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Farmer’s perception and response towards land policy and eco-environment based on participatory rural appraisal: A case study in the Loess hilly area, China

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Key words: Perception and response, land policy, eco-environment, Loess hilly area, China

SUMMARY

Based on a survey of 107 farm households by means of participatory rural appraisal, this paper presents a region-level analysis of farmer’s perception and response towards land policies and eco-environment in the Loess hilly area, China. The surveyed farmers are divided into two groups, farmers on non-irrigated farmland and farmers on irrigated farmland. The results indicate that most farmers mainly depend on cropland, especially the farmers on non-irrigated farmland. Farmers believe that stability and persistence of land policies are important, and most hold a positive attitude towards the Grain-for-Green Programme. The farmers on irrigated farmland have a more favourable attitude to environmental conservation than the farmers of non-irrigated farmland. Nearly 80% of interviewees consider that the local eco-environment has improved in the last ten years. About 45% never consider the environmental impact of their agriculture practices. About 55% think drought is the most important reason for eco-environment deterioration, over-grazing and serious soil erosion. Soil and water conservation is not conscious and voluntary behaviour for farmers, it is only a measure to guarantee their basic agricultural production and to improve their living conditions. Results indicate that farmers on non-irrigated land find engineering approaches more beneficial to agronomic methods. However, the farmers on irrigated farmland pay more attention to improving farmland quality.

INTRODUCTION

Land degradation is a phenomenon with serious social, economic and environmental implications; it is directly caused by natural processes, but is also strongly influenced by human actions. In recent

years, more efforts have been made to incorporate socio-economic issues into the study of land degradation, although there is still a gap between the understanding of natural and human causes and

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consequences of land degradation (Carvalho *et al.* 2002). Land use is the result of interactions between physical factors and human activities. Land-use change can result in land degradation, such as water and soil loss and land desertification. It can also control water and soil loss and land desertification, and improve soil quality (Fu *et al.* 1994, 2004; Islam and Weil 2000). In some regions, if there are no distinct differences between physical environmental conditions, like topography and climate, farm households' behaviour is one of the most direct and crucial factors affecting land quality (Ouyang *et al.* 2004). Farm households affect land quality and environment via their methods of resources utilization, especially their land use decisions. Land-use change may influence many natural phenomena and ecological processes, including soil nutrients and water, water runoff and soil erosion (Fu *et al.* 1999, 2000), biodiversity and biogeochemical cycles (Freemark and Merriam 1986; Correll *et al.* 1992). In China, in the past, the public's land management decisions were largely determined by the state. Public perceptions and land management practices were somewhat separate. However, after a series of land reforms, the state's influence on public land management decisions has decreased. It is expected that the general public will now manage their lands in accordance with their own perceptions to a greater degree in the future (Lee and Zhang 2004). Farm households have already become the main body for investment, management and production in rural areas, as well as the basic unit of decision-making. Their land-use types and management methods may affect land quality and eco-environment in different ways and to various degrees. So farm households' land-use decisions would influence sustainable land use. Differences in farm households' decision-making in agricultural production are influenced by their income level, income source, degree of their dependency on farmland and land-use policy.

The Loess Plateau in the middle reaches of the Yellow River basin in North China is well known for its high erosion rate and heavy sediment load. Currently, surface soil loss in most hilly areas of the Loess Plateau is at approximately 5000–1000 Mg km⁻²year⁻¹ (Chen and Luk 1989; Chen *et al.* 2001). Soil erosion leads to undesirable on- and off-site effects, and is one of the most important forms of land degradation in China and is the main obstacle to sustainable land use in the Loess hilly area (Fu

1989; Fu and Chen 2000). Serious soil erosion is caused by factors such as highly erodible soil, steep slopes, low vegetation cover, etc. Irrational land use is one of the most important reasons for serious soil erosion in the area (Fu 1989; Fu and Gulinck 1994; Chen *et al.* 2003). Controlling soil erosion is a significant factor in sustainable land-use planning for the Loess Plateau. Soil and water conservation programmes designed with little reference to the perceptions and capacities of local people have often failed, as they were not perceived by the local residents to be effective. Outsiders cannot necessarily identify local needs and priorities or figure out how best to meet them. Local people have invaluable experience and a specialized understanding of their own environment (FAO 2000). In recent years it has become increasingly recognized that resolving land degradation is better achieved by winning over the local population than by imposing an 'expert' solution from above. However, little research has so far been conducted into the environmental perceptions of the general public in China. The study of farm household behaviours and perceptions is very important for comprehensive watershed management and sustainable development in the Loess hilly area.

The objectives of this paper are: (1) to compare differences of perception and response towards land policy and eco-environment in the two groups of farmers; (2) to explore the issues of regional development based on farmer behaviour; and (3) to suggest sustainable land-use policies for the study area.

STUDY AREA AND METHODS

Study area

The study area, Hengshan county, is situated in the north of Shaanxi Province, northern China (37°22'–38°74'N, 108°65'–110°02'E), bordered in the south by Maowusu Desert and in the north by the Loess Plateau. The study area is one of the areas in China that have the most severe land degradation problems. Local agriculture is mostly rain-fed, and the major constraints are water and nutrient availability and erosion. The area is about 4281.6 km², with an altitude from 887 m to 1552 m, and slopes ranging from nearly flat valley bottoms to very steep (> 50°). Land is mainly divided into hills and gullies. The climate is semi-arid

continental, with an average annual temperature of 8.6°C (maximum 23°C in July; minimum −9°C in January) and an average of 2815 h of sunshine each year; there are 146 frost-free days. The average annual precipitation is 403 mm, and over 60% of rainfall occurs between July and September. The soil is mainly loess (somewhat arenaceous), and is characterized by a loose structure and high erodibility. Land-use categories mainly comprise irrigated, slope, terrace, and check-dam farmland (flat land behind a dam, which has filled with silt deposits and is normally used for crops), orchards, grassland, shrubland, woodland, roads and residential land. Common crops are millet (*Panicum miliaceum*), maize (*Zea mays* L.), beans (*Phaseolus vulgaris*), sorghum (*Sorghum* spp.), paddy rice (*Oryza sativa*) and potatoes (*Solanum tuberosum*). The natural vegetation is poor due to long-term cultivation.

The total population of Hengshan is 324,200, with an agricultural population of 296,500 (91.5% of the total population). Agriculture is the principal economic activity in the area. Total value of industry and agriculture is 7.26 billion Yuan (RMB) and average net income per farmer is 1185 Yuan (RMB) (Bureau of Statistics of Hengshan County 2002). More than 90% of the county's agricultural output is generated by subsistence farmers who use traditional tools and farming practices. Low productivity characterizes local agriculture. Cash income for household financial requirements is mainly generated from sale of livestock and crop products. A limited number of households generate off-farm income.

Methods

In order to explore farmers' attitudes and perceptions towards land policy and eco-environmental change, a questionnaire survey of farmers was carried out in July 2004. A face-to-face survey was conducted using the Participatory Rural Appraisal (PRA) technique. Before the formal survey, a pilot study was conducted in July of 2003 in order to reveal any possible misinterpretation of questions and ambiguity in response categories. The information collected in the informal survey helped to guide the development of the formal questionnaire.

The survey included closed and open questions. The first aimed to characterize the interviewees and investigate their attitudes, perceptions and

responses towards land policy and local eco-environment. The open-ended questions sought to elicit more detailed information on the issues faced in agricultural production. The ensuing interpretation of the survey was based not only on quantitative data, but also on analysis of farmers' responses to the open-ended questions.

According to physical conditions, administrative districts and integrated economic factors, all the respondents were selected by stratified multistage sampling. A total of 112 farm households were randomly selected and interviewed. There were 107 completed valid questionnaires. The questionnaire data were analyzed using SPSS 11.5.

RESULTS AND DISCUSSION

Basic information of interviewees

Table I summarizes the demographic and other basic information for the respondents. Among the 107 interviewed farmers, 73.8% were male and 26.2% were female. The average age was 46, ranging from 17 to 73. Families were composed of 4–6 persons. About 66.4% of households have two working members. Nearly half of the surveyed households (49.1%) depend mainly on subsistence agriculture because of little alternative employment. Only 34.9% of farm households obtain some income from off-farm work. About 36.4% are satisfied with their current living conditions, while 43% think that their current conditions are mediocre, and the remaining 20.6% are dissatisfied with their current conditions. The literacy level of interviewees is generally low. Education would have a profound influence on the farmers' general perception of the land policy and eco-environment, which would also affect their ability to gather information and adopt new production technologies.

According to physical conditions and the farmland type, the surveyed farmers are divided into two groups, farmers on non-irrigated farmland (located in the hilly area, far from the river and cannot be irrigated, precipitation is the only water source for agriculture) and farmers on irrigated farmland (located in the flat open area near the river, and can be irrigated), to compare their perceptions and responses towards land policies and eco-environment. There are 57 farmers on the non-irrigated farmland, and 50 on irrigated farmland. There was little difference between the

Table 1 Basic information on interviewees: % of respondents

Category		Total	Non-irrigated farmland	Irrigated farmland
Gender	Male	73.8	70.2	78.0
	Female	26.2	29.8	22.0
Education	Literacy	29.9	31.6	28.0
	Elementary school	35.5	36.8	34.0
	Junior high school	21.5	19.3	24.0
	Senior high school	11.2	10.5	12.0
	College and above	1.9	1.8	2.0
Occupation	Planting	81.3	82.5	80.0
	Stock raising	4.7	5.3	4.0
	Service industry	1.9	0	4.0
	Transportation	0.9	0	2.0
	Other	11.2	12.3	10.0
Family members	< 4	19.6	21.1	18.0
	[4,6]	68.3	71.9	64.0
	> 6	12.1	7.0	18.0
Labour force	< 2	7.5	12.3	2.0
	= 2	66.4	66.7	66.0
	> 2	26.1	21.1	32.0
Off-farm work	Yes	49.1	56.1	40.8
	None	50.9	43.9	59.2
Satisfaction with life	Positive	36.4	29.8	44.0
	No preference	43.0	45.6	40.0
	Negative	20.6	24.6	16.0

occupations of the two groups. Only a very low proportion of income comes from off-farm sources. The farmers on non-irrigated land have limited access to markets, and cash for household requirements is mainly generated from sale of live-stock and crop products; farmers on irrigated land have more opportunities for off-farm work. Some differences exist between the two groups in attitudes towards their current living conditions. Nearly a quarter of the respondents (24.6%) of non-irrigated farmland are dissatisfied with their current conditions. However, the proportion of unsatisfied respondents is relatively low for irrigated farmland farmers.

Farmers’ attitudes towards policies

In the current situation on the Loess plateau in China, all families have land use rights without ownership; any form of exchange of land is prohibited, and the fields are scattered throughout the area. Most interviewees comprehend and uphold

the current land policies, and 64.2% approve the policy (where the farmer signs a 30-year contract with the local government) that the land will not be redistributed within the time of the contract. Farmers think stability and persistence of policies are crucial factors affecting their decision-making. If farmers consider the land policy is unstable or the contract is too short, they will not increase their investment or adopt the long-term return technology. Therefore, 93.4% of respondents want to maintain the current status after contracts expire. Land is fundamental to survival to the local people, so they do not want to abandon their farmland and engage in off-farm work. About 86.8% of respondents believe that farming is the farmers’ duty and to abandon the land is to lose their life-blood; 72.9% believe that leaving home for a living outside is not an option, particularly farmers of non-irrigated farmland (85%). Many farmers do not like to make a living outside or taking a risk with off-farm work unless it meets their basic requirements (food and clothing).

In addition, property rights and stability are very important in land use, and for successful sustainable land use. Property rights affect adoption of soil and water conservation practices at the farm level (Napier 1992). Frequent land reallocation has been a source of tenure insecurity and a disincentive for the farmers to invest in land protection works (Bewket and Sterk 2002, Daba 2003). Length or duration of use of land positively influences conservation decisions because a longer period of control will give farmers a sense of tenure security and, as a result, encourage them to have longer planning horizons. To the question 'would prolonging the length or duration of use of the land in the contract increase the farmland investment?', about 69.8% of the respondents answered positively, as also found by Shi (1997). Farmers are willing to protect their lands and agriculture production in a sustainable way but are limited by short-term land tenure and changes in policy.

There are obvious differences of perceptions between the groups towards land policies. About 58.9% of respondents on non-irrigated farmland approve the policy that the land should not be redistributed within the contract period due to increasing population, and 70% of irrigated farmland respondents hold the same view. About 91.1% of respondents on non-irrigated farmland believe that farming is their duty and to abandon the land is to lose their life-blood, and about 82% of respondents on irrigated farmland agree. With the physical constraints, traffic and accessibility of information, etc., the opportunity for off-farm work was low for farmers on non-irrigated farmland, and 85.7% believe that leaving home for a living outside is no solution; only 60% on irrigated farmland agree. Land quality of non-irrigated farmland is not as good as that of irrigated farmland, but the former farms are larger. More convenient transportation, information access and limited farmland, reduce the dependency on farmland for the farmers of irrigated farmland and affect the farmers' perceptions and attitudes.

In 1999, the Chinese government initiated a massive conservation set-aside programme, the Grain-for-Green Programme, to reduce soil erosion and improve the eco-environment in western China through the retirement of sloping agricultural lands and conversion to forests or grassland. About 51% of the farmers support and are glad to accept the policy; about 37.4% support it but need technical support and capital; 5.8% have no idea

about it and just obey the government's order; and only 5.8% oppose the policy.

There are variations in the responses to Grain-for-Green: only 2.1% on irrigated farmland oppose the policy, which is much lower than that of non-irrigated farmland (8.0%). Because the farmers on irrigated farmland have little hilly land, most of their agriculture production is obtained from the limited irrigated farmland, and Grain-for-Green has little influence on their living. In contrast, farmers of non-irrigated farmland are the main participants in Grain-for-Green, and are reluctant to accept the programme because they would lose some of their cultivated land, which is fundamental to their survival. It is difficult for them to accept the policy.

Among the respondents, 67 farm households (62.6%) take part in Grain-for-Green, with 44 farm households (77.2%) on non-irrigated farmland and 23 farm households (46%) on irrigated farmland. Among the farmers involved in Grain-for-Green, 83.3% on non-irrigated farmland and 91.7% on irrigated farmland are glad to accept it completely. For the farmers of irrigated farmland, the total area of slope farmland is rather small, it is far from their homes, inconvenient to cultivate, and the yield is very poor. So they prefer to put more manpower and investment into the irrigated farmland of high quality with good cultivation conditions, or they engage in off-farm work to increase family income. Furthermore, the government compensates them for the related income losses, and they can get subsidies provided from the government. Farmers' attitudes and participations towards Grain-for-Green are closely related to compensation systems. Subsidies seem to be fundamental to the success of the programme. Overall, the farmers' attitudes are positive, especially the farmers of non-irrigated farmland. They consider that the programme will improve living conditions, but they worry about the duration of subsidy and whether they can really obtain premiums. Nearly 60% of the farmers of irrigated farmland consider it would not influence their lifestyle.

Farmers' perceptions and responses towards the eco-environment

The majority of interviewees (more than 80%) believe that eco-environment is very important, especially the farmers of irrigated farmland.

In spite of knowing the importance of eco-environment, few farmers consider the environment impact when they arrange agriculture practices, and 45% never consider the environment impact. The results suggest that economic aspects of agriculture and maintaining a livelihood are more important than a production system that gives priority to environmental constraints and sustainability. Nearly 80%, especially farmers on irrigated land, consider that local eco-environment is better than 10 years ago due to the national eco-environment protection policies and related projects. The environmental improvement is associated with lasting watershed management, especially the implementation of the Wuding River (the main river of the county) watershed management project. The project was implemented nearly 20 years ago, while the Grain-for-Green was only recently implemented, and has yet to take effect.

More than 55% of respondents attribute the eco-environment deterioration to climate change, and think that drought is the key factor, as do 63% of the farmers of non-irrigated farmland. More farmers of non-irrigated farmland (7.4%) than irrigated farmland (4.2%) consider that deforestation for household fuelwood and vegetation destruction are important reasons for eco-environment degradation. The opinions of the latter group may be related to their surroundings, inconvenient transportation and living habits. In the survey of the fuel sources, most farm households (97.9%) use coal, only 3.9% use natural vegetation and wood, the rest (1.9%) use straw and field residues. Among the farmers of irrigated farmland, 97.9% of households use coal and the rest (3.9%) use natural vegetation and wood. Among the farmers of non-irrigated farmland, 90.9% of households use coal, 1.8% use straw and field residues, and the rest (7.3%) use natural vegetation and wood. More than one-fifth of interviewees consider that eco-environment deterioration is induced by overgrazing, and 31.3% of farmers on irrigated farmland and 18.5% of farmers of non-irrigated farmland agree. The reasons for variation between the groups differ. First, because of the different cognition abilities of the farmers, and second, because overgrazing mainly happened in the non-irrigated farmland area. However, for the farmers of irrigated farmland, due to the constraints of physical conditions and local resources, their livestock-raising is rather small scale. They

cannot benefit from this action, but they must pay for the cost of the eco-environment, so their responses are relatively strong. In spite of relating soil erosion to land exhaustion, more than 90% of the farmers interviewed did not perceive intensive cultivation as a deleterious practice. Local people have invaluable experience and a specialized understanding of their own environment, and 31.5% of farmers of non-irrigated farmland consider serious soil erosion is a key factor in eco-environmental deterioration, while only 12.5% of farmers of irrigated farmland think this is a cause. Soil erosion is mainly found in the hilly area.

There are five methods to deal with straw and field residues. Straw and field residues are mainly used locally to raise livestock, but there are variations between the groups because of different surroundings. There are four methods used by farmers of irrigated farmland: (1) returning residues to the field (6.3%); (2) using them to raise livestock (79.2%); (3) selling them (2.1%); and (4) burning and returning them to the field (12.5%). There are three treatments used by farmers of non-irrigated farmland: (1) burning as fuel (1.8 per cent); (2) using them to raise livestock (94.5%); and (3) burning and returning them to the field (3.6%). Compared with the farmers of non-irrigated farmland, the farmers of irrigated farmland hold less farmland and raise livestock on a smaller scale. So the proportion of straw and field residues used to raise livestock is low. It is necessary to increase investment or improve land quality to obtain more agricultural outputs with limited farmland. As far as improving the land quality, the farmers of irrigated farmland have a more positive attitude than farmers of non-irrigated farmland. The proportion returning straw to the field (including burning and returning to the field) is up to 18.8%. Only 3.6% of farmers on non-irrigated land burn straw and return it to the field, and none of the respondents return straw directly to the field; straw and field residues are mainly used to raise livestock in the non-irrigated area.

Soil erosion can be controlled by a change in land use and/or by the application of appropriate soil and water conservation techniques. However, solutions cannot be found independently of the land users. Therefore, participation of land users in the development and application of technical solutions to prevent soil erosion is crucial in such activities. Recommended solutions should

be technically feasible, economically viable, and socially acceptable for the local end-users and stakeholders in order to guarantee success of the projects. In the survey of inclination to adopt soil and water conservation measures (Table 2), planting trees and grass is a favourite choice for farmers in both groups (74%). This is associated with the government's eco-environment protection and related policies. Planting trees and grass are recognized as an essential tool to prevent and combat soil erosion and land degradation in threatened or damaged areas. Farmers can get a premium from planting trees and grass according to some encouragement policies. In addition, the government has increased investment in planting trees and grass and recently intensified the supervision of these projects.

With the implementation of these projects, the local eco-environment improves, so the farmers are enthusiastic about planting trees and grass. There is no clear difference between the groups in fallow and rotation, as farmers' planting decisions were mainly decided by local conditions. Crop rotation every other year and agriculture production is adapted to local conditions. The socio-economic situation of farmers affects their capabilities to implement environmentally viable soil and water conservation measures and affect farm practices and attitudes towards rational use of resources (Daba 2003). As a result, farm households may have different soil and water conservation decisions for different plots, depending on the specific circumstances of a plot and the importance of the plot to the household economy (Bekele and Drake 2003). Farmers may take into account both economic incentives and other non-economic factors.

Table 2 Willingness to adopt soil and water conservation measures: % of respondents (respondents could choose more than one option)

Category	Total	Non-irrigated farmland	Irrigated farmland
Contour cropping	2.0	3.6	0
Constructing terraces	26.5	30.9	20.9
Planting trees and grass	74.5	74.5	74.4
Fallow and rotation	4.1	3.6	4.7
Other	12.2	12.7	11.6

Previous studies have related farmer's adoption behaviour to personal, physical, economic and/or institutional factors (Ervin and Ervin 1982; Lapar et al. 1999; Milham 1994; Pender and Kerr 1998). Farmers of irrigated farmland prefer to put more manpower and investment into the irrigated farmland, which is high quality and has good cultivation conditions. They do not like to construct terraces, or take agriculture measures such as contour cropping. But farmers on non-irrigated farmland are more dependent on cropland because of limited survival strategies. The farmers of non-irrigated farmland prefer engineering approaches to agronomic methods because they can get more benefits in terms of future agriculture production. But, compared with agronomic methods, engineering approaches require relatively high capital and labour inputs for construction and maintenance, and this is a vital limiting factor for local development. As reported by Bekele and Drake (2003), project assistance to cover the initial investment cost for conservation structures is expected to have a positive influence on soil conservation. Design and implementation of appropriate support programmes, particularly for initial investment in conservation, may result in the retention of farm labour and subsequent investment in soil and water conservation.

Soil and water conservation is not a conscious and voluntary mode of behaviour for farmers, but a measure to guarantee their basic agricultural production and improve their living conditions. Farmers are unlikely to adopt soil and water conservation measures unless they will improve their immediate well-being (Shiferaw and Holden 1997). However, this anticipation may not be realized in the short term due to the inherent long-term nature of such measures. Hence, use of incentives to compensate for such problems becomes inevitable and these can influence farmers' decisions of whether they should adopt soil and water conservation measures (Gao 1995). When farmers realize the destructive effect of soil erosion on agriculture production, they make decisions to control erosion, such as adjusting agricultural structure, adopting new technology, or increasing investment and the labour force.

Eco-environment protection is a fundamental policy in China and lots of manpower and capital have been invested in watershed management. According to the Chinese government rules, once

enrolled in the watershed management programme, farmers can obtain government training, technology support and a premium, which are all very important to eco-environmental protection (Wang 1999). Results of this survey imply that there are few respondents (7.8%) who have signed a watershed management contract with the local government. Only 9.1% of the respondents of non-irrigated farmland signed the contract. In the survey of whether relevant departments of local government had organized training for agriculture production and environment protection, none of the respondents gave a positive answer. Without farmers' participation, national conservation programmes are unlikely to be successfully implemented and continued. The scarcity of propagation and training for soil and water conservations and farmers' recognition of soil erosion are limited. So it is difficult for them to take any conservation measures on their own initiative.

CONCLUSIONS

Sustainability has become an important topic all over the world since the 1980s. As the basis of human survival and a principal aspect of sustainable development, agriculture has been the focus of national economic development. Farmers are the principal and direct participants of agriculture production, and their activities influence farmland quality and consequently impact sustainability of agriculture. Farmers' perceptions and attitudes towards land policy and eco-environment are interconnected with their behaviours and decision-making in agriculture production. This investigation suggests that the stability and persistence of land policies are more important for farmers in the Loess hilly area, especially for the farmers on non-irrigated farmland. Most of the interviewees support current land policies and have a positive attitude towards the Grain-for-Green Programme. They would choose different land-use types that are driven by short-term profit maximization. In their opinion, economic aspects of agriculture and maintaining a livelihood are more important than a production system that gives priority to environmental constraints and sustainability, because the impact of land use on the eco-environment would hardly affect their lives in the short term.

Local people have invaluable experience and a specialized understanding of their own environment, and exploring their perceptions is essential for environment protection and the sustainable development of this area. The majority of interviewees (>80%) believe that eco-environment is very important and the local eco-environment has improved over the last 10 years due to national eco-environment protection policies and related projects. However, nearly half of the respondents (45%) had never considered the environmental impact of their agricultural practices. More than 55% of respondents attribute eco-environment deterioration to climate change, overgrazing and serious soil erosion. Straw and field residues are mainly used to raise livestock, but there are some variations between the groups because of different physical surroundings. Although farmers are aware of the severity of soil erosion, soil and water conservation is not a conscious and voluntary behaviour for them, but a measure to guarantee their basic agricultural production and improve their living conditions. The farmers of non-irrigated farmland prefer engineering approaches to agronomic methods because they can obtain more benefits from the former. However, farmers on irrigated farmland pay more attention to improving farmland quality.

Eco-environment protection is a systemic project, and without the farmers' participation, national conservation programmes are hard to successfully implement and maintain. Development programmes designed with little reference to the perceptions and capacities of local people have often failed as they cannot be recognized by local residents. The scarcity of propagation and training for soil and water conservation results in farmers' limited cognition of soil erosion and difficulty in implementing conservation measures on their own initiative. For long-term support to be assured in future, policy should orient its efforts toward conservation incentive schemes, environmental education and technical assistance.

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