Use of the Vetiver Grass System for Soil and Water Conservation In Kenya

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Abstract: This paper gives a brief history of the development of soil and water conservation services and outlines the situation of Vetiver System use in Kenya. It highlights the limitations and the prospects of using vetiver grass in Kenya for soil and water conservation. It also gives suggestions on what could be done in order to ensure successful adoption of the Vetiver System in Kenya.

Key words: Vetiver grass system, soil and water conservation

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1 INTRODUCTION

Historical evidence shows that Kenya started experiencing high soil erosion rates as early as in the 1930s leading to the establishment of the Soil Conservation Service (Maher, 1937; Maher, 1938; Thomas *et al*., 1997). The problem of soil erosion was exasperated when the colonial government introduced a land use policy after many European settlers came and took up farming in Kenya. This policy resulted in the resettlement of large numbers of African farmers and pastoralists, assigning them restricted zones or native reserves, of limited agricultural potential (Nandwa *et al*., 2000). The growth of human and livestock population in the native reserve areas led to land degradation.

The colonial government used the issues of land degradation to justify government control over African lands. The European settlers also used the same issue to promote expansion of their landholdings. The colonial government then introduced some regulations to help in controlling the problem of soil degradation. Farmers were not allowed to plough steep land, cultivate along stream channels or clear forests. Other policies encouraged contour farming; tree planting on hillsides, terracing, strip cropping and destocking of herds in certain areas. Conservation measures such as grass strips, trash-lines and rotational grazing were promoted to supplement terraces. Compulsory communal work was organised for terracing, grass planting, and large areas were closed off to prevent grazing (Tiffen *et al*., 1994). These measures were implemented by coercion under local chiefs, headmen, and technical assistants (Thomas *et al*., 1997). Because of this, farmers were reluctant to maintain the structures, and as a consequence the policy failed in the long term (Kinyanjui *et al*., 2000).

After independence most of the European settlers who were occupying the highland areas left and most of their large farms were sub-divided into smallholdings and allocated to the natives in the settlement schemes programme. Having associated the soil conservation work with colonialism, farmers either cut down their conservation activities or abandoned them altogether. Consequently the soil erosion problem persisted up to the present moment affecting both the highlands as well as the lowland marginal areas (Barber *et al*., 1979; National Research Council, 1993).

As the population continued to increase and the shortage of good arable land became acute, Kenyan government resolved to address the problem of increasing soil erosion as a step towards improving food production. The country asked for international assistance and soil conservation activities were revived from 1974 with the initiation of the National Soil and Water Conservation Programme (NSWCP)

supported by the Swedish International Development Agency (SIDA). Between 1974 and 1993, about 1.4 million farms were conserved, and approximately 800,000 farmers, 50,000 youths, 43,000 community leaders, 23,000 Government officers and 14,000 school teachers were trained on soil and water conservation.

Currently soil and water conservation activities in the country are being managed through the National Agricultural and Livestock Extension Programme (NALEP) under the ministry of Agriculture (MOA). NALEP aims at harmonizing approaches in public extension services by targeting at a broader and more farmer-oriented extension service, which is better equipped to meet the needs and demands of the small-scale farming population. It builds on existing resources and experience gained by earlier programmes and projects in the ministry of Agriculture (MOA) such as National Soil and Water Conservation Programme (NSWCP).

Vetiver grass occurs in several locations in Kenya where it has been used mainly as an ornamental or in marking boundaries. Use of Vetiver System for soil and water conservation started in 1990. Some work on vetiver grass was done in Embu district under the E.M.I. soil conservation project. The International Centre for Research in Agroforestry (ICRAF) and the Tea Research Foundation of Kenya have also been carrying out some studies on vetiver grass in Kenya. In Taita Taveta district a number of farmers have established vetiver grass nurseries and they have the grass available for sale. Vetiver grass is being tried in many other places in Kenya but not much information is available concerning the progress. This is mainly because there is no coordination and proper channels of communicating information on Vetiver System use in Kenya. It is unfortunate that the soil and water conservation branch of the ministry of the ministry of Agriculture, which is the main government division that coordinates soil conservation work throughout the country, has had very little interest in vetiver grass system. As a result most of the agricultural extension staff and farmers have little or no knowledge at all of the Vetiver System.

2 LIMITATIONS

Vetiver grass (*Vetiveria zizanioides*), which has been in existence in the tropics for several years has recently become the subject of intense study and experimentation as an alternative measure for soil and water conservation. Whereas the Vetiver grass system has been shown to have enormous potential for environmental and economic advantages in various parts of the world, in some places the technology has met with resistance from government agencies and research institutions. The adoption of the technology in Kenya has been quite slow and very little has been done towards its promotion since 1990 when it was first introduced to the country for soil conservation purpose. It has been tried in various parts of the country with limited success especially in the high altitude areas where some of the reasons given for its poor rate of adoption by farmers include slow growth rate and low palatability to livestock.

In some of the high altitude areas in Kenya, vetiver grass hedge requires more than two years in order to develop into an effective barrier and the users in these regions need to be aware of this so that they do not give up so quickly. In a study that I carried out in the Rift Valley highlands of Kenya, results showed that the rate of growth of vetiver grass was slow compared to Napier grass. As a result the gaps within the Vetiver grass strip took more than 18 months to close, thus making it less effective during that period (Owino, 2002). Currently, at over 36 months, the vetiver grass barriers are well established and are far much more effective than the Napier grass barriers.

Research has shown that farmers in the developing world consider erratic rainfall, pest and diseases as great threats to their livelihood than soil erosion, and as such they show very little interest on technologies that mainly focus on soil conservation alone. It has also been observed that most small scale

farmers in Kenya require fodder so much that where they have individual title to land and can control grazing animals, they tend to prefer the use of grasses such as Napier grass (*Pennisetum purpurem*), Guatemala grass (*Tripsacum laxum*), signal grass (*Brachiaria* spp.), Guinea grass (*Panicum maximum*) and Setaria grass (*Setaria anceps*) (Thomas, 1997). The above grass species can be used as grass strips and also provide fodder for livestock.

There is lack of support from the government in the promotion and implementation of the Vetiver System. The ministry of agriculture, which is charged with the responsibility of coordinating and implementing soil conservation work in the country, has given very little attention to the use of vegetative measures and instead more emphasis has been placed on the structural measures. They look narrowly at the use and application of the Vetiver grass system and fail to promote all other valuable aspects of the technology. One of the main constraints to soil and water conservation practices in Kenya is the labour required for construction and maintenance of the structural measures.

Lack of information on the Vetiver System has also hampered its development here in Kenya. Since the ministry of Agriculture does not support the Vetiver System it has not incorporated it into its soil conservation programme and therefore, most extension staff and farmer have very little knowledge or are not aware at all of the existence of this technology. They also lack technical information on the establishment and management of the vetiver grass. Availability of information is also limited by lack of, or poor Internet services in most parts of the country.

Currently the supply of vetiver planting material is not adequate in most parts of the country and so those who are interested in trying out this technology are not able to get the quantities they need. Most people are also not aware of where to find the planting material.

3 PROSPECTS

The problem of land degradation is widespread in Kenya in spite of all the conservation work that has been done. The areas most seriously affected are the semi-humid, semi-humid to semi-arid, semi-arid and arid zones, which together comprise 46% of Kenya's land area. This is because the erratic nature of the rainfall and long dry periods often lead to poor cover both on cropland as well as on grazing land. The more humid areas are generally better protected because they usually have sufficient rain to support a close cover of vegetation, which also include perennial crops such as tea, sugar cane bananas and Napier grass (Thomas, 1997). However the risk of erosion and landslides become very high on the steep slopes if vegetation cover is removed to grow annual crops with out putting in place effective conservation measures. The very arid areas are less prone to erosion by water since rainfall is lower and the terrain is not so steep. Further more these area are mainly under pastoralism and as such the impact of erosion is not as much as in the other areas where small-scale farmers practice sedentary farming.

Soil conservation activities were revived in the country in 1974, and the aim was to introduce simple, cheap and effective conservation measures that could be carried out by the farmers themselves. The focus was on the small-scale farmers and use of labour intensive methods. The primary objective was to achieve good land management, which involved controlling soil and water losses and maintaining soil fertility and structure. The over-all long-term objectives had to be broadened when the conservation activities were expanded to cover all districts. The emphasis shifted to increased and sustained agricultural production with minimum soil loss and damage to the environment. The above goal was to be achieved through the following ways among many others:

- Conserving and protecting all arable and grazing lands from any form of degradation and reclaiming that which has become degraded

- Improve the cover of perennial crops, grasses and plant residues to reduce the damage from rainfall and runoff.
- Incorporate trees and other forms of vegetation in the farming systems to increase production and conserve the soil.
- Controlling runoff from building compound and roads.

Vetiver System technology can play a very important role in the realization of the above goal if incorporated in the menu of measures that the government, extension agents, researchers, NGOs and educational institutions can experiment with and offer to farmers. It is compatible with other methods of erosion control and it can also be used to restore the soil to a point where it is able to support other soil conservation measures such as alley cropping.

In Kenya soil erosion by water affects land productivity in the arable lands, which form about 17% of the total land area. The affected areas require some form of soil conservation measures. Mass movements are also common features especially in central Kenyan highlands, for example in Muranag'a and Nyeri districts. Flooding is a serious problem on Busia, Nyando and Tana river districts. Vetiver System can offer a more reliable solution to these problems.

Challenges of land degradation have mainly been approached through the use of structural measures including stone bands gabions, fanya juu and bench terraces. Although these measures have shown effective results in some parts of the country, they have been without success in many other parts of the country. The major reason is either that they are laborious and time consuming to construct and / or that they do not fit the farming systems of the area, or they need more technical inputs.

One potential option that could be applied to tackle the problem of land degradation in the affected areas is the use of the Vetiver System. The use of this system in other countries has shown that it is effective and cheap. Vetiver grass is known to grow in a wide variety of soils and climatic conditions, it is less time consuming, a large area can be covered within a short period and it can withstand livestock browsing and trampling. However there is need to carry out studies to establish the adaptability of vetiver grass to various agro-ecological conditions in the country for it to be applied effectively for soil and water conservation.

4 STRATEGIES FOR PROMOTING THE VETIVER SYSTEM

In order for the Vetiver System to be adopted and accepted in most parts of Kenya the following should be done:

- Vetiver System should initially be introduced in areas that are conducive to its growth so that it is beneficial effects can be realised within the shortest possible time. Western and coast regions of Kenya, which are generally humid and warm, would be most appropriate.
- There should be meetings organised at location, division, district and national levels to establish strategies on how to acquire, multiply and distribute vetiver grass.
- Demonstrations, video shows and other forms of presentations should be used to show the effectiveness of Vetiver System. Result-demonstration method should be used in selected farms to convince farmer that the Vetiver System is practical under local conditions.
- Field days should be organised where farmers can get a chance to discuss about the Vetiver System.
- Planting material should be made available by establishing nurseries. These nurseries could be established along side the ministry of Agriculture's Agro-forestry nurseries and farmers should also be encouraged to establish their own nurseries.

- Training on the Vetiver System should be conducted for extension staff as well as farmer. They should be trained on the proper methods of planting and maintenance of vetiver grass.
- There is need to establish collaboration with other organizations and institutions to network in the dissemination of information and materials to interested parties in different parts of the country.

5 CONCLUSION

Most of the arable lands in Kenya require some degree of soil conservation in order to maintain soil productivity. Problems of landslides and flooding are also frequent during rainy seasons. Vetiver System has shown very good results in solving such problems in other regions of the world. It is therefore important to promote the Vetiver System use in Kenya, and the correct approach in its dissemination should be followed to ensure that its adoption is successful.

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A Brief Introduction to the First Author

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