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LOCAL ENVIRONMENTAL MANAGEMENT, LAND DEGRADATION AND THE '*GESTION DES TERROIRS*' APPROACH IN WEST AFRICA: POLICIES AND PITFALLS

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Abstract: This paper critically evaluates the *gestion des terroirs villageois* (GTV) approach to community management of natural resources. The approach is widely used in francophone West Africa by NGOs, bilateral programmes, and government agencies. Three aspects of GTV approaches are presented and reviewed, based on research conducted with a large bilateral programme in Bam Province on the Central Plateau of Burkina Faso. These are: (i) the ways in which GTV projects tackle problems of territorial control; (ii) their ability to respond to and work with local power relations; and (iii) differential social and economic benefits resulting from the programmes. These issues are examined in two communities that have worked with GTV planning since the early 1990s. The paper concludes by stressing the significance, and the drawbacks of *gestion des terroirs* and asks whether it represents any more than a 'second best' form of community planning for natural resource management in the Sahel. © 1998 John Wiley & Sons, Ltd.

1 INTRODUCTION

In West Africa, campaigns against land degradation and poor agricultural performance have seen no shortage of technocratic and paternalistic failures, whether led by the state, bilateral projects, or NGOs (Marchal, 1986). But since the mid-1980s, a number of more effective models of natural resource management and land rehabilitation have emerged (Painter, 1993; Reij *et al.*, 1996). This paper critically examines one of these approaches, *gestion des terroirs villageois* (village land use

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management, or GTV). This approach is based on holistic, community-based resource management, and it has received wide support from donors, government agencies and NGOs involved in environmental work in the West African drylands.

The *gestion des terroirs* model of participatory land rehabilitation is well developed in Burkina Faso, where there are at least forty projects reaching 2,500 villages and with a combined investment of at least $280 million. It also features prominently in environmental policy in Senegal, Mali, Côte d'Ivoire, and Niger. In mid 1995, the *Club du Sahel* of the OECD carried out a major review of GTV approaches based on several expert missions, consultancy reports, and workshop discussions. The resulting reports stressed the complexity of Sahelian environments, and the mixed success of the *gestion des terroirs* model in 'turning over' natural resource management to communities themselves (Yacouba *et al*., 1995; Winckler *et al*., 1995). These reports emphasize the need to develop sound mechanisms to evaluate the success or failure of GTV approaches, given their increasing significance for natural resource management interventions. A total to some 41 possible indicators of project 'success' were suggested, ranging from the technical performance of soil and water conservation (SWC) techniques, to the durability of land management committees set up at the village level. This paper looks at just three indicators; the success of GTV projects in handling problems of territorial control, their ability to capture local power relations, and to tackle problems of social differentiation. These issues are assessed with particular reference to two Mossi and Yarsé villages on the Central Plateau of Burkina Faso that have participated in an environmental programme employing the GTV approach. The paper does not seek to evaluate the technical efficiency of the various types of soil and water conservation methods commonly employed by GTV projects, since these have been adequately addressed by other researchers (Hooper, 1989; Vlaar, 1992a; 1992b; Hailu and Runge-Metzer, 1993; Reij *et al*., 1989). The paper concludes by stressing the significance, and the drawbacks of *gestion des terroirs* and asks whether it represents more than a 'second best' form of community planning for natural resource management in the Sahel.

There is a particular significance to examining participatory forms of resource management in Burkina Faso. The country has undergone a recent, fundamental upheaval of its political and administrative structures, and new thinking on rural development has accompanied these changes. Reorganization in government agencies and extension services, launched under the radical socialist programmes of President Thomas Sankara (1983–1987), have led to enthusiasm for long-term rural programmes that retain elements of control by local institutions, coupled to a slowly unfolding programme of political decentralization (Atampugre, 1997; Englebert, 1996). State media services, and a free press, broadcast messages of environmental responsibility to rural communities. There are numerous NGO projects and bilateral aid programmes working in a variety of fields (forestry, water supply, health, literacy programmes etc.) attracted by stable governance and the legacy of rural populism (Laurent, 1996; Atampugre, 1997). Burkina has a *Programme National de Gestion des Terroirs*, which receives international funding through the World Bank, UNDP and other donors, and is working in many parts of the country including the southern, wetter regions where in-migration is causing land conflicts and there is an urgent need to regulate land access through local institutions (Faure, 1992; Lund, 1997).

2 GESTION DES TERROIRS VILLAGEOIS

The *gestion des terroirs villageois* approach to local environmental management is widely used by development projects working with settled agricultural communities (Painter, 1993; Painter *et al*., 1994). It involves the transfer of control over resource management and the land used by that community (its *terroir* or territory) to local people (Toulmin, 1995). This is usually achieved by vesting decision-making powers in a village group or committee. The majority of these village groups take on informal decision-making powers, although some do have legal status as registered co-operatives or membership organizations.

The common range of activities associated with *gestion des terroirs* projects are shown in Table 1. In northern Burkina Faso, the most urgent environmental activities carried out within the context of *gestion des terroirs* projects have been the treatment of soil erosion and soil fertility problems, although efforts have also been made to empower village committees to manage communal land and to improve agricultural systems more generally (Critchley *et al*., 1992). Villagers draw up a managment 'plan' for the *terroir* over a period of years, taking into account current land use, their present and future farming needs, and the status of land degradation in their village. Carrying out this plan can involve the construction of contour stone lines (*diguettes*) and semi-permeable rock dams (*digue filtrantes*) to reclaim poor quality land, tree-planting, the 'set-aside' of degraded bushland and forest, and the diffusion of techniques like composting and fungicide use. More rarely, pastureland is improved through allowing natural regeneration and by restricting animal densities, and some villages place priority on improvements to their water supply. Land tenure questions may be dealt with through local leaders or referred to the village group or 'management committee'. A group can also decide on how and when to approach development projects and extension services for assistance or advice on erosion control, transport, loans of materials and so forth.

Projects develop a GTV 'approach' in conjunction with their research partners and field staff, often over several years. Participation, replicability and self-help are now seen as necessary elements of such environmental management programmes. Work at the *terroir* level does not preclude active co-operation with pre-existing on-farm extension programmes, but it may offer a new framework around which these operate, and requires that extensionists be retrained in natural resource management and participatory techniques. The actual setting-up and monitoring of GTV initiatives differs from project to project, and of course this reflects ecological and social differences among rural communities. Figure 1 shows the early approach of PATECORE, working in Bam Province, a bilateral project and one of the pioneers of the technique in Burkina Faso.[1]

The PATECORE approach to GTV has been widely publicized elsewhere, and it has been seized upon by populist writers as a sound form of participatory planning (Esser-Winkler, 1992; PATECORE, 1994; Critchley and Graham, 1991; Pretty, 1995). The project clearly shifts responsibility for managing the environment to village committees over time, as Figure 1 shows. PATECORE's model differs in some

[1] PATECORE's strategy has changed since 1994 to focus more on capacity-building of local organizations (PATECORE, 1994; De Leener, 1995). Other well-known Burkinabé projects developing similar GTV methods include the Dutch-funded projects PEDI and ADRK, both based around Kaya, and VARENA (formerly UP10), PATECORE's sister project in the south of the country.

Table 1. Typical activities carried out in communities where the *gestion des terroirs* approach operates. *Source*: Painter (1993, p. 3); Toulmin, (1994), field research.

Major objectives	Examples
Restore and improve the potential of natural resources	Plant windbreaks of trees, shrubs or non-seeding grasses. Dam gullies with permeable rock and earth dams. Assist soil regeneration by laying trash lines and millet stalks. Reforestation of selected areas.
Improve the security of agricultural, pastoral and forest production	Collect stones and build cross-contour permeable rock bunds (*diguettes*) on agricultural land. Prepare and farm communal fields. Collect and store forage for dry season consumption by animal herds. Close off of selected degraded areas to cultivation and grazing (*mise en defens*).
Augmentation of soil fertility	Promotion of and training for composting systems. Provision of donkey carts for transport of manures (also used for stones, harvest products).
Enable better security of land rights	Regulate land access through GTV committees. Committees define eligible users of local common property in the *terroir*.
Minimize land use conflicts through negotiation and planning of land use zones	Delimit pastoral grazing zones and other areas of the *terroir* for particular uses. Define location of woodlots and protected areas.
Train individuals and groups in natural resource management techniques	Run a tree nursery Train *agro-formateurs* Train villagers in use of air photos and self-evaluation techniques like village maps and transects.
Reinforce and strengthen local level institutions so that they can coordinate and plan land uses and rehabilitation effort at the *terroir* level	Help establish GTV committees, usually through extension agents. Provide selective training.

respects from that adopted by the much larger *Programme National de Gestion des Terroirs* of the Burkina government (Atampugre, 1993; Lewis, 1996).[2] A wide range of field methodologies are used, including participatory rural appraisal and the use of air photographs. PATECORE's early contacts with villagers include sessions where villagers identify different land categories from these photographs and map the extent of their land rights (their *terroir* or territory) before planning for the future management of these land units.

There are three dimensions to the GTV approach which require highlighting, because despite being overlooked, they are of wider relevance to policy debates about natural resource management. These are the notions of scale implicit in the approach, its implications for power relations, and problems linked to community differentiation. These issues are treated in turn.

[2] This nation-wide programme has been criticized in the past for its approach to local land management (identical committees must be formed in each village, and national land tenure laws respected — Faure, 1992) although these shortcomings are now being overcome (Lewis, 1996).

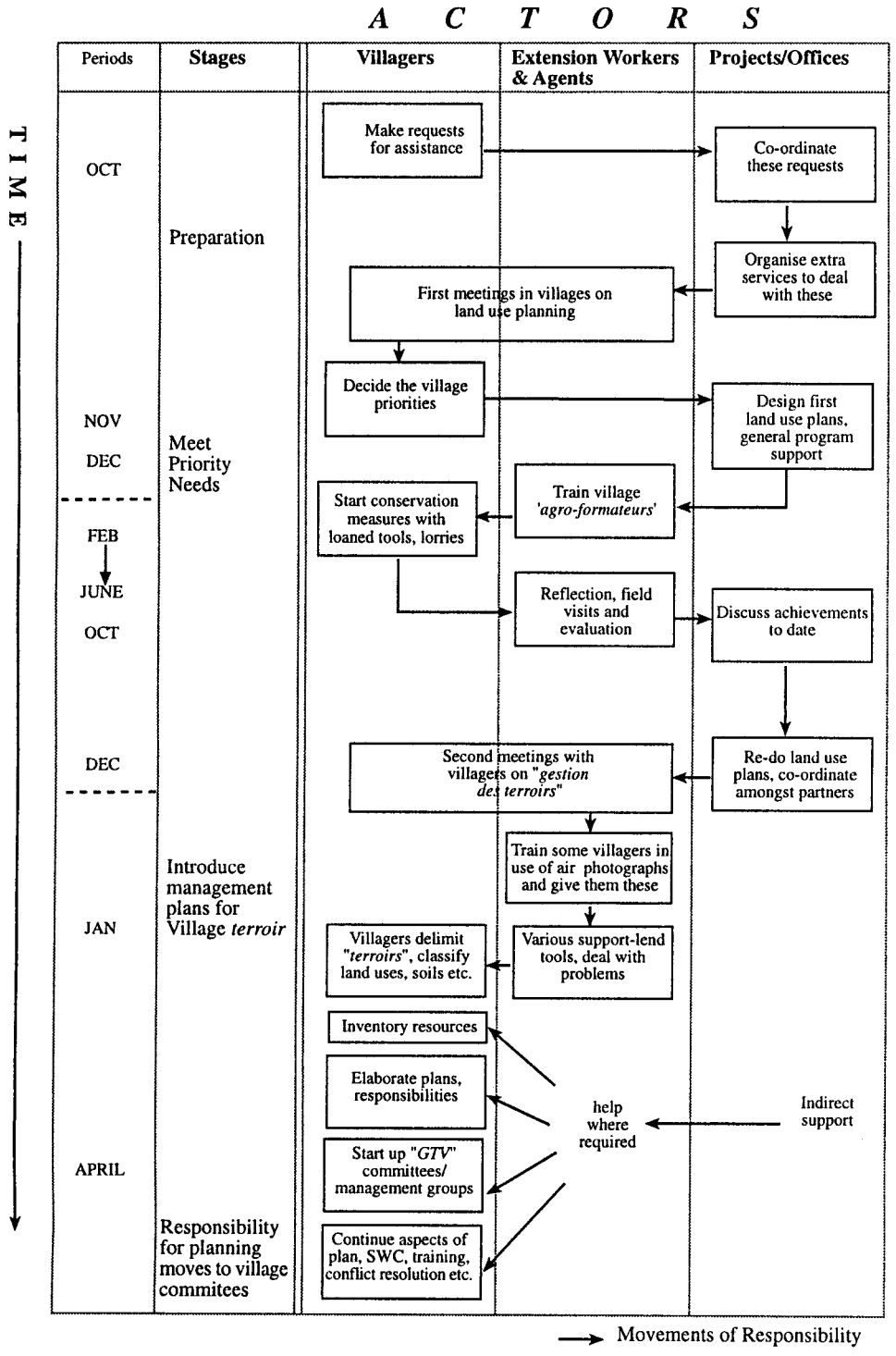


Figure 1. The *gestion des terroirs* approach to community management: the PATECORE project system in 1993.

2.1 The Question of Scale

The GTV approach has its origins in the *systèmes agraires* approach of French tropical geographers (Painter *et al.*, 1994; Painter, 1993; SPORE, 1994 p. 2). As early as the 1950s, French geographers were proposing the village *terroir* as a significant unit of study, a 'used environment' farmed or otherwise exploited by a community. Gilles Sautter, Paul Pelissier and their students produced monographs of agrarian systems at the *terroir* scale, using cartographic techniques and lengthy fieldwork to explore the relations between environment, technology, society and economic organisation over time (Sautter, 1962; Pelissier and Sautter, 1970; Imbs, 1982; Marchal, 1982). Marchal's classic study of agrarian space in Yatenga, Burkina Faso pioneered the techniques of air-photo interpretation, land use mapping and detailed social survey now adopted in several GTV projects (Marchal, 1983).

The GTV approach is most effective as a planning tool when working with nucleated agricultural communities where land is controlled by village leaders over a distinct spatial area that forms the *terroir*, and where most agricultural production takes place. Where this relatively simple land tenure situation exists, soil and water conservation work is easier to vest in communal control.[3] But Painter *et al.*, (1994) and Painter (1993) have argued quite sensibly that the *terroir*, while often containing many of the agricultural and herding activities carried out by villagers, will not include the 'sites' where other activities such as seasonal migration (often to the West African coast) and trading are carried out. Farmers have, of course, many non-agricultural activities that fall outside the *terroir*. Also, these authors show how easy it is to use the *terroir* as a planning unit while overlooking social differentiation and the overlapping use of land by different ethnicities or groups, particularly mobile or semi-sedentary pastoralists. While this is a valid criticism and the social definition of a *terroir* or 'action space' (Toulmin, 1994) is problematic, in agricultural communities its territorial boundaries are usually quite easy to trace using historical boundary markers known to the earth-priests or community leaders.

The staff of development projects are usually the first to recognize that this focus on spatial, not social planning units is a compromise, and that the approach cannot work well with mobile pastoralist groups or even where major land conflicts exist. The problems involved in reducing complex spatial arrangements and social networks to a *terroir* could be compared to the sometimes unhappy efforts of ecologists to define 'system boundaries'; reality is rarely straightforward enough to make this an easy task. But to focus on the local territory is, supporters of the approach say, an improvement over the over-ambitious efforts of Integrated Rural Development schemes and river-basin (*bassin versant*) planning approaches, both of which have failed to capture local interest in the West African drylands (Painter, 1993; Toulmin, 1995; Lewis, 1996).

[3] The position of mobile or semi-nomadic pastoral communities, exploiting extensive lands and often co-evolving with settled communities is more problematic, and has yet to be tackled successfully in any GTV programme known to the author.

2.2 Power Dimensions

GTV combines control over local space (the *terroir*) with control over resource access and decision-making. The limited literature on *gestion des terroirs* that has emerged in the 1990s has been written primarily for evaluative purposes, and it is easy to miss its implications for social power and environmental politics. The notion of local management currently being explored by the more innovative projects is empowering certain communities and groups within these communities, and is providing them with skills and institutions that duplicate or replace those of central government. State control over land rights may be weakened, for example, particularly when national land tenure legislation is still imperfectly applied in rural areas (Lund, 1997). Indeed, there are policy-makers who believe *gestion des terroirs* projects should somehow steer clear of involvement with rural politics as much as possible, only concerning themselves with environmental issues. Given the long history of local struggle and resistance to centralised authority in West Africa, to separate artificially natural resource management work from rural social relations is unrealistic (Engberg-Pedersen, 1995; Laurent, 1996). There are at least four ways in which our understanding of changes to power relations resulting from GTV activities need to be furthered and analysed.

- The importance given to villages and 'communities' in *gestion des terroirs* has implications for the way extension work is conducted. It changes the relative power of extension personnel vis-à-vis the community. Since GTV projects generally adopt a participatory ethic, extension agents are expected to work with farmers, not to instruct them. Their new roles can include the analysis of conflicts, the promotion of indigenous soil and water conservation techniques, and the understanding of complex land rights issues. Similarly, GTV projects have different dynamics to many other types of rural interventions; they cannot work without the involvement of young and enthusiastic staff who are willing to spend extended periods in rural communities, they require excellent communicators and inter-disciplinary teams, and they need to be responsive to sudden changes in plan initiated by farmers, as well as by their own colleagues.
- Secondly, it is surprising to note that the GTV approach has similarities with a previous development 'model'; agropolitan development. Agropolitan development, first developed as part of a radical critique of urban and regional planning (Friedmann, 1979), stresses local territorial control. In Burkina Faso, a form of self-determination based on village unities was present under the self-reliance programmes of the Sankara leadership (1983–1987), that were based around local Revolutionary Committees (Farenhorst, 1992; Englebert, 1996). These were an early effort to decentralize political powers away from Ouagadougou while retaining a measure of government control (Asche, 1994). Decentralization is again a key theme in West African politics in the 1990s, and GTV could complement national efforts in this area, which are still politically delicate (Lewis, 1996; Atampugre, 1997). Whether new institutions introduced as part of GTV will be more cohesive than the traditional village organizations they replace is, however, problematic (Faure, 1992; Engberg-Pedersen, 1995).
- Hyden (1990a; 1990b) has argued persuasively that African farmers have yet to be 'captured' (i.e. they largely ignore) other social groupings in the development

process, place primary importance on kinship and social ties, rely on family labour, and rarely choose to engage with urban or national markets if their prime investment is in low-input agriculture. The affective economy, which is by definition strongest at the community and household level, can be mobilized for social change and in group conservation programmes since 'individuals contribute with an expectation that others will do likewise because there is a deep legacy to that effect which is too costly to ignore' (Hyden, 1990a, p. 255). Although Hyden's views are disputed (Lemarchand, 1989), the affective economy is ideally suited to the local scale at which GTV projects are operating. In the Mossi region discussed in this paper, strong social networks and economic levelling mechanisms, termed 'communal sharing' by Fiske (1990), are a feature of social life. Remote communities demonstrate a huge capacity for mobilization on community issues, often setting aside internal differences and conflicts to work together.

- Fourthly, *gestion des terroirs* can support a particular form of self-organizing by women. It has been widely noted that women gain little political or material gain from soil and water conservation (SWC) projects to which they frequently contribute more time and labour than men (Batterbury, 1994; Vlaar and Brasser, 1990; Rohatynskyj, 1993). If they do not own land of their own, benefits from their participation in SWC are indirectly realized as increased crop yields and better soil quality on treated household farm plots. Yet even in societies where gender roles are well defined and patriarchal, womens' village groups can be highly organized and anxious to develop links with outsiders. Environmental projects can provide the catalyst for these networks to expand, gain confidence, and grow. Friedmann's recent work (1992, pp. 115–7) touches on this issue, and the importance of women's ''networks of empowerment''. Locally-led environmental management work does face problems in strengthening these networks. For example the 'used' space or *terroir* of women differs from that of men, is concentrated at different points in cycles of production and reproduction, and involves different labour patterns.

2.3 Community Differentiation and the 'Beneficiary' Problem

The third question mark over the *gestion des terroirs* approach is the extent to which uneven access to resources and community differentiation can really be understood and taken into account by development organizations using the approach. Households and individuals in sub-Saharan Africa pursue diverse production strategies which balance labour, capital, land and animal ownership, and they operate in complex and risky environments. In a famous essay, Richards (1993) has suggested that farmers make a series of *sequential adjustments* to an unpredictable climatic calendar; the exploitation of multiple micro-environments and crop mixes constitute opportunist practices. He suggests agricultural activities are 'performed' rather than planned out, and are strung together with opportunism and creativity. Richards' critique could be used to explain the poor record of agricultural research in northern Burkina Faso, which has had little impact on farming systems in remote regions to date (Ouali, 1987; Lindskog and Mando, 1992; Spiers, 1996) and was long associated solely with research by French agronomists on methods to boost cash crop production, notably of cotton (Gervais, 1987; Sedogo and Michelsen, 1995).

How can GTV projects promote what is essentially a new 'plan' for a village *terroir*, if temporal and spatial aspects of labour allocation and other requirements are indeed negotiated opportunistically in this way? I suggest that although local responses are indeed highly contingent and variable, populist criticism of community planning overlooks the fact that farmers are using development projects as just one source of knowledge and personal advancement. The distinction between 'planning' by GTV projects, and farmer 'performance', is a blurred one (Batterbury, 1996a). Often, farmers, including those organized into GTV management committees, actively encourage donor interest in their communities and will select and choose from the advice and material support these projects are offering. A few local people may in fact be working for those same projects and have great insight into local needs. The farmer's world now incorporates selected elements of external techniques, tools and practices, and 'adoption' of new ideas. Contemporary agrarian change is occurring through multiple sources of innovation and decision-making.

The history of SWC in Burkina Faso explains why farmers are quite accustomed to new ideas and techniques. Traditionally, SWC was carried out by the Mossi on a very small scale; traditional contour stone lines (*diguettes*) were built across slopes to protect valuable fields from the pernicious effects of overland flow during peak summer rainfall. An introduced innovation — improved *diguettes* built with the aid of water tube-levels and efficiently spaced to account for soil type and slope angle — originated from field research, carried out by poorly paid NGO workers, interested farmers and European volunteers over a decade ago (Atampugre, 1993; Schmitt, 1989; Reij, 1983; 1990; 1994a). This was an informal, trial-and-error process in which public research institutes had little or no involvement. *Diguettes* enabled large areas of degraded land to be brought back into production and were later adapted (by a French volunteer in 1982) to treat large ravines and gullies. Today, the technique is widely known and it is used by many farmers in northern Burkina Faso.

But the real question remains over the extent to which even the participatory model espoused by GTV projects actually capture the complexities of social differences. As Painter (1993) identifies, there is a real need for applied research on the diverse sorts of production systems and strategies for income generation encountered in a region or in a community (see Kunze, 1994). GTV projects usually operate in highly differentiated communities and these social differences can be overlooked or glossed over (Leach *et al.*, 1997). There are always 'losers' and 'winners' from management projects, in terms of actual or hoped-for benefits (increased crop yields, capital income, restored land, etc.). Research needs to look closely at how decision-making operates *within* a village group or community to empower some individuals and to marginalise others. It is still unclear who benefits, under what conditions, and whether the poorest individuals are being reached in a systematic way.

3 TAILORING *GESTION DES TERROIRS* TO LOCAL DIVERSITY ON THE CENTRAL PLATEAU

3.1 Regional Context

The Central Plateau in Burkina Faso has attracted considerable attention from donor agencies and NGOs following the more open political climate under the Compaoré

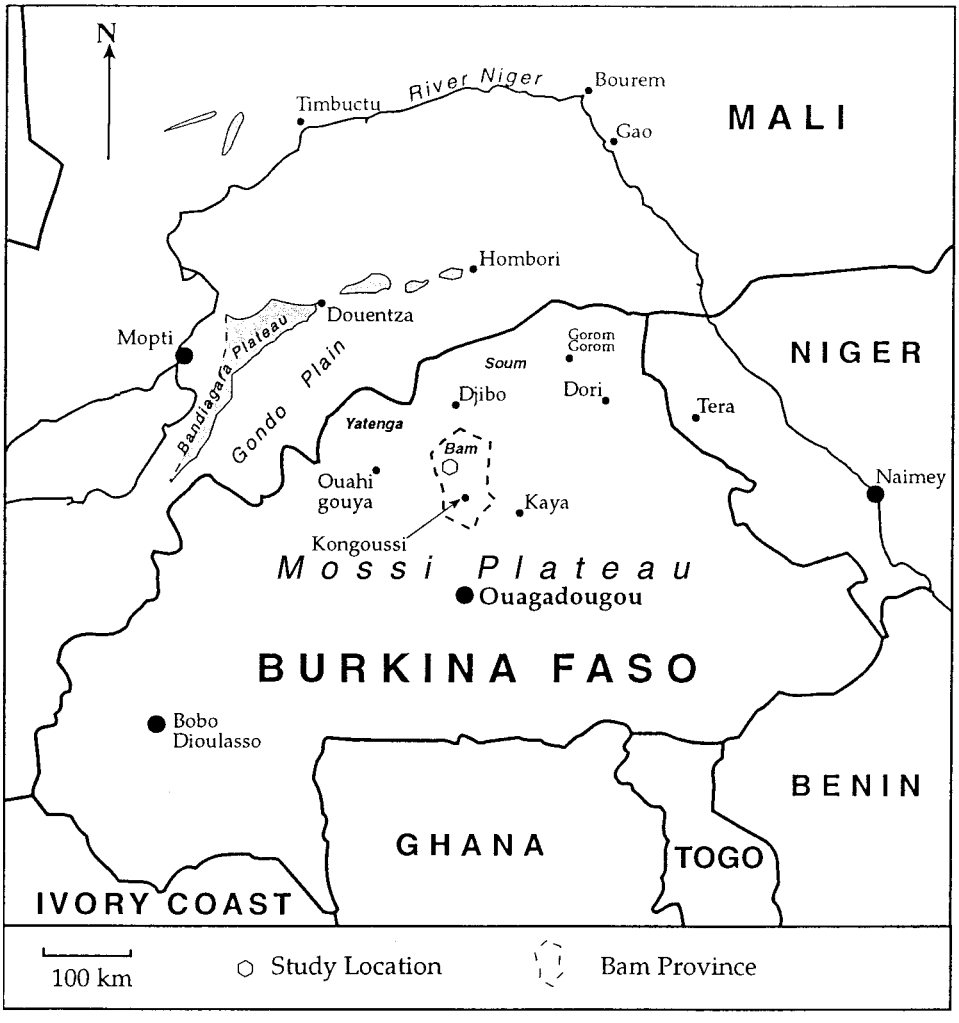


Figure 2. The study area — Bam Province, Burkina Faso.

regime (since 1987), and hosts numerous soil and water conservation projects including *gestion des terroirs* programmes (Wardman and Salas, 1991). Bam Province is situated at the heart of the Central Plateau, 100–150 km north of Ouagadougou (Figure 2).

The northern part of the Province suffers particularly low soil fertility and the progressive effects of several years of poor rainfall (Eger and Bado, 1989; Klinkhamer, 1990; Sawadogo, 1992; Schutjes, 1991). The majority of communities inhabit nucleated settlements appropriate to the *terroir* approach and have — or are willing to develop — active community organizations, and in many of these, soil and water conservation is well advanced. These characteristics are not present everywhere on the Plateau, so caution should be used in over-extending these findings. Bam has also hosted a large environmental management programme since the late 1980s, PATECORE (Figure 1), as well as an international NGO, Plan International. Two

government departments are involved in rural environmental work: the Service Provinciale Agricole (SPA), who are charged with agricultural and some livestock extension work, and the Service Provinciale de l'Environnement et Tourisme (SPET) whose remit includes forestry programmes and environmental protection (Guèye and Laban, 1992).[4]

Two communities of Mossi and Yarsé farmers were studied in depth, in order to understand agrarian change and to shed light on the ways in which environmental management programmes had impacted individuals and households in the recent past. It was already known that Mossi farmers could be keen participants in soil and water conservation for three reasons:

- Farmers are generally keen to accept technical advice on *diguette* construction, and assistance with the transport of heavy stones and rocks needed for these activities. Where a project also supplies food to those building the conservation works, this is also appreciated, although the provision of 'food for work' is a contentious issue (Atampugre, 1993; Vlaar and Brasser, 1990).
- *Diguettes* can also be favoured because they are visible symbols of a community's capacity for organization, hard work, and its ability to attract outside assistance (Batterbury, 1996a).
- The generally beneficial effect of *diguettes* on crop yields and pasture quality is now recognized and accepted, although some scientists still have doubts about long-term sustainability. Farmers have reported good yield increases, and agronomic measures have generally confirmed this (e.g. Hooper, 1989; Schmitt, 1989; Vlaar, 1992a; Wardman and Salas, 1991).

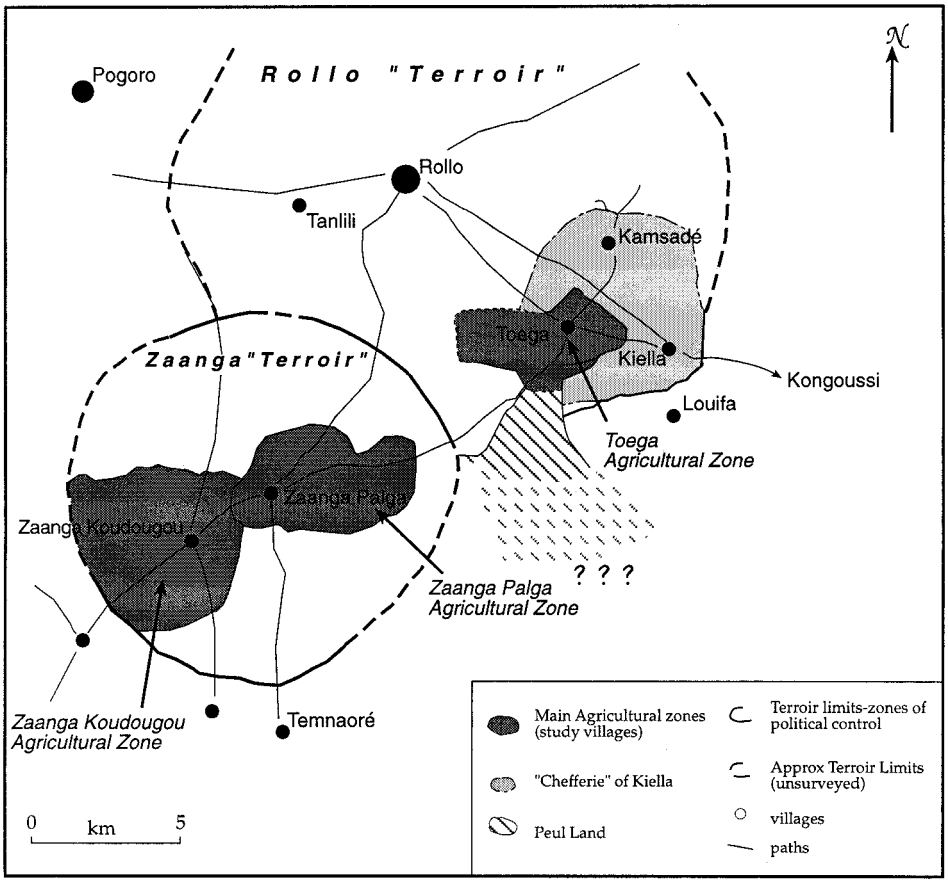
The social issues surrounding SWC and GTV outlined in Section 2 were, however, less well understood at the time this research was initiated in the early 1990s.

3.2 The Village Dynamics of *Gestion des Terroirs*: Two Cases

The communities of Zaanga and Toega lie about 12 km apart in the '*département*' of Rollo, 40–50 km north of the capital of Bam Province, Kongoussi (Figure 3).[5] Both study villages lie in the Sudano-Sahelian belt of Burkina Faso, characterized by eroded, iron rich soil running from plateaux down to seasonal water courses (Eger and Bado, 1989). Political authority in the region is split between the *préfet*, the sole government official at Rollo for 24 villages in the administrative district, and a network of customary village chiefs. Although situated close together, the villages have very different histories.

Zaanga Palga is a community of 300 Mossi, established more than 150 years ago. The chief of Zaanga Palga also holds jurisdiction over the nearby community of Zaanga Koudougou, and a large, well-defined territory of bush and farmed land (Figure 3). Zaanga has retained many elements of traditional Mossi farming practices. Cultivation is predominantly by *daba* hoe/digging stick, and in 1993 there was a single donkey-plough, three donkey carts and a handful of bicycles in the village. In that

[4] SPET receives support from the Dutch government; PATECORE/GTZ supports SPA, since it employs its rural extension agents to oversee its village-level activities.
[5] Pseudonyms are used.



Source: field survey, villager diagrams & air photographs (1993). Names have been changed.

Figure 3. The *terroirs* of Zaanga and Toega, showing land ownership.

year, almost all households planted local cereal varieties (Sawadogo, 1992), with small quantities of NPK fertilizer being used by only two farmers. Agricultural sales were restricted to small quantities of groundnuts, sesame, tobacco and other 'garden' crops, traded in limited quantities in local markets. Crop sales average around £5 per year per household; cash income was greater from animal sales and weaving work.[6] Around 20–30 teenagers and young adults were working as economic migrants in the urban centres of Ouagadougou, Bobo-Dioulassou or Abidjan, and few of these were regular returnees to the village. Remittances from these migrants were small, mainly subsidizing grain purchases in bad years.

The village formed men and women's community associations and registered these with the authorities in the 1980s, and elected to undertake a concerted restoration of degraded land surrounding its central compounds in 1992, following some contact with the PATECORE project. Prior to this date, little contact existed

[6] In a sample of villages in Bam, Kunze (1994) found 37 per cent of all households income came from animal sales.

with development organizations outside occasional visits from an extension agent. It was possible to monitor the process of decision-making about environmental improvements in their early phases. During the 1992 dry season around 800 metres of *diguettes*, some 70 cm across and 30 cm high, were built by village residents on land which had been barren for seven seasons; the stones required were transported from the hillsides by PATECORE truck and by donkey carts. In 1993 and 1994, this work was continued and several hundred metres of bunds were added on degraded land, the majority around the village centre. In the first two years, there was great enthusiasm for these ventures. In particular, the support given by the powerful village chief to the work meant that all the village lineages had a moral obligation to participate, although only four farmers actually had plots on the treated land. Complaints surfaced in late 1993 as the trucks used to carry the stones on their journeys were delayed; the community had learned to assert its requests to the project.

Toega has more advanced conservation activities. The village dates from 1918, and was founded by Yarsé migrants (traders of Mande origin, who intermarry with the Mossi). Toega's population today is around 350. The Yarsé are Muslim, and do not practice Mossi harvest festivals and fertility rites but are otherwise 'Mossi-ized' with similar social organization and farming practices. Unlike Zaanga, the village has a small seasonal water course (*bas-fond*) which allows some extension of the cropping season onto richer clay soils, termed *bole*. Sheetwash and rill erosion gives rise to extensive tracts of *zipellé* (dead land) where the topsoil has been removed entirely, leaving surface crusts interspersed with clusters of hardy shrubs and grasses. The village shows obvious signs of participation in the regional economy, partly by virtue of its merchant roots. Many male residents leave to seek paid work in the dry season (November–April) and several are *commerçants* with stalls in the regional markets. Migrants remittances and animal sales are the most lucrative income sources. A small number of men live in the village only for the cropping season, and work elsewhere. By contrast with Zaanga, farming techniques include the use of small quantities of fertilizer by 30 per cent of farmers (in 1993) and nine donkey ploughs exist, used widely on sandy soils. Mopeds, bicycles, ploughs and other assets are present in small numbers. PATECORE has worked in Toega since 1989 and around 3–5 km of well-built *diguette* systems are now well established in the village centre, with *andropogon* grasses and saplings planted on the silt already built up behind these structures. Much of this work was carried out under the eye of *agro-formateurs* — young farmers who received basic training in erosion control, *diguette* construction and agroforestry at PATECORE. There are three tree plantations, and the government extension services are active, visiting the village up to once a week in the cropping season. In 1993, PATECORE donated fencing for a 50×50 m demonstration plot on barren land, where many land husbandry techniques are in progress including *diguettes*, mulching, composting and planting of N_2 fixing species. The wide range of environmental activities of the village group are set out in Table 2 which shows the history of GTV activities in some detail. Note that, unlike Zaanga, there is no village chief to enforce participation in these ventures; lineage elders hold far greater influence and, as in Zaanga, gave their labour.

The territory issue and GTV activities

The resource management activities in these two villages allow a tentative evaluation of the *terroir* concept in two communities with different histories and local

Table 2. Participation by gender in *groupe Tengsongho*, Toega, 1990–1994. *Source*: Village records and participant-observation.

Date	Activities	People participating	
		Men	Women
Jan 1990	Tree planting — digging planting holes	–	–
	Meet with forestry extension agents	72	63
	Tree planting — digging planting holes	48	0
	Tree planting — finish planting holes (900)	72	0
	Tree planting — plant seedlings	69	0
	Tree planting — plant seedlings	52	0
	— BREAK IN RECORDS —		
Sept. 1990	Village meeting on soil conservation	–	–
	Village meeting with agricultural extn. agents	41	90
Nov. 1990	Begin collection of stones for contour bunds		
Feb. 1991	Collection of stones from hills with PATECORE truck	40	109
	Collection of stones from hills with PATECORE truck	53	149
	Collection of stones from hills with PATECORE truck	43	107
Mar. 1991	Collection of stones from hills with PATECORE truck	59	139
	Collection of stones from hills with PATECORE truck	40	100
	Collection of stones from hills with PATECORE truck	66	159
	Collection of stones from hills with PATECORE truck	72	128
April 1991	Training on contour bund work (extn. agents)	63	142
	Building contour bunds in village centre	59	153
	Building contour bunds in village centre	61	102
	Building contour bunds in village centre	62	139
	Building contour bunds in village centre	57	146
	Building contour bunds in village centre	32	150
	Building contour bunds in village centre	72	142
June 1991	Village meeting decides to start a communal field (1 ha)		
	Communal field prepared and seeded for millet	70	127
July 1991	Communal field is weeded	36	43
	Tree Planting — tidy saplings in plantations	–	–
	Meeting with head of primary health service (Advice on guinea-worm)	42	59
	Tree Planting: replace dead saplings	48	0
	Meeting with agricultural extn. agents on land husbandry techniques	47	63
	Tree Planting: prepare new plantation	25	0
	Plant grasses next to contour bunds	15	0
	Plant grasses next to contour bunds	25	0
	Plant grasses next to contour bunds	15	0
Aug. 1991	Communal field: second weeding	35	15
	Women's communal field (peanuts): first weeding	35	75
	Tree Planting: re-digging planting holes	36	0
	Communal field: third weeding	17	42
	Tree Planting: along tracks	39	42
	Meeting with local officials	79	43
Sept. 1991	Communal field: harvest	43	62
Oct. 1991	Repair communal meeting place	37	0
	Tree Planting — repair fencing	49	0

Table 2 continued on next page

Table 2. Continued.

Date	Activities	People participating	
		Men	Women
Nov. 1991	Meeting with forestry & agric. extn. agents	40	0
Dec. 1991	Meeting with extension agents and PATECORE	22	36
	Building contour stone bunds in village centre	63	42
	Collection of stones from hills with PATECORE truck	25	16
Feb. 1992	Collection of stones from hills with PATECORE truck	37	25
	Make bricks for communal granary	47	0
	Buy and transport chicken-wire for fencing	3	0
Mar. 1992	Meeting with forestry and agricultural extn. agents	25	0
	Prepare 'demonstration plot'	32	0
	Prepare 'demonstration plot'	42	0
April 1992	Visit from farmers from other region	–	–
May 1992	Collection of stones from hills with PATECORE truck	23	67
	Building contour bunds in village centre	52	0
June 1992	Work on the 'demonstration plot'	55	0
	Collection of stones from hills with PATECORE truck	37	60
	Communal field prepared and seeded for millet	48	67
	—BREAK IN RECORDS—		
Oct. 1992	Meeting with PATECORE agents	–	–
	Rebuilding old compound to host visitors	–	–
	5 days of participatory rural appraisal with team of 8 visitors	ALL	ALL
Dec. 1992	Meeting with PATECORE agents	40	60
	Collection of stones by truck	42	66
	Collection of stones by truck	51	60
	Move & Prepare stones	41	29
	Move & Prepare stones	42	31
	Move & Prepare stones	46	73
	—BREAK IN RECORDS—		
	Major effort on compost pit in late 1993	not known	not known
Oct. 1993	Completion of *fosse fumière*, now full with residues	72	163
	Village meeting (animal pasture)	50	0
Nov. 1993	Deepening of *boulli* water source in village centre (12 days)	ALL	ALL
	Harvest of communal field	–	–
Dec. 1993	Collection of stones from hills	42	21
Jan. 1994	Collection of stones from hills	35	72
	Collection of stones from hills	49	63
	Measuring up for new contour bunds with tube level	15	0
	Collection of stones from hills with PATECORE truck	39	63
	Collection of stones from hills with PATECORE truck	39	63
	Prep/collect sand for village school construction	49	82
	Collection of stones from hills (by truck?)	29	63
	Collection of stones from hills (by truck?)	35	72
	Collection of stones from hills (by truck?)	32	51
	Collection of stones from hills (by truck?)	not known	not known
	Prep/collect gravel for village school construction	53	103
	Prep/collect stones for village school construction	42	71

Table 2 continued on next page

Table 2. Continued.

Date	Activities	People participating	
		Men	Women
Feb. 1994	Prep/collect stones for village school construction	39	82
	Collection of stones from hills with PATECORE truck	63	103
	Collection of stones from hills with PATECORE truck	30	22
	Collection of stones from hills with PATECORE truck	37	60
	Collection of stones from hills with PATECORE truck	32	42
Mar. 1994	Collection/preparation of stones on hills (put in piles)	10	28
April 1994	Collection/preparation of stones on hills (put in piles)	variable	variable
	Collection of stones from hills with PATECORE truck	50	2
	Collection of stones from hills with PATECORE truck	20	5
	Preparation of piles of stones prior to construction	38	25
	Building contour bunds in village	44	54
	Building contour bunds in village	62	32
	Building contour bunds in village	29	57
May 1994	Building contour bunds in village	49	53
	Building contour bunds in village	53	37
June 1994	Building contour bunds in village	41	56

environments. Despite showing a classic nucleated settlement pattern, the '*terroir*' is very hard to define in Toega since decisions over land tenure and access are not contained within that community. Toega residents farm a zone over which they have almost no customary rights, and they have little control over land tenure. This unusual situation has come about since the village, a relatively recent settlement, was carved out of the pre-existing territory of Rollo to the west and from land settled by Peul herders at Bouli, to the south.[7] This has important implications for soil and water conservation activities. Today, one can talk of a threefold division of Toega's used space, as follows (Figure 3);

- Some 46 per cent of the area cultivated by Toega's farmers is controlled from the larger settlement of Rollo. Numerous Rollo residents cultivate close to, and amongst Toega farmers, while Toega residents are forced to ask permission of the Rollo authorities to clear and farm a new plot of land, or must 'rent' from Rollo landholders. The planting of trees or construction of conservation works on this borrowed land is not always possible.
- Peul (semi-sedentary Fulani) still control all land to the south of the *bas-fond* and have two permanent encampments in this region. Mossi/Yarsé require their permission to farm here. Surprisingly, relations with farmer 'tenants' on Peul land are generally good. For these farmers to construct *diguettes* or plant trees would be seen as laying claim to land not theirs to manage, however, and is quite strongly proscribed at present.
- Closer around the village itself, land has for some years been controlled *de facto* by village elders at Toega — a small area 'carved out' from the Rollo *terroir*. It is here that many impressive *diguettes* have been constructed over a three year period on

[7] The latter gained their land rights through deft political manoeuvres with Mossi leaders in the early colonial period.

> 17 per cent of the cultivated area, on land once heavily degraded and stripped of topsoil by fierce summer runoff.[8]

To illustrate how complex local land and political arrangements can be, this threefold division of rights to land is further complicated by the existence of a village chief not in Toega itself, but at the settlement of Kiella (Figure 3), the '*responsable administrative*' charged with tax collection and dealings with the government for a zone which includes Toega, Kiella and neighbouring villages. Toega lacks political authority and is viewed by the State as a quarter of a larger village which falls under administrative control from Kiella. The residents of Toega, fiercely protective of their identity, lack the political power to dispute this situation; they are caught between Rollo, the Peul herders, and a Kiella leadership that they scorn. When PATECORE initiated contact with Toega alone in 1990, on the recommendation of the local extension agent, these hostilities were exposed. Not surprisingly, relations between Toega and Kiella deteriorated, to the extent that by 1993 Kiella had 'withdrawn its women' from Toega unions and prohibited further marriages between the two communities.

This issue of divided space and lack of political control, as exposed above for Toega, presents a formidable obstacle to a 'territorial' approach to land use management. It forces management activities back on the small 'village space' over which the community has *de facto* rights. Outside this area, both Peul and Rollo landlords must be approached to permit environmental improvements on their land. To make significant changes in land tenure would disturb lineage authority and perhaps disrupt the already fragile balance of forces that link Toega with its neighbours. Although there are national moves to reform land tenure arrangements in Burkina Faso, these are still the subject of some confusion and they are not fully active at the local level (Lund, 1997).

Underscoring the strong diversity of land access amongst Mossi communities, we find a different situation at Zaanga; here the '*terroir*' approach fits well with the spatial distribution of farming activities. Most farming and animal grazing takes place in the *terroir*, and over 80 per cent of the cultivated area is in lineage ownership. The customary chief of the village resides at Zaanga Palga but, as mentioned above, has absolute authority over the nearby settlement of Zaanga Koudougou.[9] Although soil fertility is generally poor, the cultivated fraction forms 38 per cent of the *terroir*, and fallows are still practised; farmers will generally clear a new field every 7–10 years. The chief of Zaanga is subservient to the chief (*naaba*) of Rollo to the north but more powerful than his immediate neighbours; Zaanga's *terroir* is thus clearly demarcated. Soil and water conservation has so far been confined to the village fields of Zaanga Palga, but there are no obstacles to the future expansion of tree-planting, *diguette* construction or the treatment of ravines further from the village centre or onto the land farmed by Zaanga Koudougou households.

Power relationships and village organizations

The future development of co-ordinated land management activities will depend strongly upon the dynamism, internal cohesion, strength and organizational capacity

[8] This three-fold division of space was uncovered through field surveys and interviews with all farmers in 1992, and confirmed by a rapid rural appraisal exercise held at Toega in November 1992 where villagers drew their own maps (see Guijt, 1992).

[9] Zaanga Koudougou was developed first, but several generations ago a prominent lineage relocated to exploit farming land to the north-east; this lineage later took the chieftainship (*chefferie*) and has retained it.

of their respective village organizations; this is especially true where a village group assumes a planning function and 'represents' the village to outsiders. Membership of a cross-community organization allows a man or woman to 'speak for' his or her own household or lineage at key meetings and discussions with outsiders, demonstrates commitment to community ideals, and it is a commitment to assist in projects requiring group labour. In the Mossi region, village organizations range from the unconcerned (small, indifferent, and often co-opted by key players) to the dynamic (large membership, representative, egalitarian, and hard working). Extension agents and project workers prefer to work with the latter type of organization, although experienced workers can spot instances where a village is simply attempting to attract benefits or tries to conceal serous intra-village rifts through an unconvincing show of solidarity. At Zaanga, the village group was just beginning in the early 1990s, and the power of the chief (*naaba*) was still strong. At Toega there is no customary chief. The village group here is dynamic, inclusive and hard working (see Batterbury, 1994; Guijt, 1992). The group comprises virtually all adult males and a cross-section of women (in 1993 a woman was vice-president), and co-ordinates all GTV-type activities. It relies on personal ties based on kin and friendship — the affective economy — and frequently receives visitors and missions from PATECORE and other projects. Activities it has undertaken, shown in Table 2, are wide ranging, and in 1994 its members expressed enthusiasm for expanding these to a fully-fledged 'village management plan' that was begun that year.

This encouraging picture conceals complex struggles and covert manoeuvring. Prior to 1990, Toega farmers operated a joint village association with the residents of Kiella. A long dispute fissured the two communities in the late 1980s. Toega's lack of a chieftainship, and subordinate status vis-à-vis Kiella, was a long-standing source of resentment. The current incumbent at Kiella has, Toega says, deprived them of resources and under-reported their real tax returns to the *préfet* in Rollo. Secondly, Kiella residents have opportunistically used their position on the only road into the area to waylay vehicles and goods bound for Toega.[10]

Contrary to first impressions, communities can be *internally strengthened* by such all-too-common disputes. The Toega group demonstrate autonomy and a capacity for hard work, and are keen to impress their neighbours. A history of conflict does not detract from their impressive achievements, and indeed it has nourished them. In this respect, inter-community struggle has been of positive advantage to the affective economy. It has even brought back a few longer-term male migrants who had heard of the new village activities and wished to participate in them.

The position of women's organizations in natural resource management is less clear. Forced to adopt a secondary role in the household, Mossi women are often able to achieve small improvements to their position through advantageous marriage or subservience to elder co-wives and mother in law, and not necessarily by active participation in self-help ventures or contact with outsiders (Rohatynskyj, 1988; 1993). Both villages have registered women's associations, and both concentrate their activities on the production of groundnuts on communal fields; these are sold for cash

[10] Several years ago Toega was targetted in the Saudi-Arabian funded borehole programme because of fresh water supply problems. Kiella was not. Kiella residents attempted to conceal the location of Toega from the drilling crew. Kiella also appropriated and consumed in secret a large consignment of food aid that was destined for the women of Toega (to release them from meal-preparation during the construction of *diguettes*). From then on, the two villages have remained separated.

and enable the group to save modest sums against future hardships or expenses (these fields can only be tended once labour obligations on their own and household plots are over for the day). Both women's groups registered an interest in social improvements such as improved maternity care, but these were not the prime concern of PATECORE and could not be offered by this project. In both villages, certain women were ostracised from the group because of marital disputes, and never participated in meetings; they were 'missed' by extension workers in their field visits as well. Should a *gestion des terroirs* model be continued in Zaanga in the future, womens' preoccupations should be brought to the fore and addressed more openly.

Agriculture practices, community differentiation, and beneficiaries

This section looks more closely at the diverse agricultural strategies employed by land users in the two study villages. It is now widely accepted that 'local knowledge' and innovations by farmers themselves should be supported (Scoones and Thompson, 1994; Warren *et al*., 1995). Indeed, these constitute vital elements of farming systems in northern Burkina Faso (Ford, 1982). At Zaanga, field surveys demonstrated many farmers were actively experimenting with their own systems of erosion control and crop mixes, and had been doing so before the 'project' *diguette* systems were begun in 1992. There are several examples of stone cordons lain around field boundaries, wood barriers of various types, *andropogon* grass strips strategically placed to capture water and fine silts, and small check-dams across rills and gullies. In addition, those farming more than one plot commonly chose to locate fields on different soils or slope positions to maximize their chances of at least part of the crop surviving pest infestations or lack of moisture. Farmers are adept at exploiting the microtopography of their field margins using millet stalks and trash lines to both brake and direct overland flow to seedlings and plants. These practices demonstrate a tuned awareness of risk from climatic perturbation, pathogens and low soil fertility.

At the same time, farmers are now building large *diguettes* in selected locations, adopting extension advice on the creation of small-scale agroforestry systems, purchasing donkey carts or tools at discount prices from development projects, and applying small quantities of herbicides and fertilizers — all practices originating from outside the community. Local knowledge thus incorporates selected elements of 'development' packages and other new techniques. As Saul (1991, p. 303) states, 'local people can imaginatively adapt and use some of their elements, provided they hit an appropriate socio-economic matrix'. Farmers in the study region are 'planning' many of these elements themselves, particularly those associated with the rehabilitation of degraded land that require large inputs of labour or other resources. Any development initiative working with farmers showing such a capacity for innovation needs to tread carefully, and to go beyond formal models of technology transfer and extension work (Scoones and Thompson, 1994).

One potential impact of GTV interventions will be to change land use patterns. It is frequently argued that the increasing food requirements of a growing population across the region have led to the expansion of agriculture onto land that is less well suited to sustained production and therefore more susceptible to erosion and nutrient decline. Under conditions of land scarcity (present at Toega) this has resulted in the exploitation of marginal land, both *up* the toposequence to 'borrowed' plots on less moisture-retentive gravelly soils and *down* into richer, but difficult to work and sometimes waterlogged valley-bottoms. Vierlich and Stoop (1990, p. 125) suggest

declining yields have forced Mossi farmers primarily in the latter direction — down the sequence, where poor rainfall may now be making these areas more viable for agriculture (through the lowering of water tables and less frequent waterlogging). Ramaswamy and Sanders (1992), in an attempt to apply agricultural intensification theory to the Plateau, concur and suggest 'as population pressure increases, making land seem scarcer, there is a definite trend toward intensification on the best lands' — farmers, under pressure, invest in the best soils. Reij (1994a) argues another trend is visible;

> farmers do not invest in their best lands, which are cultivated permanently, but they invest in rock hard, barren land (*zipellé*). In the early 1980s most experts believed that these lands could only by rehabilitated with heavy machinery (deep ploughing) and the economic merits of such an operation were deemed doubtful. Reij (1994a)

Reij, referring here to an area of high population density about 50 km away in central Yatenga, suggests degraded up-slope land is being rehabilitated by enormous inputs of dry-season labour into *diguettes* and *zay*[11], thus bringing formerly abandoned land back into production. This labour-intensive rehabilitation of degraded land away from areas of better potential could accompany intensification of production closer to village centres, and in valley-bottom areas. Assistance by GTV projects could aid a process of agricultural intensification on formerly uncultivated land, but also in high potential zones. In the two villages, where comprehensive surveys of all plots were made, this has resulted in a complex pattern of land intensification. In each village, both the up and down-slope options were being pursued. One farmer had forsaken a large bush plot to cultivate land that had received *diguettes* in Toega centre, gambling (unsuccessfully) on increased yields. Also in Toega, animal manures and some fertilizer were selectively applied on some outfields, and in 1994 a major investment was made in composting pits (*fosses fumières*) by the village group. It is unlikely this initiative would have been taken without project guidance; the significance is that the compost became a community resource, to by used by group members anywhere on their land. Ploughing, however, was restricted to those owning or able to borrow both plough and donkey, favouring the richer households but occurring on everything from clay-rich to stony soil types in various locations. It appeared some families had chosen to 'extensify' while holding constant labour inputs (through use of ploughs) while others had deliberately chosen another path — to concentrate inputs to obtain sustained yields on smaller, intensively farmed plots. A farmer in Zaanga had cultivated the same plot for 26 years, with little change to its dimensions or boundaries, experimenting over the years with organic manures from a small animal herd (latterly he established a compost pit as well), and the application of low grade NPK fertilizer since 1986, financed by animal sales. This latter period appeared to have stabilized the resistance of the plot to poor rainfall. Rather than relocate his plot, a drop in soil fertility was tackled by *selective* investments, aided by the use of carts and other tools from PATECORE. Rather than construct *diguettes* on his own land, this farmer went on to use the development project to build up personal status and as a method to improve other parts of the *terroir* than his own.

[11] Also called *zai*. These are planting pits dug on infertile soils, filled with manure and perhaps fertilizers or local 'Burkinaphosphate' rock. The technique is widely practised in Yatenga, and had recently arrived in the case study villages.

This diversity of response is critical for *gestion des terroirs* initiatives since it suggests a patchwork of land use strategies, without evidence of a gradual movement up or down-slope over time by large numbers of farmers that could be programmed into a land-use plan for future years. Only in some cases have farmers chosen to invest heavily in soil and water conservation, although they are usually willing to participate in the hard work needed to build erosion structures through group labour (Table 2) (Fiske, 1990). Kunze (1994, p. 66), working in several villages in different ecological zones of Bam Province, found the beneficiaries of SWC more often to be returnee migrants, to have a larger area of cultivable land per person, and own more livestock and tools than the non-beneficiaries. She also found that women farmers were less likely to have soil conservation works on their fields, and had less access generally to good farmland. Soil and water conservation must, therefore, be seen one type of option among many in reducing exposure to risk, and the current inequalities in benefits be seen as an outcome of village power structures and social differentiation. Management of the village lands need to remain responsive to these differences, allowing the pace and scale of land rehabilitation to be truly led from the village, not imposed as a set of blueprints.

If participatory research and action is to stimulate local control and to set communities on a new path towards sustainable livelihood systems with greater resilience, the understanding and then stimulation of *intra*-village communication needs to be boosted (PATECORE, 1994; De Leener, 1995). In this process of selective intensification of land use, and in the more formal planning of soil and water conservation that has occurred in both cases, '*agro-formateurs*' and village organizations are critical. *Agro-formateurs* are local farmers who have received appropriate outside skills or training, can disseminate this information in the village, and can understand why the beneficiaries of project assistance are not passive recipients, but are actively incorporating this new knowledge into their own livelihood strategies.

4 DISCUSSION

The paper has offered some general avenues of enquiry for the continued study of *gestion des terroirs* initiatives in northern Burkina Faso. Based on a case study of the early impacts of a large environmental programme, the paper has voiced cautious optimism for the approach, but raised some concerns about its applicability and its differential impacts. To some extent, the evidence presented here shows the approach to be a 'second best' form of community planning, since the impetus for carrying out large-scale land rehabilitation on village lands appear to originate from outside actors, even where community involvement is very strong and people participate enthusiastically in these ventures. Large numbers of 'meetings' are held with project staff (Table 2), and many kilometers of SWC structures are being built. But it is still true that certain individuals and groups (those with secure land access, for example) receive differential benefits from GTV (Kunze, 1994; Reij *et al*., 1996; Schorlemer, 1996). These differences have, in Toega in particular, been minimized by the enormous labour mobilization which has occurred under project support. This has permitted and been fed by investment in 'social capital' and inclusive institutions, and joint projects of potential use to many (if not all) households like compost pits, tree plantations, and improvements to water supply.

While a 'discourse of techno-agronomic progressivism' (Saul, 1991, p. 303) underpins *some* project-induced extension efforts in the region, in the second section of the paper I argued that this was less present in the new breed of resource management projects to have emerged on the Central Plateau of Burkina Faso over the last ten years. The Central Plateau is now distinguished by its innovative approaches to the conservation of natural resources and is a true laboratory for such techniques. It is hoped that the range of techniques employed will continue to broaden, because it is highly probable that the benefits to soil fertility and water regimes will begin to lose their impact once the majority of farmland has been treated with SWC measures.

In this discussion, it is impossible to divorce the abstract notions of social benefits and participation from the practices actually carried out by farmers. It is clear that, whether reached by new forms of planning or project support or not, farmers are continuing with their own risk adverse farming strategies, in some cases selectively intensifying all or part of their land, and adopting less costly agronomic improvements where appropriate. Many Mossi farmers also obtain substantial off-farm income, which clouds the possibilities for sustained interventions where more effort or time is spent earning money away from the village lands (David and Yabré, 1995)

The case study has highlighted the dynamism of village institutions in this region, but noted that these can take on different forms and roles, *Gestion des terroirs* cannot proceed without the involvement of existing organizations, and these can be highly complex in terms of the interest groups they represent and in the manner in which decisions are taken. Organizations are especially important in the planning and enactment of a GTV plan for a community where many meetings, much discussion and some group training may be necessary (De Leener, 1995). Unfortunately, improvements to organizational structures are less easy to display to potential funders than 'visible' SWC measures, and are less easy to evaluate. A number of factors can lead to the formation and persistence of strong local organizations, not least amongst them conflict with neighbouring communities and the need for assertiveness to secure adequate land access (as at Toega), or a desire to attract some material benefits to an isolated location, coupled to a benevolent but powerful traditional leader (as at Zaanga). An important area still unexplored by many development projects is the relationship between the goals of these groups and the needs of their members. Do they really represent all land users, or may they be co-opted by certain interest groups? Also, to what extent do extension advice or action plans developed at the institutional level reach or involve individuals who really need them? Do village meetings really act as suitable 'interface encounters' between insiders and outsiders (Long, 1989; Laurent, 1996)? In most cases it is quite true that, as Fowler (1992, p. 17) points out, 'to realise people's empowerment, participation requires terms of engagement between the intervening entity and a community that in practice the project paradigm does not allow'. Women's organizations in particular are poorly addressed in many extension activities.

5 CONCLUSION

On the Central Plateau of Burkina Faso, landscapes around many hundreds of villages and settlements have now been transformed by the continued investment of farmers and environmental projects (Atampugre, 1993, Batterbury, 1996b). Among

the projects operating in Bam Province, interventions like *diguette* systems on farmland and degraded areas have been technically well designed, extensively researched using 'hybrid' research (i.e. scientific investigations, combined with practical assessments by farmers), and have had immediate and positive effects on crop yields and soil quality. More investment in plantations, compost pits etc. and the provision of donkey carts and basic tools are investments that will yield continuous returns in the future. A momentum of interest exists in *diguette* construction that will allow the present *agro-formateurs* to train their successors.

May we state, therefore, that *gestion des terroirs* initiatives in this part of Africa offer an example of sustainable environmental and social intervention? There are reasons to doubt this claim. For example Atampugre (1993) suggests soil conservation works require continued maintenance and much larger quantities of organic matter inputs (or fertilizers) than most individuals or communities can realistically provide. I have shown that 'land-poor' villages would need major changes to tenure laws and land access to plan effectively at the *terroir* level. There will always be situations where the *terroir* remains an unsuitable scale of intervention. There are also grave doubts that local government departments, now well trained to lead GTV activities, will actually be able to assume the high capital costs of maintaining these programmes in the long term. While quite cost effective, the delivery of stones to the village by truck is extremely expensive by local standards (Vlaar, 1992b). Villages, grown used to the availability of trucks at minimal cost, would have to look elsewhere for transportation of rock and stones, or return to using donkey carts (Reij, 1994b).

If there are areas where more work is required to assure sustainability, what are the main impacts of GTV programmes to date? Summarizing the social impacts of GTV requires detailed local-level research, that not always present in the numerous economic evaluations and project reports available in Francophone West Africa (but see Luning, 1989; Kunze, 1994). The most exciting aspect of the approach, as referred to in Section 2, are its emancipatory dimensions; the promotion of local territorial control where this was previously absent or downplayed, the positive effects on intra-community solidarity, and the use of GTV activities as a vehicle to expand the range of choices enjoyed by rural people. These latter benefits came across strongly when gauging the opinions and reactions of farmers in the two communities, although they are hard to express in economic terms. The beginnings of soil conservation efforts in Zaanga saw a rise in the knowledge and competence of the village in dealing with project staff and the government extension services, which ultimately led to further improvements in welfare, and the expansion of the village group to include farmers from a nearby community.

Given these reservations over *gestion des terroirs* and the lack of evidence to support the more ambitious claims of some projects that they are creating self-led environmental revolutions in dryland West Africa, I conclude that GTV is a 'second-best' form of community development, because it is initially managed 'from above' despite a populist framework and strong local input (Engberg-Pedersen, 1995; Leach *et al*., 1997; Schorlemer, 1996). *Gestion des terroirs* accords well with some aspects of changing agricultural practices — the restitution of community decision-making, the desire to improve local resources through communal endeavour, and a sense of pride generated out of the affective, kin-based economy. The participatory model in use by PATECORE, despite some problems of local sensitivity, could adapt well to other areas of West Africa. We should be wary of generalizing from a few project

experiences, however, or even a few communities. Dryland West Africa is too complex for simplistic forms of community-led development.

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