

# MAKE EVERY DROP OF RAINWATER COUNT

DR LOUIS DU PISANI  
INDEPENDENT SPECIALIST  
AGRICULTURAL CONSULTANT

## PART 2

**Restoring the veld's water cycle through radical veld improvement**

**M**any stock farms in South Africa experience resource damage, i.e. denuded areas with little or no vegetation cover, areas with serious water erosion, bush encroachment and the invasion of alien plants, which prohibits the advantages of making every drop of rainfall count. The damage caused cannot be rehabilitated through normal grazing practices and requires special measures, known as radical veld improvement.

### Restoration of denuded areas

The topsoil of these bare areas has been removed by wind and water erosion, exposing the rock-hard sub-soil with low water infiltration, leaving the soil dry and with few safe sites where seedlings can establish to improve the soil cover. The first step in the rehabilitation process is to restore the hydrology of the soil by breaking the impenetrable topsoil layer to improve water infiltration. The method of choice depends on several factors, with the condition of the exposed soil (hardness and thickness) and the size of the bare area probably the two most important determinants.

Where the bare patches are few, relatively small and

with topsoil that can be broken by the trampling effect of animal's hoofs, the loosening process can be done by concentrating high numbers of livestock on it for short periods. This is known as hoof action. Another method that gives fairly good results for said conditions is to cover the bare patches with organic matter, i.e. garden waste, hay, well rotten kraal manure, etc. A method that works particularly well is the use of round bales of hay. These round bales can be rolled open like rolls of cotton wool and provide a good covering of organic matter, often with viable seed present in the hay, which facilitates seedling recruitment at the same time.

Where the bare patches are too large for these relatively simple reclamation methods, and/or the soil is too hard for hoof action to break it up, one needs to use mechanical methods, where the soil is broken by implements specifically designed for the job. The two best-known implements are the scallop plough ("happloeg" in Afrikaans) and the butting plough ("vlekploeg" in Afrikaans).

The scallop plough creates elongated indents or hollows into the soil, which then facilitate improved rainwater infiltration into the soil. It works fairly well in sandy soils but is not recommended for clay soils with high levels of silt. The silt seals the furrows, which then again inhibits water infiltration. Its specific design requires lots of drawing power which increases the cost of fuel when using the implement.

***The scallop plough and the furrows it creates***



***The butting plough, with the type of furrows it creates, and results obtained on soils with a high silt concentration***



***(Photos taken from the Elsenburg Infopak: Basic guidelines for veld improvement)***

The butting plough comprises a one-toe-ripper fitted with two-plough shears on each side of the ripper. The toe at the bottom of the ripper breaks the hard soil open, while the two-plough shears create a furrow where the rainwater can accumulate and infiltrate into the soil. The implement works well in all soil types and is recommended above the scallop plough.

There is a comprehensive publication available on the Elsenburg website regarding the application of both these implements. Go to <https://www.elsenburg.com/> and search for "Infopak: Basic guidelines for veld improvement".

After the hydrology of the bare areas has been restored, it is sometimes necessary to introduce seed of the more preferred plant species. The seed of the more well-known grass species is widely available from several seed companies, but the seed of Karroo shrubs are scarce and only available from a few sources, which include the Worcester Veld Reserve and KarooRenu in Prince Albert. As the seed is expensive, it is recommended that it is only introduced once it seems that not enough seed is naturally available in the system.

## Rehabilitation of water eroded areas

There are many technologies available to rehabilitate water erosion. None of these is successful, as long as the cause of the water erosion is not dealt with and while active erosion is still taking place. Sometimes this requires large and expensive erosion works, like inverted contours, etc. which can only be erected through Government intervention.



**Damage caused by water erosion**  
(photo supplied by the author)

This article deals only with those relatively low-cost works that can be erected and afforded by the individual farmer. The methods prescribed in this article all work on the same principle, i.e. slow down the rate of the water flow, but do not stop the flow of the water or dam it up. When the water flow slows down, the silt that is contained in the stormwater is deposited inside the eroded area, where it then gradually fills up the eroded area with soil until it is fully rehabilitated.

Gullies can be restored with the gabions. They do not serve as dam walls as many people think. The water still needs to flow through the rocky structure of the gabion. Its only purpose is to slow down the rate of water flow for the silt to be deposited. The placement and dimensions of the gabions should be planned and conducted by a specialist in the field. Poorly planned and placed gabions can cause more water erosion instead of rehabilitating it.



**A series of well-planned and placed gabions**  
(photo obtained from: [www.researchgate.net](http://www.researchgate.net))

Other methods include the placement of old tyres, tree branches, or flat stones in the path of the water to slow it down – not to stop it from flowing. The secret is to increase the height of these obstacles gradually, as the area behind the tyres, branches or stones fills up with silt after each rainstorm.



**On the left, one can see flat stones packed inside a water eroded gully to slow down the water flow during the next rainstorm. On the right, one can see how the silt has built up behind the layers of stones**  
(photos supplied by the author)

## Reclamation of areas encroached or invaded by woody plants

Woody plants, with their extensive root systems, can outcompete grazing plants for the available rainwater in the soil, which they then use for their growth and production, thus robbing the grazing plants of much-needed water to produce fodder for livestock.

In the Karoo, the invasion of *Prosopis* and the encroachment of Three Thorn, Kriedoring, Kapok bush, Harpuis bush, Scholtz bush, and Wild Asparagus is most prevalent. A suit of alien invaders is causing problems in the coastal areas of South Africa, including Rooikrans and a whole range of Wattle species. The most common encroachers in the Savannah Areas of South Africa are Sweet Thorn, Umbrella Thorn, Black Thorn, Three Thorn, Wild Camphor, Sickle Bush, and Mopani. Bankrupt Bush is a growing problem in the more mesic grasslands of South Africa.

There is a range of bush control methods available, ranging from prescribed burning, hand-clearing, mechanical removal with rollers and earth moving equipment, chemical control with herbicides (also known as arboricides) and biological control. Each control method has its place.

A few decades ago, when land was still relatively cheap, it was difficult to economically justify bush control. The

cost of control was higher than the value of the land. It was cheaper to buy more land. Today, the cost of many of the control methods is lower than the cost of land, and bush control started to make economic sense.

There is a perceived danger that herbicides pose a threat to the environment. Often the problem lies not with the herbicide as such, but with its use (misuse) and application. Some people also believe that chemical control results in the complete annihilation of all the woody plants. These are especially a concern to persons who are scared that highly desired and prized trees and shrubs will be killed. With the correct application methods, the application of the correct active ingredients, and exact concentrations, it is entirely possible to control bush very selectively. The secret is to consult a specialist in the field. Bush control is most definitely not a situation of obtaining a herbicide and killing the bush randomly. It requires the assistance of a knowledgeable consultant, who can devise an optimal control strategy for a specific problem, and with specific goals in mind.

**In conclusion,** South African livestock farmers are confronted by many challenges, which include amongst others, droughts, climate change, global warming, etc. If he/she wants to overcome these challenges, a good starting point is to make every drop of rainfall count. May it be said in future that we are a nation of stockmen and woman who are proudly water-wise. ■



*Sweet thorn encroachment  
in the Eastern Cape  
(photo supplied by the author)*