34, 1864-1886. <http://dx.doi.org/10.1016/j.worlddev.2005.11.020>
- Shackleton, S., Campbell, B., Wollerberg, E., & Edmunds, D. (2002). Devolution and community – based natural resources management: Creating space for local people to participate and benefit? *Natural Resource perspectives*, 76, 6. The Overseas Development Institute (ODI), London. Retrieved March 15, 2015 from <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2811.pdf>
- Smith, Z. K. (2001). Mali's decade of democracy. *Journal of Democracy*, 12, 73-79.
- Statistical Analysis System Institute. (1987). *SAS/STAT for Personal Computers*. SAS Institute, Inc., Cary, NC.

- Thomson, J. T. (1992). *A Framework for Analyzing Institutional Incentives in Community Forestry*. FAO Community Forestry Note. Rome: FAO.
- Thomson, J. T. (1994). Legal Recognition of Community Capacity for Self-Governance: A Key to Improving Renewable Resource Management in the Sahel. *Sahel Decentralization Policy Report. Vol. III, USAID*.
- Tiwari, P. C., & Joshi, B. (2015). Local and regional institutions and environmental governance in Hindu Kush Himalaya. *Environmental Science & Policy, 49*, 66–74. <http://dx.doi.org/10.1016/j.envsci.2014.09.008>
- Tutu, P. O., Pregernig, M., & Pokorny, B. (2015). Interactions between formal and informal institutions in community, private and state forest contexts in Ghana. *Forest Policy and Economics, 54*, 26–35. <http://dx.doi.org/10.1016/j.forpol.2015.01.006>
- UNCDF. (2000). *Local Development and Decentralized Management of Natural Resources*. Cotonou, Benin.
- Young, O. R. (2002). *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*. Cambridge, MA: MIT Press.

Notes

Note 1. This paper focuses mainly on the management of natural resources such as land, forests, pastures, and watersheds. Decentralization is defined as a process by which powers are transferred from the central government to lower levels in a ‘territorial hierarchy’ (Crook & Manor, 1998). The term “institution” as used in this paper is: “A complex of norms and behavior that persist over time by serving collectively values purposes”. Benjamin (2008) describes institutions in terms of rules, norms and strategies that emerge in communities from interacting livelihood strategies to structure patterns of collective action. And North (1991, 2005) categorized institutions in formal and informal institutions with formal characterized by written –down and well document principles that guide the affairs of a society. While informal institutions are simply unwritten traditional rules and norms that influence how a people is organized. Our focus on in this study is mainly informal natural resource institutions.

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