Sustainable livelihood approaches and soil erosion risks

Who is to judge?

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Abstract

Purpose – The purpose of this paper is to contribute to debates about environmental policy in developing countries by examining how far sustainable livelihoods approaches (SLAs) to development may allow an alternative and less universalistic approach to environmental changes such as soil erosion.

Design/methodology/approach – The paper provides an overview of debates about environmental narratives and SLAs. There are tensions in both debates, about how far local institutions represent adaptations to predefined environmental risks, or instead enable a redefinition of risks according to the experience of poor people. In addition, there is a tension in how far SLAs should be seen as a fixed institutional design, or as a framework for organizing ideas and concerns about development. The paper presents research on soil erosion in Thailand as a case study of how SLAs can redefine risks from erosion for poor people.

Findings – SLAs provide a more contextual analysis of how environmental changes such as soil erosion represent risk to different land users, and hence SLAs can make environmental interventions more relevant for reducing vulnerability. But this approach can only succeed if intervener agencies are willing to consider challenging pre-existing environmental narratives in order to empower local livelihoods.

Originality/value – The paper adds to existing research on SLAs by exploring the implications of SLAs for redefining environmental assumptions. The paper forms part of work aiming to make debates about the politics of environmental knowledge and science more practically relevant within development policy.

Keywords Environmental management, Soil erosion, Sustainable development, Developing countries, Thailand

Paper type Research paper

Introduction

In many upland areas of developing countries today, environmental policies are based on universal assumptions about the nature and causes of environmental risk (Kasperson and Kasperson, 2001). For example, in the mountains of northern Thailand, environmental risk is defined in terms of soil erosion and its potential impact on watershed properties. As a result, government policies seek to control erosion by restricting upland agriculture, relocating villages from the uplands, or covering large areas of land with teak and pine plantations.

This approach to environmental risk, however, is now increasingly challenged (Lash *et al.*, 1996; Wisner *et al.*, 2004). A growing number of researchers are instead urging that environmental risk should be seen more contextually, and less on the basis of universal assumptions about biophysical causes of risk. Yet, despite much discussion about the need for alternative approaches, researchers are still uncertain

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about how to implement policies that do not adopt universal approaches to environmental risk.

This paper considers the ways in which sustainable livelihoods approaches (SLAs) to development may be used for this purpose. SLAs have been adopted by development agencies since the 1990s as a way to reduce vulnerability and poverty through means such as income diversification and agricultural intensification (Scoones, 1998; Carney, 2003). Influenced by scholars such as Robert Chambers and Amartya Sen, SLAs aim to strengthen local resilience by enhancing institutions governing access to livelihoods and resources. Some analysts have claimed SLAs may allow poor people to adapt to, or reduce, environmental degradation by aligning environmental policy more with local environmental perceptions and vulnerability. But, some critics claim more work is required to make SLAs effective for governance (Arce, 2003), and their implications for governing environmental risks can be developed further.

The paper explores the potential use of SLAs in less universalistic environmental policy by considering soil erosion in the uplands of northern Thailand.

Northern Thailand and approaches to soil erosion

The highlands of northern Thailand[1] commonly inspire images of teak forests, Buddhist temples, lush green rice fields and remote hillside villages inhabited by colorful "hill tribes." Although the region is by no means as high as the snow-capped Himalayan ranges further west (northern Thailand's highest peak, Doi Inthanon, is just 2,565 m above sea level), the region is the most consistently mountainous region of Thailand. It is also the most remote region, with many valleys and hillsides unconnected to transport routes, and was only politically integrated into the rest of Thailand in the twentieth century.

Classically, northern Thailand has contained two main ethnic groups: the lowland Thai (*khonmuang),* who traditionally inhabited irrigated intermontane basins; and upland minorities (so-called "hill tribes" or *chao khao),* who historically practiced forms of shifting cultivation in the uplands. Upland minorities have also been divided into ethnic groups who have either lived in Thailand for as long as the lowland Thai (such as the Karen), and those who have migrated to Thailand from neighboring Burma, Laos and China during the twentieth century, and who typically cultivated opium. Some early studies of shifting cultivation in the region classified these groups into those using so-called "pioneer" forms of shifting cultivation, such as the Hmong, Mien and Akha (who relocated villages every 10-20 years in search of more land); and "rotational" cultivators, such as the Karen (who rotated agricultural plots around semi-permanent settlements) (Grandstaff, 1980). In recent decades, however, these distinctions have become blurred as both Thai and minorities inhabit the uplands, and forms of shifting cultivation have been replaced by more permanent and commercialized agriculture.

Both historic and current forms of upland cultivation have been blamed for causing environmental degradation, and particularly erosion. These views have long pedigrees. The British colonial scientist Spate (1945), writing about comparable areas in Burma, commented: "naturally, these practices are attended with serious deforestation and soil erosion." More recently, permanent agriculture has also been blamed for erosion as it reduces fallow periods and increases the intensity of land use. Some observers also fear that historically "pioneer" shifting cultivators may not understand the potential

long-term impacts of permanent agriculture. In 1987, the Bangkok think-tank, Thailand Development Research Institute (1987, p. 296) wrote:

> Whereas slash and burn agriculture was once more closely attuned with the ecosystems exploited, it now causes untold ecological damages … In the process, major watersheds are being denuded, with increasing silt loads washed down into the nation's rivers [and] silting up dams.

Deforestation is blamed for erosion for it reduces the canopy cover of soil, and frequently removes trees from the ground and disturbs soil. Cultivation also takes place on steep slopes, which encourages erosion. Sediment from the hills is blamed for silting up lowland dams and rivers. Erosion of soil is also considered to reduce its water-holding properties, which is seen to exacerbate lowland water shortages.

Critics have, in addition, claimed that opium-substitution policies cause environmental degradation. During the 1980s, various development agencies sought to replace opium cultivation with alternative, cash-based export crops such as cabbages, soya beans and strawberries. These crops have been criticized for either exposing too much upland land to rainfall and for providing too little binding of upland soils. Moreover, some NGO workers have also considered that attempts to integrate upland minorities within wider commercial networks may destabilize historic balances between farmers and the fragile upland environment. One upland-NGO worker wrote:

> Traditionally, the hill tribes used slash and burn tactics in a limited way – just to produce food for their families. But in trying to produce cash crops and satisfy the demands of the market, the tribes surpassed the natural capacities of the land, degraded by deforestation and erosion (Tuenjai Deetes, 2000, p. 1).

And some environmental NGOs have been even more explicit about the threat of erosion that may result from upland agriculture:

> Heavy rains wash away the soil, which quickly silts up dams, reservoirs and rivers … Every rainy season now, lowland paddies are buried under 2-3 m of sand … The evergreen headwater forest should be areas of strict conservation as their removal brings about environmental disaster (Svasti, 1998).

Consequently, various government and NGO initiatives have sought to enforce environmental policies that reduce agricultural pressure on upland soils. Policies include relocating villages from locations considered especially fragile for soil erosion; placing restrictions on cultivation on steep slopes; and reforesting large areas of land with teak and pine plantations. Plantations are claimed to help reduce erosion by protecting soil surfaces, and by reducing the need for upland agriculture by offering livelihoods in maintaining plantations instead. Grass strips on steep slopes have also been used, which aim to prevent erosion by reducing the length of the slope and hence the ability for water on slopes to gather speed. Most significantly, large areas of northern Thailand are now placed in various categories of protected land such as national parks and wildlife sanctuaries, which restrict agriculture. Currently, about 50 percent of the total northern region is classified as conservation forest. In some highly forested provinces such as Nan, conservation forest covers 80 percent of the provincial area (Ewers, 2003).

Questioning these concerns

Yet, these worries about soil erosion in northern Thailand may also be criticized for various reasons.

First, much research has questioned the assumptions made about causes and effects of erosion in Thailand. For example, research in the similar topography of the Middle Hills of Nepal has indicated that popular debates overlook the immense variation in environmental processes across time and space, and the role of non-anthropogenic causes of erosion such as monsoon rainfall and tectonic uplift (Ives and Messerli, 1989; Ives, 2004). In particular, many deep gullies that dissect upland areas may be naturally occurring (Smadja, 1992, p. 7). Other hydrological research elsewhere has questioned how far land-cover changes such as deforestation are necessarily linked to water shortages. Indeed, planting large-scale tree plantations may even decrease lowland supplies of water (Calder, 1999; Bruijnzeel, 2004).

A related finding is that estimates of soil erosion coming from the universal soil loss equation (USLE) (adopted as a guide in the USA after the so-called "Dust Bowl" crisis of the 1930s) may be overstatements in tropical regions (Hallsworth, 1987). Research has suggested that the USLE may simplify factors such as rainfall intensity (particularly the influence of storms) or the length of slopes, where farming practices provide breaks in slopes. Moreover, the USLE may focus too exclusively on erosion rather than on declining soil fertility caused by exhaustion of nutrients. In northern Thailand, slopes are frequently divided into complex household plots, and rainfall falls mainly between June and October, often in storms. In one study, Thitirojanawat and Chareonsuk (2000) found that the USLE predicted rates of soil loss in Nan province 104 times greater than those actually observed in run-off plots!

Second, research has also suggested that many farmers may mitigate environmental change by careful practices of adaptation. For example, classic research on shifting cultivation has argued that farmers are more skilled in managing species diversity and soil fertility than commonly thought (Conklin, 1954). Research has also questioned the relationship of upland cultivation and erosion. In Nepal's Middle Hills, anthropologists found that some hill farmers actually use landslides opportunistically to assist in the creation of terraced land, and that landslides may renew soil fertility by turning over soil (Kienholz *et al.*, 1984; Ives and Messerli, 1989, p. 90). Perhaps, most famously, Tiffen *et al.*'s (1994) study in Machakos, Kenya, demonstrated that "more people" could mean "less erosion" if farmers were able to build terraces, instigate soil conservation, and identify opportunities for trade and income diversification.

And thirdly, some analysts have argued controversially that fixed visions of environmental risk, such as those concerning soil erosion in northern Thailand, should be understood politically as attempts to legitimize state interventions and systems of control (Blaikie and Brookfield, 1987). Sociologists of scientific knowledge have given the name "environmental narratives" to some fixed notions concerning environmental risks, to indicate how very simple cause-and-effect stories have become accepted as incontestable, when in fact they are less certain than assumed. "Crisis narratives," Roe (1995, p. 1066) argued, "are the primary means whereby development experts and the institutions for which they work claim rights to stewardship over land and resources they do not own." And Hajer (1995, pp. 64-5) wrote: "Storylines [or narratives] are

devices through which actors are positioned, and through which specific ideas of 'blame' and 'responsibility' and 'urgency' and 'responsible behaviour' are attributed."

Consequently, analysts have argued that many fixed beliefs about the cause and effect of environmental problems serve political purposes in enforcing notions of social order or political authority that may not be as easy to achieve without these visions of risk.

How do these fixed visions of risk, or environmental narratives, occur? Scholars have argued that narratives "stabilize" conceptions of complex and uncertain biophysical events or change processes, in order to offer a managerially convenient summary of cause and effect. For example, in Guinea in West Africa, Fairhead and Leach (1996) argued that the state has blamed smallholder agriculturalists for deforestation because it believes population growth and inappropriate agriculture have contributed to the decline in forest areas. However, research that Fairhead and Leach summarize has shown that villagers have actually contributed to the conservation of forest areas, and that divisions between closed and savanna forest are complex and variable. Yet, as a result of the narrative, the government of Guinea has been able to defend a centralized approach to environmental policymaking, and instigate various restrictions on agriculture in rural areas.

One important concept in creating environmental narratives is "problem closure," which is when one specific definition of a problem is used to frame subsequent generation of knowledge about environmental causes and effects (Hajer, 1995, p. 22). Problem closure also reflects dominant patterns in society and politics, as well as the definition of technical expertise and who is allowed to participate in scientific discussion. Listening to alternative social needs, or diversifying the definition of expertise might therefore produce alternative forms of knowledge. In northern Thailand, the historic divisions between "uplanders" and "lowlanders," or ethnic minorities and Thais, as well as the desire of the state to bring this region under greater political control, seem prime ground for environmental narratives to emerge.

These various concerns have led analysts to argue that approaches to environmental risk should not be based on universal and predefined notions of cause and effect, but instead should be defined more flexibly, case by case. It is important to ask how far environmental changes present problems for different people; how far people are able to adapt to changes; and how far the definition of risk itself may affect their own political and socio-economic status. But at the same time, there is still uncertainty about how to integrate these concerns into an alternative form of environmental policy that can avoid the problems of oversimple standardized narratives.

In particular, it is not clear if more flexible approaches to environmental risk imply the need for greater adaptations to known risks, or the need to redefine the nature of risk in a more fundamental way. For example, Tiffen and Mortimore's work assumes that erosion is still a problem, even if people can adapt to, or avoid, it. In contrast, research in the Himalayas has suggested that erosion is not necessarily the chief cause of degradation, and that declining soil fertility, or overall lack of productive land, is a more accurate indication of what restricts livelihoods (Ives, 2004). Consequently, should alternative approaches to environmental policy still mean building institutions against predefined risks, or instead allow local people to reformulate the perception of risks?

One possible route for more flexible approaches to environmental risk lies through SLAs.

Sustainable livelihoods and environmental risk

SLAs within development studies are generally traced to the work of Chambers and Conway (1992), who argued that one can reduce poverty and vulnerability by increasing livelihood options, especially during times of economic or environmental stress. They wrote:

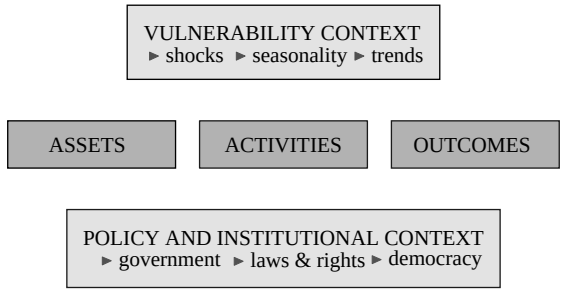
> [. . . a sustainable livelihood] can cope with and recover from stress and shocks, maintain and enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation; [it] contributes net benefits to other livelihoods at the local and global level and in the short and long term (Chambers and Conway, 1992, p. 1).

This and later discussions of SLAs have also been influenced by Amartya Sen's concepts of endowments, entitlements and capabilities, which discuss how poor people can access resources and livelihood options (Scoones, 1998; Carney, 2003). Endowments (and the related term of assets) cover a variety of types of resources (tangible and intangible, notably including institutional arrangements) that may allow individuals to achieve livelihoods and their chosen potential. Capabilities are the range of valued life-options (including life-paths over time) that people can attain (Alkire, 2002). SLAs seek to make institutional arrangements that guarantee a range of livelihood options, which can reduce the vulnerability and poverty of individuals. The term "sustainable" refers to different aspects of longevity: economic, institutional, social and environmental (Carney, 2003, p. 27).

SLAs may be described in various forms, but some authors have argued that the essence of SLAs should be to be flexible, and avoid having specific institutional designs that may restrict local determination of assets and capabilities (Ellis, 2000; Hinshelwood, 2003). Figure 1 shows one diagrammatic representation of SLA, which avoids having predefined lines of activity between local development problems (the vulnerability context), state-based policy contexts, and the middle-level development interventions that affect assets, activities and outcomes.

Self-determination of livelihoods and risks is a further key feature of SLA. Proponents hold that:

> Poor people themselves must be key actors in identifying and addressing livelihood priorities. Outsiders need processes that enable them to listen and respond to the poor (Ashley and Carney, 1999, p. 7).



Source: Adapted from Scoones (1998) and Ellis (2000)

Figure 1.
The basic sustainable livelihoods framework

> Sustainable livelihood approaches call for constant questioning of common assumptions and repeated reference to the effects of policy and actions on the livelihoods of the poor (Carney, 2003, p. 32).

Consequently, SLAs may be compatible with non-universal notions of environmental risk because they allow poor people to define risks as they perceive them. In effect, this means the problem closure of environmental interventions is derived from the perceptions of local vulnerability by poor people, rather than on the basis of externally predefined narratives about cause and effect.

This specific use of SLAs for local determination of risks has not always been made explicit in adaptations of SLAs by development agencies and research institutes since the late 1990s (such as, for example the UK's Department for International Development (DFID)). These uses of SLAs have instead developed three themes that may assist in social and economic access to livelihoods. SLAs have now generally focused upon furnishing different types of "capital" as resources for livelihoods. Usually five types of capital are identified: natural (natural resources), physical (infrastructure, technology); financial (including loans); human (personnel and training); and social (social cohesiveness). Second, livelihood strategies have been defined as agricultural intensification or extensification, livelihood diversification, and limited forms of migration. And thirdly, the ability to achieve or access these livelihoods have been seen as determined by a range of formal and informal organizational and institutional factors that influence sustainable livelihood outcomes (Scoones, 1998; Bebbington, 1999). Indeed, these three themes have been used as part of a tentative institutional design of the SLA that is transferable between contexts.

Despite these advances, some critics have argued that SLAs are insufficiently developed in political terms, or as tools of local governance. Some have suggested that SLAs should be reformulated as rights-based approaches in development, where participation is defined as the right to assert needs, rather than a "sham participation" in policymaking by poor people (Baumann, 2000, p. 34; Carney, 2003). At another level, others have claimed that an emphasis on institutional design and diverse "capitals" (such as natural, social, etc.) has made SLA "merely a confused diagram and a wordy manual" and that we should instead realize "community work is not easily captured in a diagram" (Hinshelwood, 2003, pp. 254, 243). This kind of argument underlies the desire to have flexibility in how SLAs are designed and described (Figure 1). Moreover, Arce (2003, p. 204) has argued that using words such as "capitals" in uncritical, easily transferred, ways may reduce the ability for local people to assert their own values in framing development policy.

In environmental terms too, there are questions about how SLA is applied. On one hand, some analysts have agreed that SLA implies a more livelihoods-focused approach for defining risk and resources. According to Scoones (1998, pp. 6-7):

> Natural resource base sustainability refers to the ability of a system to maintain productivity when subject to disturbing forces … This implies avoiding depleting stocks of natural resources to a level which results in an effectively permanent decline in the rate at which the natural resource base yields useful products or services for livelihoods.

In addition, DFID (2002) has argued that SLA can challenge some key environmental narratives that poor people cause or cannot adapt to environmental degradation. This approach fully adopts the new problem closure offered under SLAs because it allows

poor people to define both environmental problems and sustainable development because they are linked to activities that may reduce their vulnerability and secure sustainable livelihoods. This approach therefore gives precedence to poor people's definitions and uses of natural resources as a way to reduce vulnerability, rather than necessarily allow resources or environmental problems to be defined by other means.

In contrast, some environmental applications of SLAs have still adopted predefined definitions of risk, and have seen SLAs as ways to encourage local institutional adaptations to these risks. For example, writing about SLA and environmental science, Ashby (2003, p. 2) commented: "A reversal of environmental degradation requires new livelihood options that change people's incentives, in particular, the benefits and costs of resource use." This approach suggests that livelihood activities should be seen as operating in response to known risks and known potential damage to resources, rather than as redefining these risks or valuations of resources from the perspective of reducing local poverty and vulnerability. Similarly, a report from the United Nations' Food and Agriculture Organization has discussed SLA as a form of local institution that exists alongside methods of environmental protection, rather than as also a form of environmental protection itself. The report wrote:

> An environmentally protected area, such as a park or game reserve, represents a particular type of local institution that could link with the livelihoods of people living in the area in several ways … Successful conservation of wild animals within the area might increase the vulnerability of people living outside by having their crops destroyed or their lives threatened. On the other hand, in the longer term it may reduce people's vulnerability to natural disasters like drought or flooding by protecting watersheds, wetlands and local microclimates … (Messer and Townsley, 2003, pp. 16-7).

Such statements overlook the epistemological potential of SLAs by defining both the risks and the institutions in terms from outsiders, rather than acknowledging how the definition of livelihood strategies and risks are linked by poor people. Moreover, this statement adopts cause and effect statements about watershed and climate protection that may reflect simplistic environmental narratives. In this case, it seems that discussion of SLAs has been added on top of pre-existing notions of environmental risk, rather than being a way to specify this risk using the perspectives of vulnerable people.

SLAs therefore have been proposed as ways to build institutions around poor people's perceptions of resources and vulnerability, but critics have suggested that SLAs may still be dominated by outsiders' priorities for policy. Moreover, the link with environmental risks may still be developed further. The following example from Thailand tries to indicate how far SLAs can enable a more locally determined approach to defining environmental risk.

Example: soil erosion and livelihoods in northern Thailand

The topic of sustainable livelihoods has been researched to a limited extent in Thailand (Parnwell, 2005), but these studies have not focused on SLAs' role in environmental analysis. Various other development interventions have adopted insights from SLAs, even if they have not formally claimed this. The following examples of research on erosion and livelihoods indicate possibilities for integrating SLAs with non-universalistic approaches to environmental risk.

The first study is based on research by the author (Forsyth, 1996, updated by fieldwork, 2004-2005) on land cultivated by the Mien ethnic group[2]. The Mien were traditional "pioneer" shifting cultivators, who have learned to adopt permanent and commercialized agriculture since their arrival at this site in 1947. The population has grown from 110 in 1947 to about 1,200 in 2005. Historically, the staple crops of the Mien were rice, maize and opium. Since, the 1980s, opium cultivation has been abandoned, and farmers have also cultivated soybeans, ginger and peanuts, with limited amounts of coffee, oranges and lychee.

This study asked how farmers responded to soil degradation, including its impact on livelihoods. Historic aerial photographs, land surveys and a Geographical Information System (GIS) were used to identify how far land use had been concentrated on steep slopes[3]. These categories were then physically measured for erosion in order to to indicate the range of historic soil erosion that had occurred in this region[4]. Farmers were then interviewed about their perceptions of soil degradation and its impacts on decisions about livelihoods.

The study yielded various findings. First, the GIS map and interviews with villagers indicated that farmers were aware that steeper slopes generated more erosion, and that this was considered responsible for declining soil fertility in these regions. Yet, consequently, farmers had used less steep land more frequently, which generated less erosion, but which was more likely to experience exhaustion of soil nutrients. Consequently, erosion was indeed considered a risk, but farmers tried to avoid it, and this was shown by the "most eroded" category of land being just 5 percent of the total study area. The physical measurements of erosion indicated rates of 24 and 64 tons per hectare per year 1963-1991 for the "least" and "most" eroded categories of land, respectively. The higher of these rates is indeed considered high in Thailand and elsewhere (Nipon, 1991), but the role of agriculture in generating these levels may be relatively low because farmers avoid these slopes.

Second, gullies in this area of Thailand may result from naturally occurring weathering of granite, rather than from agricultural practices. The GIS data indicated a marked absence of relatively gentle slopes of between 10 and 20 percent, which was apparent in the landscape which consisted of hummocky, rounded land and gullies of some 1-2 m depth in-between. This has been described as an "all-slopes-topography," which is found on granite land in other locations (such as Brazil; Twidale, 1982, p. 177). Furthermore, villagers explained that these gullies existed before the establishment of the village; that they occurred on both forested and agricultural land; and that villagers preferred to keep them vegetated in order to harvest plants. These gullies may therefore be non-agricultural contributors to upland erosion and lowland sedimentation.

And thirdly, farmers explained that – despite their attempts to avoid erosion – soil fertility was declining, and that inorganic fertilizer was now considered necessary. Indeed, surveys indicate that fertilizer use has growth from just 5 percent of households to 100 percent between 1991 and 2005. Detailed discussions also revealed that farmers had adopted a new system of local land tenure during the early 1970s (after some 25 years of settlement), which allocated land to specific households and families (earlier there had been an open-access system). This new system of land tenure encouraged farmers to cultivate land continuously in order to demonstrate that they intended to keep the land, an innovation that they hoped would enhance their formal

tenure security. Moreover, the proportion of household members working in cities, or engaging in circular migration to earn remittances was increasing.

The second study was conducted by Turkelboom (1999) among the Akha people, some 15 km from the Mien site, at Pakha in Chiang Rai province[5]. The Akha are also historically "pioneer" cultivators, although this village was established in 1976. Farmers cultivate irrigated and rain-fed rice, as well as cabbage, beans and tree crops. The study used a combination of experimental plots, erosion surveys and participatory discussions with farmers. It asked how farmers were responding to erosion and land shortage, and how these impacted on livelihoods.

First, the study found that agriculture was indeed increasing erosion. Tillage erosion was apparent because farmers experienced declining soil fertility at the top of steep slopes, in locations where water erosion was less likely to occur because of the comparative lack of slope length. Gully erosion was also evident. This village also had deep, naturally occurring gullies between convex slopes. But there were also smaller gullies on agricultural land that did not occur under forest cover, of some 10-15 cm in depth. These gullies apparently resulted from overland flow generated during rainfall on steep slopes, or when water ran onto slopes from other sources, such as from roads. Sometimes landslips occurred when streams or paths undercut slopes. The erosion on slopes, however, was also found to increase soil fertility when soil was deposited on lower slopes, around lines of crops, or on leveled land. Yet, despite this erosion, it seemed clear that erosion on slopes did not lead to lowland sedimentation because only a third of agricultural slopes fed stream networks and thus deposited soil would remain in place. Moreover, soil was deposited on slopes as steep as 60 percent, and hence steep slopes need not always generate net outflows of sediment.

Second, however, farmers were aware of these problems and adopted various methods of soil conservation. Mulching reduced the impacts of erosion during the early weeks of cultivation of some crops such as ginger. Diversion channels – or small trenches 10-20 cm deep – were drawn across fields to reduce water flow, and to demarcate field ownership. Tree crops on slopes were also increasing, partly because some farmers saw them as a more reliable source of income. Yet, farmers agreed soil fertility was declining. Some elders liked to tell the mythological story of a giant, underground snake or pig-like monster ("pjengcha") that caused landslips and political havoc every 13 years. Others reported "you can see the bones through the soil now" or that "the land is becoming like old people – they are not strong enough to hold anything anymore" (Turkelboom, 1999, pp. 172, 190).

Thirdly, erosion arising from new commercial crops was not as bad as suggested. Rain-fed rice (the most "traditional" Akha crop) had the highest rates of erosion: 60 tons per hectare per crop cycle. Maize and beans were least erosive with median soil losses of, respectively, 19 and 10 tons per hectare per crop cycle. Erosion in cabbage fields lay in between these two extremes. Importantly, this study measured erosion under cropping systems (with reference to the timing and manner of cultivation) rather than according to crops or slopes alone. Consequently, the months when cabbage had only a small surface area were generally during the dry season, when rainfall erosion was least. Moreover, if the price of cabbage fell, farmers would abandon fields, allowing them to be invaded by grass and hence be further protected against erosion.

Yet, perhaps most importantly, this study also showed it is important not to generalize about farmers. Turkelboom (1999, pp. 208-11) identified five levels of

entrepreneurialism or concern for soil conservation: secure investors (who owned paddy fields and fruit plantations); profit maximizers (adopting high-risk crops such as cabbage); diversifiers (farmers who mix rice cultivation with limited cash crops); survivors (those who cultivated only rice on a short-term basis); and dropouts (who relied solely on wage labour and petty business). The survivors accounted for some 30 percent of the village. The point of this classification is to acknowledge soil and crop management does not take place uniformly across single ethnic groups, but that there is great diversity between and within households.

Implications for sustainable livelihood approaches

These two studies are relevant to SLAs because they concern the nature and response to environmental risks by poor people. They add to the debate about SLAs because they do not just demonstrate how villagers are adopting strategies such as agricultural intensification, economic diversification and limited migration. Instead, they also show that the very definition of SLAs, as responses to periods of environmental or economic stress, cannot be separated from the definitions of those risks. Three factors appear significant.

First, despite the common beliefs that upland agriculture is a cause of erosion, and that environmental policies should control erosion directly, the studies demonstrate clearly that the assumptions about erosion are simplistic. Erosion and sedimentation are not only caused by agricultural practices, but also by various non-anthropogenic causes such as gullies; the topography of stream networks is important; and other factors such as the location and influence of roads on water and soil flows have to be acknowledged. Crop cycles, or the timing and management of different crops may also mitigate their impacts on erosion. Moreover, erosion need not represent the most important cause of soil degradation for upland farmers themselves, as declining soil fertility through repeated cultivation may be more significant. Indeed, local perceptions and responses to soil problems partly ensure that erosion is not as damaging as it might be. Consequently, the organizing vision for SLAs – or underlying problem closure – should clearly not be the belief that upland agriculture is causing erosion, and that stopping this erosion will prevent lowland sedimentation or upland declining soil fertility.

Second, soil erosion is clearly only part of the causes of risks to individual households. Households have different vulnerabilities, according to access to land, availability of labor to diversify into different economic activities, and in levels of entrepreneurialism. Erosion, or soil degradation in general, clearly affects most farmers in both studies, but the impact on overall household vulnerability is highly variable. Consequently, we should perhaps not ask whether "erosion" is the appropriately predefined risk, but the extent to which erosion is potentially a risk because of the overall exposure of people to erosion. If the contribution of upland agriculture to erosion is not as high as thought, then perhaps it may be acceptable for farmers to achieve livelihoods through repeated cultivation if this is also conducted with the use of fertilizers and with achieving income through supplementary sources[6]. In this sense, therefore, we should not ask whether erosion is a predefined risk, but we should consider how far it might be a risk if resources of adaptation are not available. However, we can conclude that land shortage and declining agricultural

productivity (if it occurs) are more certain risks for upland farmers, to which erosion may or may not contribute.

And thirdly, it is clear that some of the interventions proposed by environmental policies may actually significantly work against SLAs. Most directly, this may be caused by the removal of agricultural land through tree plantations. These studies therefore indicate that SLAs need to have local fora in which these dominant definitions of risk (or problem closures) can be challenged. To date, most discussions of SLAs have not really defined the settings in which livelihoods and environmental problems are defined, and some discussions of SLAs (such as those undertaken by Ashley and Messer and Townsley above) aim to place livelihood strategies within predefined environmental objectives. If SLAs are to emphasize the needs and perceptions of vulnerable poor people, then there needs to be more attention to who defines environmental risks and how. In effect, this means ensuring that the assets and capabilities implied in a Sen-ian SLA also imply rights over defining the objectives of sustainable livelihoods, and not allowing others to define these to the detriment of local people's livelihood opportunities.

Conclusion: deepening the impacts of sustainable livelihoods approaches

This paper has summarized debates about SLAs as a potential way to avoid fixed and universalistic attitudes to environmental risk. It illustrated this challenge with examples of research in the uplands of northern Thailand, and the disputed belief that environmental policy should focus on mitigating soil erosion. The paper showed two studies that demonstrated various perceptions of and adaptations to erosion by upland farmers, which challenged government assumptions and policies addressing upland degradation.

In conclusion, I have argued that SLAs may allow environmental policy to avoid universalistic assumptions by organizing environmental interventions around more meaningful, locally governed notions of risk. This point needs to be given more attention within debates about SLAs because definitions of risk are fundamental to organizing interventions. Yet, many assumptions (or "narratives") of risk are not necessarily appropriate, nor defined by the people targeted by SLAs.

Some critics have voiced these views already. According to Arce (2003, p. 200), "neither community development nor sustainable livelihood approaches are consistent idioms with a clear set of interrelated propositions". Consequently, Arce agrees that "the starting point of a SLA should be the actors' reality" (p. 204). But is this happening? This paper argues that the means to achieve such local sensitivity is to move away from universalistic approaches to environmental risks, and instead acknowledge the local contexts in which risks exist, and how far adaptive capacity can make some environmental changes alone (such as erosion) less important indicators of risk.

Accordingly, SLAs should be seen in terms of a combination of local institutional design, plus a wider, less structured, basis for ideas (Hinshelwood, 2003). For SLAs to be effective, they must critique the organizing visions and discourses that define environmental risks in ways that exclude local consultation. This, of course, is a more complex and controversial undertaking, as it may challenge political objectives of government agencies, or social visions of how certain regions or peoples should be managed. Working locally within vulnerable people to define risks, and working

elsewhere to challenge assumptions about risks, may both build sustainable livelihoods, as well as implement a less universalistic approach to environmental policy.

Notes

1. Usually the term, northern Thailand refers to the the upland areas in the provinces of Chiang Rai, Phayao, Chiang Mai, Lamphun, Mae Hong Son, Lampang, Nan, Phrae and Uttaradit, although administratively, the region also includes provinces further south.
2. On underlying granite with sandy-clay soils at an average altitude of about 700 m.
3. The photographs and land survey allowed maps of dry-season land use to be made for the years, 1954, 1969, 1977, 1983 and 1991. The GIS then calculated susceptibility to erosion using the simple indicator of slop steepness. Each map was divided into categories to indicate "most" and "least" used or steep. The final map of predicted erosion was achieved by multiplying the two indices of slope steepness and historic land use together, and dividing this index into four quartiles, of which the highest and lowest quartiles indicated "most" and "least" eroded land.
4. The study used the Cesium-137 method to measure soil erosion, which is based on the assumption that Cesium-137 isotopes were deposited evenly on soil after thermonuclear bomb tests of the 1950-1960s. Soil erosion or sedimentation since this era can be measured by comparing isotopes between eroded and uneroded sites. Conventionally, this approach provides estimates of annual erosion since 1963 (the peak of isotope deposition), and soil measured to a depth of 25 cm (Ritchie and McHenry, 1990).
5. Underlain by granite, phyllite and shale, with sandy-clay soils, at an altitude of 7-900 m.
6. This point leaves undiscussed the question of the impact of fertilizers on soil and water quality, which this paper cannot do for reasons of space.

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