Conservation of Farmland in KwaZulu-Natal

Co-ordinated Extension
KwaZulu-Natal Farmland Conservation 25 1997

GRASSING AND MAINTENANCE OF ARTIFICIAL WATERWAYS

S K Armour
KwaZulu-Natal Department of Agriculture
INTRODUCTION

Artificial waterways are permanent structures excavated to design specifications. Their function is to convey stormwater safely from the cultivated field to the natural watercourse. Waterways must be constructed and well established to a suitable grass cover before contour banks, stormwater drains or any other water-bearing structures are connected to them. The importance of adequate construction and grass establishment cannot be overstressed, as reconstruction or repair work to waterways, once they form part of a functioning runoff disposal network, is achieved only at risk of severe erosion in the waterway itself. Several species of grasses are suitable for use in waterways. The choice of grass type must be based on the climate, rainfall, soil type and the gradient of the waterway itself. It is up to the land user to decide what his priorities are. When a waterway is designed by the departmental Soil Conservation Service, his preference will have been taken into account. It is then imperative that he establish the grass for which the waterway was designed, otherwise he must ask for a re-design. Of the two basic growth types of grasses, namely bunch (or tufted) type and creeping type, the latter, because of its far superior soil binding characteristics, finds greater favour. Creeping grasses withstand higher flow velocities than tufted species and their use results in a narrower, although deeper, waterway than that which would be required if bunch grasses were used. Consequently less cultivated land is needed for the waterway. On the other hand, some of the creeping grasses become invasive and can become a nuisance in the cultivated land. Although the grass cover of the waterway may be suitable for forage, this must be considered to be of secondary importance in the choice of species. It will, however, be necessary to defoliate the grass in some way or other during the growing season, and so the waterway(s), depending on their size, can become an important part of the fodder flow on a farm. Maintenance of a good sward is discussed later.

The following grass species are suitable for use in waterways subject to local climatic conditions and soil types:

**Paspalum notatum** (Lawn paspalum)
A sod-forming, low growing, creeping perennial which does particularly well where conditions are moist and fertile. It is an aggressive invader via the seed it produces. It is not a high producer of vegetation, but provides excellent cover when conditions are suitable. Establishment is simple and relatively inexpensive because it is established by seed.

**Pennisetum clandestinum** (Kikuyu)
A robust creeping perennial species providing excellent soil cover even on steep slopes. It does especially well in the higher rainfall areas, *e.g.* above 750 mm, where it is probably the most successful of all the species which may be used for soil conservation works. It is, however, not completely suitable along the KwaZulu-Natal Coast north of the Tugela because of high summer temperatures. It is planted most commonly by runners, although a seeded variety is available. It tends to become invasive through the implements picking up roots at the edge of the land, and dropping them in the land on the return trip. Kikuyu is, however, easily controlled chemically. It can provide good quality herbage if properly fertilized.
Eragrostis curvula (Weeping lovegrass)  
A tufted perennial widely used as a hay crop throughout South Africa. It is easy to establish by seed, but because of its tufted growth habit requires a high level of management in order to maintain a reasonable ground cover. For this reason this species is not recommended for waterways where the land slope is in excess of 5%. Where it is used it should be mown regularly during the growing season to encourage thickening of the bunches in order to reduce the bare spaces between the plants.

Cynodon dactylon (Couch grass, Kweek)  
A hardy creeping perennial, widely adapted to a large variety of soil and climatic conditions. It may colonise cultivated lands, especially in the drier areas where it is difficult to eradicate. For this reason, although it does best on sandy soils, it is not the most sought-after waterway cover where an alternative grass type can be used. Several improved varieties exist, e.g. Coast Cross (KII) and Star grass. It is normally established using runners, but a seeded variety, NK 37, is also available. The improved varieties were bred for herbage production.

Acroceras macrum (Nile grass)  
A perennial creeping grass which forms a dense sod. It is especially suited to moist or wet sites, although this is not a prerequisite for successful establishment. It does not spread as vigorously as the other creeping species described, is easy to eradicate, and is therefore not a threat to cultivated lands. It is slow to recover in spring after cold winters.

Axonopus compressus (American carpet grass)  
A perennial creeping species established both by seed and by runners. This grass has a relatively low fertility requirement and does not pose a threat as an invader of cultivated land. It is not very drought resistant, however, and should not be used where the annual rainfall is less than 700 mm.

Dactyloctenium australae  
A perennial creeping species for use where rainfall exceeds 1000 mm per annum. This grass type can handle shady conditions, is not a vigorous producer, but provides a low dense mat. It is more suited to the coastal area due to limited cold tolerance.

Stenotaphrum secundatum (Coastal buffalo grass)  
A creeping perennial with extensive runners, adapted to the coastal area, especially on sandy soils. It forms a dense, coarse mat and is hardy and persistent.

ESTABLISHMENT OF GRASSES

A high fertility status is important in order to attain as quick a basal cover as possible. In this regard it is advisable to have the soil analyzed for fertility beforehand. As with any pasture establishment, the preparation of a suitable seedbed for the type of grass to be planted is essential. If the waterway is to be seeded, a finely prepared, firm seedbed, moist and free of weeds, is a prerequisite. The seed must be broadcast and not sown in rows down the slope. In the case of the planting of runners, the chopped runners can either be disced or rotovated into the soil before rolling, or they can be
manually established by planting in furrows hoed across the width of the waterway at 250 to 500 mm spacing. Where the risk of damage by stormwater to the newly prepared waterway exists, runners can be planted in holes punched into a firmly prepared surface using a metal rod. This type of establishment, however, is limited to the higher rainfall areas. Whatever method of planting is employed, tramping down and rolling the planted area is important to ensure adequate soil and moisture contact. The surface of a newly-planted waterway will generate its own runoff during stormy weather. This runoff can cause damage to the waterway, especially if it is long and/or steep. Earthen berms should be erected across the waterway at intervals of 30 to 50 m and angled to divert runoff into the adjacent land. Once the grass has established and the danger of damage has declined, the berms must be removed and grass established where they were. If the waterway is to be planted during a dry spell, supplementary irrigation should be considered to ensure rapid cover. The grass should be planted at least 1 metre wide on the shoulder of the excavation to protect it. It is, in fact, preferable to create a 5 m wide headland on either side of the canal to provide even better protection. Control of weeds until the grass cover is well established is very important. If possible, establishment should take place after mid-summer, when weed competition is considerably reduced, when the soil is warm and moist, and when the high-intensity storms of summer are past.

MAINTENANCE

Once the waterway is well established it is vitally important that regular maintenance is not neglected, in order to maintain a vigorous grass cover. Waterways should be mown periodically if there is any danger of the vegetation becoming rank, as this will cause clogging and eventual overflowing of the structure. The grass itself will no longer be able to protect the soil surface to the same degree, if it is allowed to become moribund. Annual maintenance applications of fertilizer, as prescribed, will be necessary to keep the grass cover in prime condition. Grazing should only be allowed for the purpose of reducing rank vegetation and should be carefully controlled. It is preferable to mow the grass, rather than have grazing animals trampling the moist soil. Waterways should preferably not be used as head-lands, and never as roads.

It is advisable to contact the local Soil Conservation Officer who will be able to assist with advice if there are aspects of the design, construction, establishment, and maintenance of waterways which are not clear.

REFERENCES
