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Maja Slingerland
Masdewel Mouga

Aménagement et Gestion
e Sylvo-Pastoral au Sahel

ienne de l'Université Agronomique Wageningen Pays-Bas
sité de Ouagadougou Burkina Faso

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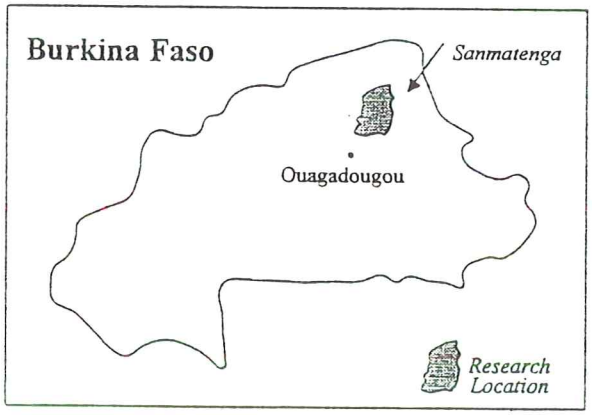
MULCHING ON THE CENTRAL PLATEAU OF BURKINA FASO

Widespread and well adapted to farmers' means

Maja Slingerland and Mouga Masdewel



Most soils in the semi-arid Sudano-Sahelian zone of West Africa are liable to crust formation which produces considerable run-off during heavy rainstorms. The run-off water selectively washes away any organic matter and nutrients from the surface layers. Thus, not only water but also soil fertility are lost. Several traditional soil and water conservation (SWC) techniques to fight this phenomenon can be found in this region (Roose, 1988). Mulching, which is one of them, will be treated in detail here. Mulching is examined in the province of Sanmatenga and the village of Tagalla.

INTRODUCTION TO THE AREA

In the densely populated Central Plateau of Burkina Faso, most fields are permanently cultivated. Demographic pressure is increasing and, with the decline in

opportunities for labour migration to the Ivory Coast, some migrants have returned and settled in their villages again. In this region few crop residues remain on the field after the harvest as they are used as feed for livestock or as fuel. The bare soils, largely loamy in texture and lacking any protection, are thus susceptible to crust formation, run-off and soil erosion. Traditionally, farmers put a mulch on small parts of barren land with a hard crust as a means of rehabilitating it, as well as spreading it on cultivated fields on which the yields had declined. Until the early 1990s, this technique continued to be practised only on a minor scale because farmers felt that it involved considerable work cutting grass, transporting it to the fields or transporting millet stalks and spreading them. However, since 1992, the practice of mulching has spread rapidly. In the months just before the rainy season (from February to May) many people, men and women, old and young, can be seen cutting grass and transporting it in heaps on their heads or by donkey cart to the fields (see photo 13). Cases have been found where young migrants who have returned from the Ivory Coast were allocated marginal land and made an enormous effort to improve the quality of these fields through mulching. Elsewhere, old women mulch their small plots (*beolgo*) on which they largely depend. Where grass is not sufficient, people collect dry leaves of various trees, in particular of *Butyrospermum parkii* or sheanut. A light form of mulching is used by Mossi farmers. This method consists of covering the soil with a layer of about 2cm of dry grass, equivalent to 3–6t/ha. The advantage of mulching is not only the fertilization of soils by decomposition, but also the attraction of termites. Termites create passages in the soil, thereby destroying the crust, increasing soil porosity and permeability. Termites also stir and mix large amounts of soil (Mando *et al*, 1993). All these factors together create more favourable conditions for the development of roots. The remainder of the mulch, after termite consumption, is sufficient to absorb some rainfall and to decrease run-off (Roose, 1989).

The province of Sanmatenga

Tagalla village is situated in the province of Sanmatenga. A farming systems study for this province was recently carried out which showed that mulching was only a sideline, but the results provide an idea of its relative importance (Barning and Dambré, 1994). Data are based on a sample taken in three villages in the province, one in the north (Kogyende) and two in the south (Dembila and Ouanané). The surfaces mulched in these villages and by the two main ethnic groups are presented in the table opposite which shows that in the north, 74 per cent of the households mulch part of their fields, whereas this is 43 per cent in the south (Ouanané).

The study also found that the use of animal traction and organic fertilizer was much more common in the south than in the north and, as might be expected, farmers using animal traction and organic fertilizer were less involved in mulching. On the smallest farms (0–4ha), 39 per cent of farmers put a mulch on their fields, but on the larger farms (4–8ha), 64 per cent mulch part of their land.

Percentage of household fields mulched for different villages and ethnic groups

	Villages			Ethnic Groups		
	Kogyende	*Denbila*	*Ouenané*	*Mossi*	*Peulh*	*Total*
Number of households	101	48	72	150	71	221
Surface mulched (per cent)						
None	25.7	81.3	56.9	33.3	74.6	48.0
0–25 per cent	61.4	14.6	30.6	50.0	22.5	41.2
25–50 per cent	11.9	4.2	11.1	13.3	2.8	10.0
50–75 per cent	1.0	–	–	0.7	–	0.5

Larger farms have larger bush fields and these are more often mulched than fields closer to the homesteads which tend to receive more manure. Farmers on larger farms also often have a donkey cart which facilitates the transport of grass. The study also revealed that whereas the majority of the Mossi (67 per cent) mulch their land, only a minority of the Peulh (25 per cent) do so. This can be explained by the fact that the Peulh are agropastoralists who have larger numbers of livestock and therefore more manure, while their fields are smaller than those of the Mossi, who depend more on farming. A positive relationship was also found between the total area mulched and investment by farmers in SWC. Finally, the table below shows a positive relationship between available work-force per ha and the area mulched. This suggests that labour may be a constraint on the area which can be treated in this way.

Tagalla

In Tagalla, a village on the Central Plateau located in the western part of Sanmatenga province, a more in-depth study on mulching was done with 49 households practising this technique. The farmers distinguish four main soil types in their village: *bolé* (clay), *baongo* (valley bottoms), *zipellé* (sandy–loamy soils with a hard crust) and *zegdega* (lateritic soils). All 49 farmers claim that the *zipellé* suffer most from erosion and run-off, and acknowledge that the eroding

Number of active household members per ha cultivated in relation to the percentage of the surface mulched

Surface mulched (per cent)	Active worker per hectare	Number of households
None	1.71	105
0–25	2.11	91
25–50	2.60	22
50–75	2.67	1
Total	1.96	219

factors are: rain, wind and human action. They mention that erosion is accelerated by a decrease in the vegetation cover, especially the progressive disappearance of trees (50 per cent) which is said to result in bare and hot soils (6 per cent), a decrease in rainfall (10 per cent) and drier soils (10 per cent). This results, according to the farmers, in a decrease in crop production and in weight loss for cattle. The farmers generally know of several methods to fight erosion. Stone bunding and mulching are mentioned by 36 per cent and 38 per cent of the farmers respectively, while 25 per cent mentioned grass strips. Mulching and grass strips are traditional practices, whereas stone bunding was introduced in the 1980s. The main constraint for mulching is the scarcity of grass and the distance over which to transport it. Only 12 per cent of the farmers claimed to be able to find grasses nearby; the others considered them a long way from their fields. However, grass is light and small quantities can be carried even by old women. Most transport of grasses is done by head, with only 10 per cent of the farmers using donkey carts.

Loudetia togoenses is the only species of grass used for mulching. It can be found in reasonably large quantities as homogeneous layers on very poor soils on nearby hills. Its alternative use as fodder ends as soon as it starts to flower because then it grows spikes which discourage livestock from eating it. Other grasses are not available in the same quantities, either because they are eaten by livestock or because they are cut and used at household level for handicraft, thatching or fodder. The main period for cutting and mulching is May, although some farmers may already make a start in February (see photo 14). In this period the grass is totally dry and unfit for livestock consumption. Farmers want to mulch all their fields but are constrained by the time required. In the majority of cases, two weeks of work is put into mulching, including cutting and transport. With this investment in time, none of the farmers managed to cover all their fields. The criteria used by farmers to choose the fields to be mulched are the following: low soil fertility (47 per cent), prevention of soil degradation (23 per cent), maintaining or increasing soil humidity (17 per cent) and a decrease in crop production in general (10 per cent). The benefits of mulching they mention are an increase in crop production (36 per cent), maintaining and increasing soil moisture (30 per cent), an increase in soil fertility (23 per cent) and protection of the soil against wind, rain and the sun's heat (5 per cent). The main crops which benefit from mulching are sorghum and cowpea which are mostly intercropped. Sorghum is the staple food of the area. Apart from mulching, some farmers also use manure (42 per cent) or even inorganic fertilizers (16 per cent) on the same fields. Some farmers (23 per cent) burn their mulch shortly after the beginning of the rainy season, partly to facilitate ploughing at the start of the planting season and partly to facilitate weeding afterwards.

Although farmers know the advantages of mulching, they are not interested in applying mulch to fields other than to those currently being cultivated. Forty per cent of farmers also claimed that they have no land left in fallow. For many farmers, stone bunds and mulching are complementary measures, because once

the investment is made in stone bunding, mulching brings added benefits, thereby increasing the return on investment in conservation works.

CONCLUSION

Mulching is a traditional soil- and water-conservation technique which is now widespread and well adapted to farmers' means. However, many questions remain to be answered. What triggered the rapid adoption of mulching by thousands of farmers on the northern part of the Central Plateau, since 1992 in particular? It cannot be due to the activities of development projects or national programmes because none made a specific effort in the pre-1992 period to promote mulching. It may have been triggered by the low rainfall received in 1991. In 1995, by contrast, following a year of high rainfall, the area mulched was considerably less than the previous year. But low rainfall cannot be the single reason triggering mulching because there were years of low rainfall in the 1980s which did not lead to such an increase in mulching. In the 1980s, the government enacted a number of measures aimed at reducing environmental degradation, such as the campaign against bush-fires. As a result, such fires have become a rare phenomenon, which has led to an extension of grass cover in this region. Further investigation is needed of other issues, such as how villagers manage the areas where *Loudetia* grasses grow. Do they control access to grass, or can every villager cut as much as he or she can handle? In some villages, those who cause grass- or bush-fires are now sanctioned and have to pay a fine, which indicates a growing interest and concern among villagers for ensuring the maximum availability of materials for mulching their land.

SUSTAINING THE SOIL

Indigenous Soil and Water Conservation in Africa

Edited by Chris Reij, Ian Scoones
and Camilla Toulmin

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Earthscan Publications Limited
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