

Land Tenure and Soil Conservation Practices - Evidence From West Africa and Southeast Asia

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ABSTRACT

Studies on land tenure and soil conservation usually emphasize a mono-directional relationship between tenure security and adoption of soil conservation measures. It is stated that increased tenure security will lead to better land management practices. However, the fact that the adoption of conservation measures can increase farmers' tenure security is often neglected. Drawing on empirical research in West Africa and Southeast Asia, the aim of this paper is twofold: (1) to examine the impact of land tenure on the adoption of soil conservation measures; and (2) to determine the influence of long-term investments on tenure security. The study is based on both quantitative and qualitative research. Data was analyzed by parametric and non-parametric tests and by descriptive statistical tools.

Research results from Benin and Niger suggested that tenure security of certain rural dwellers, especially of women, tenants and pastoralists, is limited by both customary land rights systems and state legislation. As tree planting is regarded as a mark of ownership rights, customary tenure does not allow non-owners to plant trees, which is an important constraint for the introduction of agroforestry systems.

The case studies from Southeast Asia showed different results. Minority farmers in Northern Thailand, where agriculture is in conflict with the government's reforestation policy, reacted to increasing tenure insecurity by planting fruit trees, by converting rainfed land into paddy fields, and by applying erosion control measures. Similar processes could be observed in mountainous regions of Vietnam where farmers adopted soil conservation practices mainly to obtain long-term land use certificates.

INTRODUCTION

There is increasing evidence that property rights regimes play a central role in the use and management of natural resources. Many environmental problems such as soil degradation and forest depletion can be characterized as a result of incomplete, inconsistent, or non-enforced property rights (Bromley and Cernea, 1989; Wachter, 1992). Hardin (1968) argues that where property regimes are non-existent, natural resources are prone to overexploitation because the costs of off-site impacts, such as water pollution or overgrazing pastures, are borne by the community as a whole, but the potential benefits accrue to the individual.

Coase (1960) also argued that the absence of clearly defined property rights inevitably leads to degradation of soils and other natural resources. The general interpretation of these theorems from the 1960s onwards was that collectively owned property was the culprit for forest destruction, land degradation, and water pollution and that private property was crucial to sustaining natural resources. However, the fact that the adoption of soil conservation measures like agroforestry systems and the planting of perennial crops can increase tenure security of smallholders is often neglected by both researchers and development practitioners. The following case studies are based on intensive field surveys in West Africa and Southeast Asia.

METHODOLOGY

In Southern Benin and Southwest Niger, 190 farm households were investigated from 1993-1995 by the author using standardized questionnaires. The head of the household and all members of the family cultivating individual fields were interviewed. Additional qualitative information on the evolution of land tenure systems was obtained by semi-structured interviews with district and village chiefs, and groups of elder people. Results from Vietnam are based on a literature review and semi-structured interviews with key persons, such as village headmen, party secretaries and cadastral officers, in two northern provinces. The case study of Northern Thailand was done by a postgraduate student in 1997/98 under the author's supervision in the framework of an interdisciplinary study project in two watershed areas in the 'Golden Triangle'. The student interviewed the heads of 60 farm households by means of semi-standardized questionnaires. Quantitative data was analyzed with descriptive statistical tools and by means of parametric and non-parametric tests.

THE CASE OF WEST AFRICA

Land tenure & land policy in Benin & Niger

Land tenure systems in Niger evolved in pre-colonial periods under the following conditions: due to a moderate population density, land for agricultural use was abundant. Consequently, the practice of shifting cultivation was the most adapted and prevalent farming system. Control of labor was much more important than control of land. A closely-knit social structure formed by clans, lineages, and extended families had developed over hundreds of years. The predominant production objective was to cover the requirements of the village community. Land was not only a

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factor of production but also an inheritance from the ancestors and an object of cultic veneration. This explains the principle of land inalienability, meaning that land cannot be sold. "Property rights" were vested in the group while the individual has only use rights. His legal status was exclusively derived from his membership to a certain group.

In rural societies of Southwest Niger, land distribution has been the task of the village chief who is the descendant of the person having cleared land first. He allocates land depending on the demands and working capacities of the different families. While indigenous families occupy the most fertile places around the village, immigrants are given plots in the outer circle of the village territory. These have to give a small share of the harvest as a symbolic rent to the village chief or the respective landowners.

Increasing land pressure and influence of urban centers on rural areas induce the individualization of land tenure which is especially enforced in regions with a major share of perennial crops as in the oil palm region of Southern Benin. Moreover, social norms such as the inalienability of land and the legitimacy of 'traditional' authorities are coming under increasing scrutiny. In peri-urban areas, land markets are monopolized by urban purchasers whose interest is less in making productive use of the land and more in speculation or risk insurance. Many of these newly acquired plots are then leased to tenants.

Impact of land tenure on land use systems and soil conservation in Benin

Non-owners in local land tenure systems face severe restrictions as regards their land use practices. For example, tenants are not allowed to plant trees or other perennials because trees are used as a mark of ownership rights. Moreover, because rental contracts are informally arranged, and contract periods are relatively short, tenants lack the incentives to make long-term investments and cultivate the rented fields in a sustainable way. The willingness to invest in the long run is significantly higher on operated-owner fields than on leased, borrowed, or pledged fields with only medium or short-term use rights. This is particularly evident in the incidence of tree planting. In this survey, land owners planted more than 200 trees per hectare on average, while the number of trees per hectare on non owner-operated fields with medium and with short-term use rights were only 26 and 6.3 respectively.

In Southern Benin, the share of land cultivated by non-owners in the total area is steadily increasing with growing population pressure and influence of urban dwellers on rural land markets. This implies that with growing demand for the promotion of sustainable land use systems (e.g., agroforestry practices, perennial cropping), the potential for their introduction declines (Neef and Heidhues, 1994).

In addition to increasing land scarcity, unregulated land markets have escalated conflicts of land property rights in Southern Benin. Land use conflicts raise social costs in rural areas and hamper the application of long-term soil amendments (Table 1).

Impact of land tenure on resource management and erosion control in Niger

Soil and water conservation measures and techniques to restore soil fertility are considered as a necessary condition to preserve the life basis of the majority of the rural population of Niger in the long run (Gorse and Steeds, 1987; Toulmin, 1991; Rochette, 1988). A technique that is very efficient for fighting wind erosion and to improving soil fertility is the spreading of crop residues (in particular millet stalks) on the harvested fields (Bationo and Mokwunye, 1991; Buerkert, 1995). A necessary precondition for the application of this method are exclusive and permanent use rights of the farmer on his fields. In Niger, however, these use rights are limited to the cropping period. During the harvesting of the millet or sorghum fields, the farmer can collect stalks for construction or animal feed. If a resource-poor farmer does not have enough crop residues for his own needs, he can ask for the permission to collect stalks from the fields of other farmers who can not refuse due to social custom. When all crops are harvested, the remaining crop residues become public goods. They can be used by all villagers and by pastoralists passing by with their animals.

The establishment of windbreaks faces similar problems. The prohibition of tree planting was already discussed in the case of Benin. In addition, if agricultural fields are used as pastures by herds of pastoralists during the dry season, the protection of tree and bush seedlings is nearly impossible. The only possibility to prevent animals from destroying new plantations is to construct fences, which is both labor- and capital-intensive and therefore exclusively done to protect commercial fruit trees with high economic returns, such as mango. Thus, it is not surprising that on less than five per cent of all fields cultivated by landowners erosion control measures such as spreading of crop residues and establishment of windbreaks were applied (Table 2). Not one single field cultivated by a non-owner was actively protected against erosion.

Mineral fertilizer consumption in Niger is the lowest in the world and amounts to only 0.3 kg of plant nutrients per hectare on average (World Bank, 1997). The most important way of restoring soil nutrients is the application of animal manure either by transporting it from the animal compound to the field or by fixing corralling contracts during the dry season with pastoralists who are paid in cash or in kind. In the latter case, the animals stay overnight in a corral on the farmer's field in order to fertilize it. The corral is regularly moved so that the whole field benefits from the manure. Evidence from Niger suggests that these fields receive 5 to 13 times more manure than average village land (Hiernaux et al., 1997). Many pastoralists use these contracts as a trump in case of land conflicts (Loofboro-Hasley, 1994) and as a strategy to obtain and secure permanent land use rights from private landowners or local leaders (Neef, 1997).

The majority of the landowners as well as tenants with medium-term use rights (six years and more) use animal manure to improve soil fertility (Table 3). No significant differences between these two groups could be found, whereas non-owners with short-term use rights (less than six years) used animal manure to a significantly lesser extent

Table 1. Influence of land use conflicts on the use of long-term soil amendments in the study regions of Southern Benin.

	Fields with land use conflicts	Fields without land use conflicts
Use of long-term soil amendments ¹	0.0% (0)	20.4% (56)
No use of long-term soil amendments	100.0% (11)	79.6% (218)
Total land area with annual and biannual crops	100.0% (11)	100.0% (274)
Median-Test	Chi-square = 2.7979	p-level=0.0944+

¹Clearing without burning; mulching; improved rotation

Table 2. Influence of land rights on the application of erosion control measures in rainfed farming in Southwest Niger.

	Owner-operated fields	Non owner-operated fields
Application of erosion control measures ¹	4.3% (5)	0.0% (0)
No application of erosion control measures	95.7% (130)	100.0% (122)
Total cultivated area	100.0% (135)	100.0% (122)
Median-Test	Chi-Square = 4.61	p-level=0.0318*

¹Crop residues, windbreaks

Table 3. Influence of type and duration of land rights on the use of animal manure in rainfed farming in Southwest Niger.

	Owner-operated fields with long-term property rights	Non owner-operated fields with medium-term use rights	Non owner-operated fields with short-term use rights
Use of animal manure	51.9% (70)	53.2% (41)	26.7% (12)
No use of animal manure	48.1% (65)	46.8% (36)	73.3% (33)
Total land area with annual and biannual crops	100.0% (135)	100.0% (77)	100.0% (45)
Kruskal-Wallis-Test	H(2, N=257)=9.82	p-level=0.0074**	

Table 4. Tenure status of different land use systems in Song Da watershed, Son La province, northwestern Vietnam. From SFDP, 1994.

Land tenure status	Valley based systems		Upland based systems	
	Paddy based system	Diversified system (paddy/others)	Medium altitudes (< 800 masl)	High altitudes (> 800 masl)
Land use certificate/ permitted tenure	48%	66%	25%	5%
Without permits	51%	34%	73%	95%
Rented	1%	2%	2%	0%

than the other two groups. Some of them feared that the landowner would reclaim the land back if he noticed that soil fertility was improved.

THE CASE OF SOUTHEAST ASIA

For the last 30 years government policies towards ethnic minorities living in erosion-prone highland areas of Northern Thailand and Northern Vietnam have been led by top-down approaches following the concept that minorities are a threat to both natural resources and national security and have to be encouraged to settle in 'fixed' villages and to adopt permanent agricultural practices or to be moved out from fragile highland areas.

Land reform in Vietnam and long-term investments in soil conservation

Land tenure and land policy in Vietnam

Recent land allocation policy in Vietnam has evolved through three main reforms all directed towards greater individualized land ownership and control. Firstly, the Directive 100 in 1981 initiated a first stage in devolution of responsibility for production to farm households. Secondly, Resolution 10 in 1988 led to a large-scale decollectivization in most parts of the country (Tran Thi Van Anh and Nguyen Manh Huan, 1995). The third stage, initiated in 1993, has allocated land use rights to farm households providing long-term security for agricultural activities (Dao The Tuan, 1995; Rambo et al., 1995). The 1993 Land Law, based on

the principles of the 1992 Constitution, guarantees to farmers long-term use rights for a period of 20 years (for annual crops and aquaculture) to 50 years (for forest and perennial crops). In the first five years of implementation of this law, *Red Book Certificates* by which these leases are confirmed, have been distributed mainly in urban centers and in the main lowland rice growing areas. Ethnic minorities in the uplands appear to be last in line to obtain formal land use rights (Wandel, 1997; Kirchmann and Neef, 1999).

Table 5. Strategies of farmers to secure land rights in two villages situated in a reforestation area of Northern Thailand (sample of 30 households per village). Data from Knuepfer, 1997.

Strategies to secure land use rights	Respondents (%)
Planting of fruit trees	85
Planting of other perennial crops (e.g. tea)	15
Converting rainfed fields into paddy fields	22
Abandoning fallow systems	22
Applying erosion control measures	13
Construction of fences	8

Securing access to land use certificates by adopting soil conservation measures

Research in particular upland areas by Rambo and Le Trong Cuc (1995), Bergeret (1995), Hirsch and Nguyen Viet Tinh (1996) and Mellac (1997) all indicate that land allocation processes in the uplands often lack transparency and provoke inequalities among ethnic minority groups and between individuals. This is confirmed by interviews with key persons (village headmen, party secretaries, cadastral officers) in various villages of Yen Chau district, Son La Province as well as Ba Bê district, and Cho Don district, Bac Kan Province carried out by the author from 1997-1999.

In Son La Province the implementation of the land allocation process has been initiated in the valleys rather than in the uplands (Table 4). Thus, the Black Thai who occupy most of the paddy rice area have been favored by the land allocation process, whereas land tenure of the majority of the Hmong cultivating exclusively the high altitudes remains without any legal status. Similar processes can be observed in Cho Don District, Bac Kan Province, where long-established Tay families who hold the political and administrative power control both the redistribution of lowland paddy fields as well as the allocation of sloping lands and forest areas. Thus, the Kinh and especially the Dao minority people are directly disadvantaged by being forced to give up their extensive agricultural practices with long fallow cycles due to lack of land resources. For the Dao, the shift from *slash and burn* agriculture to permanent agriculture has led to immense problems of adjustment in farming systems (Mellac, 1997).

For some years, local scientists have been promoting agroforestry systems against erosion in sloping land. Most of the agroforestry systems currently promoted in Bac Kan Province follow the patterns of Sloping Agricultural Land Technology (SALT) created by the Mindanao Baptist Rural Life Center in the Philippines. Although Dao minority farmers did not perceive soil erosion to be a major problem in this region, they adopted the new system to demonstrate their willingness to practice 'conservation farming'. However, they did not use the stalks and leaves of the bushes to improve soil fertility and stop erosion in the uplands, as recommended by extension workers, but carried the mulch to their lowland paddy fields to improve rice yields.

In summarizing experiences from Montane Mainland of Southeast Asia (MMSEA) Rerkasem and Rerkasem (1998) conclude that "preventing soil erosion has never been found to be among the farmer's primary land use objectives" (p. 1328). Thus, soil and water conservation practices often serve functions that are not taken into account of by government agencies. Farmers in Cho Don District, Bac Kan Province, stated that they adopt soil conservation to secure their long-term land use rights. In this area, the adoption of soil conservation measures was often a precondition to obtain land use certificates in sloping land.

Farmers' responses to forest policy in Northern Thailand

Land tenure and forest policy in Northern Thailand

In the highlands of Northern Thailand, agriculture is in conflict with government interests as many ethnic minority villages are located in areas that have been declared as forest reserves, watershed areas and wildlife sanctuaries. Many ethnic minority villages are currently facing problems of land insecurity due to extensive reforestation activities of the Royal Forest Department, which started in the late 1980s to early 1990s. As a consequence, many villages lost considerable parts of their farmland. Additional pressure comes from high birth rates and continuing immigration from neighboring countries. Along with growing market influences through improvements in infrastructure, this induced considerable changes in agricultural land use patterns (Turkelboom et al. 1995).

Strategies of farmers to prevent land claims by forest authorities

The responses of farmers in Mae Chan and Mae Salong watershed, Chiang Rai province, to increasing land insecurity caused by reforestation activities were manifold. The most common strategy was planting fruit trees or tea, as it was generally believed that forest agents would not claim land that has already been planted with fruit trees and other perennial crops. Similar to the West African case, trees were seen as a mark of ownership. Another strategy was the conversion of rainfed land into paddy fields. Wet rice cultivation on terraced land is regarded as a sustainable agricultural practice and supposed to protect farmland from claims of the Royal Forest Department. The same applies for the use of contour lines and hedgerows, even if the farmers

cannot see any direct economic benefit from these measures. Erosion control measures were promoted by a local Non-Governmental Organization (NGO) in the village of Ban Pakhasukjai. Like the construction of rice terraces, the establishment of contour-lines is labor-intensive and costly. Therefore, these practices were only applied in Ban Pakhasukjai where the local NGO was extending credit to farmers willing to practice 'conservation farming'. Farmers in Ban Thad, where no project was active, have developed another strategy: they shift from fallow to permanent cropping systems after being informed that fallow fields are extremely jeopardized by claims of the forest authorities (Sangkapitux, Neef and Knuepfer, 1999; Knuepfer, 1999).

As farmers do not have enough time to adapt to the new agricultural practices and often lack the knowledge in appropriate fruit production and establishment of erosion control measures, performance of these practices is often poor and economic returns are insufficient. However, many villagers stick to these activities, as they want to demonstrate their 'environmental awareness' to the authorities, thus hoping to receive Thai citizenship and not to be expelled from the watershed where their settlement still has no legal basis (Sangkapitux, Neef and Knuepfer, 1999; Knuepfer, 1999).

CONCLUSIONS

The results from the four countries suggest that tenure insecurity does not inevitably lead to decreasing investments in land and that the relationship between land tenure and soil conservation measures is not necessarily unidirectional as often stated. Uncertain land rights can even enhance tree planting and adoption of erosion control measures if farmers believe that these investments will increase long-term tenure security. Marginalized groups like women and tenants within both customary and officially recognized tenure systems, however, are often forced to adopt agricultural practices that are not environmentally sound. Land registration and land reform programs tend to favor the groups with relatively secure rights (e.g., land owners in high-potential lowland areas) but disregard the really disadvantaged groups, namely tenants with short-term use rights, forest-dependent people, and ethnic minorities.

It can be concluded that sustaining environmental resources does not primarily depend on whether the property rights regime is based on communities or individuals or whether farmers have titled land or not. The most important question is whether property rights regimes are congruent with their ecological and social context (compare Bromley, 1991; Hanna and Munasinghe, 1995; Adger et al., 1997). Examination of these issues is the key to understanding resource management strategies of farmers and the potential impact of externally imposed property rights on their continued sustainability.

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