Labour aspects of gardening in Turkana

To bund or not to bund?

The dry, north-western corner of Kenya is inhabited by the Turkana, nomadic pastoralists whose economy is built around raising livestock, but who also hunt, fish, trade and grow sorghum. Traditionally, sorghum production has taken place during the wet season, by exploiting the rainfall that naturally collects after rainstorms where the soils and topography combine to form a favourable environment for gardening.

Simon Croxton

In the early 1980ies, following a drought and widespread epidemics which decimated livestock numbers, the region became the focus for various development initiatives. The majority of these sought ways to assist the recovery of the pastoralists' economy. A lot of emphasis was placed by outside 'experts' on the proposed benefits of improving the utilisation of scarce rainfall by using rain water harvesting (RWH) techniques. These were often associated with food-for-work (FFW). The most popular approaches were to build large earth banks (bunds) on the contour, to trap run-off. These structures were aimed at increasing the reliability of sorghum gardening.

These measures met with varying levels of success. A recent independent review of RWH in the north-east of the district concluded that the most effective and widely used method was the construction of irregular shaped bunds on the contour (with 'wings' stretching up-slope) on fairly flat slopes (less than 1%) around traditional sorghum gardens. The most effective approaches have been those which have built on traditional methods of land tenure, have included the local community in decision making and have ensured that the necessary technical skills required to construct and maintain gardens were in the hands of local people. In these circumstances, where local control of the idea has been encouraged, there has been considerable uptake of improved gardens and the concept has proved to be quite popular. This article examines the labour implications of 'improved' sorghum gardens.

Labour constraints

Despite the benefits, in terms of increasing the productivity of sorghum gardens, the construction of bunds and the levelling of gardens (so that impounded water spreads evenly across the garden) requires a considerable amount of labour. Even when draft animals are used to scoop and transport earth, the amount of labour needed to improve a garden is usually more than can be provided by one household. In addition, bunds often break during heavy storms and need to be repaired and this again is a labour intensive operation. If improved gardens are not maintained the result is often severe soil erosion as large quantities of water are channelled through relatively narrow gaps in the bund. The poorly maintained garden is not necessarily the only area to suffer as gulleys can start to develop in an adjacent garden. Silt from a damaged garden can also be washed into other gardens further downslope, which then require levelling again as the new soil that is deposited stops water spreading evenly across a garden. There are other problems: improved gardens on slopes steeper than 1% are technically possible, but in practice labour requirement is greatly increased (eg an increase in slope from 1% to 2% doubles the amount of soil that needs to be moved to level a plot of a given area). In some sites unstable, cracking clay soils are unsuitable for bund construction as the subsurface flow of water (piping) undermines the bunds. If bunds are built on these soils the labour required for maintenance is increased as they will

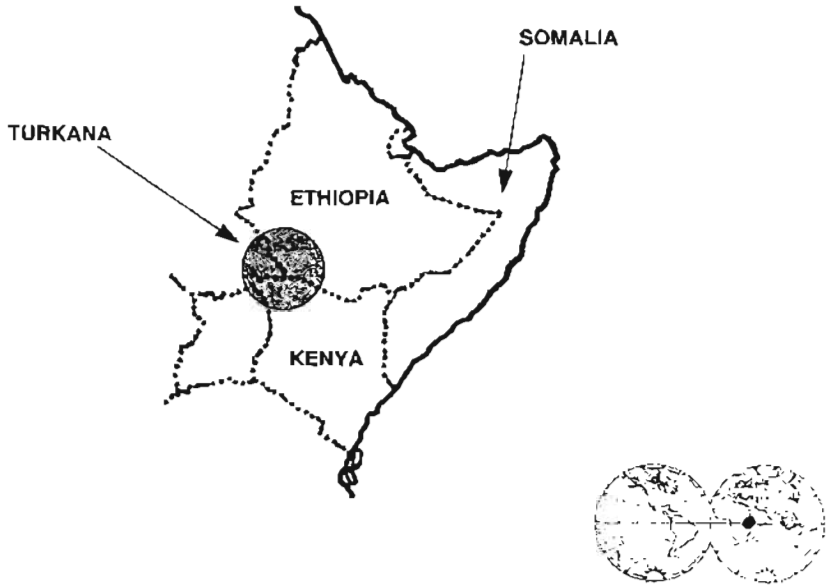
fail more frequently than bunds constructed on more stable soils. Sites on steep slopes or with unstable soils are now avoided.

Mobilising labour

When these ideas were first tried out on a large scale by Turkana gardeners, there was a considerable amount of FFW work available for garden construction. While FFW was available this could be used by gardeners as payment to friends and neighbours to assist in garden construction. However, FFW had a distorting effect on peoples' perceptions of the returns to their labour. People naturally considered the food gained as an additional benefit acquired by some rather arduous work. People were prepared to do all sorts of activities to 'earn' FFW food. Some of these activities, such as building roads, provided little direct benefit to their nomadic lifestyle. For some people constructing gardens was just another of these activities. However, FFW did not last forever, and in recent years its supply has dwindled and now stopped.

Who can afford labour?

Gardens are small and can never provide more than a supplement to the major activity of herding, although the grain produced in gardens is often exchanged for goats. Sorghum yields are quite low, and although these are regarded as a valuable supplement to household subsistence incomes, they are not sold and, even with improved gardens, harvests cannot be guaranteed in any one year. Without FFW it is far more difficult for families to mobilise sufficient labour for garden construction and maintenance. The Turkana do not have a traditional method of mobilising labour for work in gardens (although there are traditions of sharing labour in herding) and there is a perceived trade-off between the benefits of improving gardens and the costs of mobilising the amount of labour this work requires. The only way a household can replace FFW is to provide some incentive, usually food of some sort, to friends and neighbours to assist in the construction or maintenance of gardens. Maintenance is not usually too much of a problem, as less labour is required, but as constructing a new garden requires a lot of labour this can be very difficult for less affluent households to mobilise. Thus, despite the technical success that has been demonstrated, there is still an inherent problem with the concept of improving gardens with bunds, because only relatively affluent households will have the extra resources required to mobilise sufficient labour to construct them.



Women gardeners

Traditionally, sorghum gardens are managed by women rather than men. Some men will provide some labour in gardens, but this is not the norm. As the work of constructing and maintaining gardens is strenuous, men's labour is valuable and useful and whilst FFW was available it was not difficult to get men to assist in constructing gardens. Without FFW more responsibility for this hard work falls on women, who have relatively less control over household resources and so find it difficult to construct gardens.

Women building rainwater harvest gardens with scoops and shovels.

Aloe effective in combating erosion

In most areas of Transkei, soil erosion is becoming a serious problem. It is not just the quiet and almost unnoticed type of sheet erosion but gullies or 'dongas' are formed. This causes considerable loss of valuable soil and creates danger for down-slope farmers. For some time the government had suggested that people should put up rock walls across the dongas. In areas with sufficiently available rock material, this method can work well but even then it takes a lot of heavy labour.

Over the years I have watched how farmers combated erosion in different manners. Some of their methods work out very positively while others are less convincing. One effective method which at the same time proves to be efficient in terms of labour requirements, is the use of aloe (*Aloe ferox* or *Agave americana*). Farmers plant small aloes to form a line across the dongas. As these grow, the big leaves mesh with one another and form a natural barricade. Sometimes people also put brush down along this row of aloes to make the barrier larger. This barricade slows down the speed of runoff water and thus it deposits the soil it is carrying. As the aloe plants grow, the barrier catches more and more soil, until the donga is gradually filled up again.

Small *Aloe ferox* plants grow on the hillside. Small agave plants are found at the base of large agave plants. Both species can be easily dug up and transplanted into the dongas. Since goats and other grazing animals do not disturb these two species, and because they are easy to find and transplant, the effectiveness is high especially compared to the relatively light and little labour involved.

From: Radio Programme No 15, August 2, 1990, HP Harman, Transkei Council of Churches.

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Labour-saving alternatives

In an attempt to overcome some of the labour constraints on improving gardens, some groups of gardeners are currently experimenting with another method of water conservation. This is the use of grass strips, about 2 metres wide, sited on garden boundaries. The grass strips are a modification of the traditional method of demarcating garden boundaries. Traditionally a narrow, uncultivated strip would be left around a garden. Sometimes this would be reinforced with a thorn and dead-wood fence to keep out livestock. The traditional strip is too narrow to have much effect on soil and water conservation. However, by creating a wide strip, it is possible to significantly slow down the rate at which runoff water flows across a garden. In addition, topsoil would often be washed out of a garden (sometimes along with newly planted seeds). By widening the strip and levelling the garden to ensure water spreads evenly, soil and water conservation is enhanced while garden improvement requires far less labour. This technique is reserved for gardens on gentle slopes because, as is the case with bunded gardens, levelling gardens on steeper slopes would still require large amounts of labour.

Keen to experiment

It is still too early to thoroughly evaluate the technical advantages of grass strips over traditional gardens. However, neighbours of gardeners who have already improved their garden in this way are keen to try out the idea and one of the reasons for this is the fact that they do not regard the amount of labour needed as a serious constraint. It is interesting to note that some gardeners using the grass strips know how to construct bunds, but are keener to first try out the idea that requires less labour.

Conclusion

The major lesson that can be drawn from this example is that 'improved' technologies can increase labour demands as well as increase productivity. This may have differing implications for different sections of the community (eg rich/poor; men /women). The 'best' technical option may not be feasible for poorer households. It is important for poorer farmers to be offered choices and assisted in developing their own solutions. Perhaps if 'outsiders' had spent more time looking at the techniques the Turkana were already using, improved grass strips would have been tried out at a far earlier stage.

In addition, external factors (in this case FFW) may distort the real returns to labour of adopting an 'improved' technology and, if these external factors themselves change in some way, this can also affect the viability of adopting a new technology. Even though a specific technology may work well in one set of circumstances, if there is a change in the social or physical environment, it may be necessary to modify, adapt or even scrap an 'improved' technology that was previously regarded as successful. ■

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Give nature a chance

In ILEIA Newsletter 1/92 it was reported by Marta Guidi on page 17 that "terrace building did not catch on as expected". My question is: why do so much work when nature can do it for less? It is like an old strategy of the Indians in America: walk in the moccasins of your enemy for a while. Or in other words, let us make use of natural erosion. In the Chittagong Hill Tracts of Bangladesh we translated this philosophy into a system in which contour lines were set out at vertical distances of 5 ft on heavy clay soils and 3 ft on less heavy soils. Then the contours were planted with fibrous grasses having a dense root pattern such as napier grass, Guatemala grass, and Guinea grass. The hillside strips protected by a strong grass barrier can be cultivated by any method, with the advantage that the more you or nature (read erosion) move the soil, the quicker a terrace is built. In our experience rains formed the terraces in five years time. The advantage: no work, in comparison to Marta Guidi's hardship of 32 mandays for 0.25 ha.

The process is so simple: runoff water can pass through the semi-permeable bund but soil particles are filtered out and deposited uphill of the bund. The grass can be cut for fodder or (partly) used as additional material in the barrier to increase filtering and thus to speed up natural levelling. Once it has established itself, the grass contour can be planted with banana, pineapple, coffee, fruit trees or firewood crops.

If drainage is needed, every second or third terrace can be provided with a ditch. This should be constructed just below the grass barrier so that 'filtered' water is discharged into the ditch.

From a letter to the editors by **David Stockley**. He worked as an agricultural missionary for 40 years in Bangladesh and Brazil and be contacted at Hillside, Radwinter Road, Ashdon, Essex CB10 2ET, UK.

Broom grass works

Broom grass (*Thysanolaena maxima* Roxb) grows as a wild plant in forests of the Eastern Ghats and the Plateau region of Orissa (India). The original tribal population collect the panicles from November to February at a limited scale and sell them for broom making. However, even under the low extraction rate the forest wealth gets depleted. This 1.5-3.2 m high perennial grass has a dense root system: its rhizomes grow 1.5-2 m deep and spread 1-1.5 m wide. This mat effectively restricts soil erosion. In order to be able to deliberately grow this useful plant the Tribal Area Research Centre of Orissa University of Agriculture and Technology has undertaken research to standardise broom grass production. In the hilly Phulbani area it rains some 1,200-1,500 mm, while laterite soils prevail. Rhizomes can be collected during the early part of the rainy season. They are to be cut in pieces of 5-10 cm, each weighing 40-60 g, and having one or two dormant buds. Before planting, the soil should be ploughed 3-4 times. Spacing should be some 50x50 cm. However, triangular arrangements are possible too. It is good to add manure or fertiliser to the planting holes. In the first year some intercropping is necessary to cover the soil. Yields in the first year are low but subsequently production of panicles increases. They are severed from the stalk 5-10 cm above the ground.

At present some 70-80 wagon loads of brooms are yearly sent from Phulbani to Bombay. The grass produces some 8-10 tons of fresh material. The leaves that remain after panicle cutting can be fed to cattle while remaining parts of the stem can serve as fuel. Broom grass has a potential for being cultivated and deserves due attention for further development.

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