

## Bridging drought Resilience in Rangeland Management in Times of Climate Change

JUDITH ISELE<sup>1</sup>

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### Author's Background

Judith Isele holds a Dipl. Ing. in Organic Agriculture. German born she moved to Namibia in 2004 and since then farms with indigenous livestock according to Holistic Management and Organic Agricultural principles.

### Summary

*Organic livestock farming in semiarid regions greatly depends on the sustainable management of the natural rangeland as the resource for livestock sustenance. High stock density in combination with short grazing and long recovery periods achieve effective rainfall utilisation and considerably higher fodder production resulting in a high degree of resilience in drought situations. On Farm Springbockvley, Namibia, such principles were implemented with the help of Holistic Management over the last two decades. Increased stocking rates and correspondingly higher per hectare meat production have been achieved. Stocking density has been further increased through the use of electric fencing with the consequent goal of achieving an improvement in the palatability of the low diversity of grass species now being feasible. The recent achievement of gaining organic certification through the Namibian Organic Association's Participatory Guarantee System has elevated the farm into being a Namibian organic pioneer, with the lessons learned along the way being shared with other farmers to help heal degraded lands.*

### Background

As an effect of climate change weather conditions in semiarid regions tend to become more extreme and farmers will probably be hit more often by severe droughts in the near future. In low-rainfall areas natural circumstances favour extensive livestock farming on the basis of free range grazing on indigenous vegetation. In Namibia the majority of the agricultural land receives an average yearly rainfall of 150–500 mm supporting only marginal savannahs. In these rangeland based systems animal husbandry and especially adaptability of livestock to their specific circumstances are of utmost importance. Being uniquely able to convert high cellulose plant material into animal produce, ruminants are simultaneously 'gardeners of their own food'. Animals, the plants they eat and the soil in which these grow, are irrevocably linked and interdependent. None of them can be in a healthy state without the other one flourishing just as well. High stock density helps to feed the soil by returning some of the nutrient containing dry and green plant material to the soil building resilience and production potential.

The example of Farm Springbockvley shows how droughts can be bridged with location-adapted cattle and sheep and resilient, sustainable rangeland management. The 9 500 ha farm is located in the southern central part of Namibia, 180 km southeast of the capital Windhoek, on the Western edge of the typical Kalahari dune landscape but in almost completely flat countryside. With an average yearly rainfall of 260 mm Springbockvley is situated in an area of average production capacity which provides appropriate fodder for cattle and sheep alike. The farm has been managed according to the Holistic Management decision making framework since 1990 and is certified 'Namibian Organic' by the Namibian Organic Association's Participatory Guarantee System since 2013.

### Main chapter

Springbockvley is subdivided into 60 more or less rectangular camps, ranging in size from 45 to 330 ha, with an average size of 160 ha. Livestock on the farm is run in three herds: the sheep breeding flock of up to 4 500 head of indigenous, small framed, fat-tailed Damara sheep, the cattle breeding herd of up to 450 head of indigenous small framed Nguni cattle (cows with calves and replacement heifers), and the herd of up to 450 head of oxen, young heifers and old cows together with the small flock of old ewes. The flocks and herds are moved through all camps according to a detailed grazing plan which takes into consideration the differences in size, quantity and quality of fodder in each camp and factors such as different soil conditions, breeding seasons, compulsory vaccinations, weaning, marketing, special treatment of specific areas and problem predator species like black backed jackal. The nutritional needs of the animals at different times of the year are considered in the planning to optimize animal condition and production. The resulting average grazing periods vary between four and eight days per camp throughout the year. During the growing season the main objective is to grow as much forage as possible. To assure adequate recovery time the needs of perennial grasses are given special consideration while accounting for the needs of animals and people. For each dormant season a new schedule of animal moves is drawn up, combining the needs of animals and soil life (portioning out the available forage to their maximum benefit) with the need to prune grass tufts and work the soil surface to prepare both for the coming rainy season.

### Achievements:

Holistic Management planned grazing on Springbockvley has made it possible to increase stocking rates over the years. This has been achieved in spite of inconsistent rainfall which, since 1989, varied between a minimum of 60 mm (in 1995) and a maximum of 680 mm (in 2011). Stocking rates also varied, from a minimum of only 17 kg live animal mass per ha

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<sup>1</sup>Farm Springbockvley / Namibian Organic Association / Namibia Centre for Holistic Management, Namibia, [www.noa.org.na](http://www.noa.org.na), e-mail: [iselkuel@iway.na](mailto:iselkuel@iway.na).

being stocked during the severe drought in 1995. Better rainfall together with growing resilience in rangeland management allowed increasing stocking rates more recently which culminated in around 48 kg live animal mass per ha stocked by the end of 2012, a total stocking rate which was never achieved before and which (according to oral statements from fellow farmers) is noticeably higher than on neighbouring farms. Although stocking rates tend to follow the ups and downs of the rainfall curve, it can be noted in Figure 1 that the latter is much more erratic. The trend in the stocking rate curves accompanied by healthy rangelands points to sustainable management practices resulting from proper soil preparation and plant treatment which aim to provide forage of more consistent quality and quantity even in years of low rainfall.

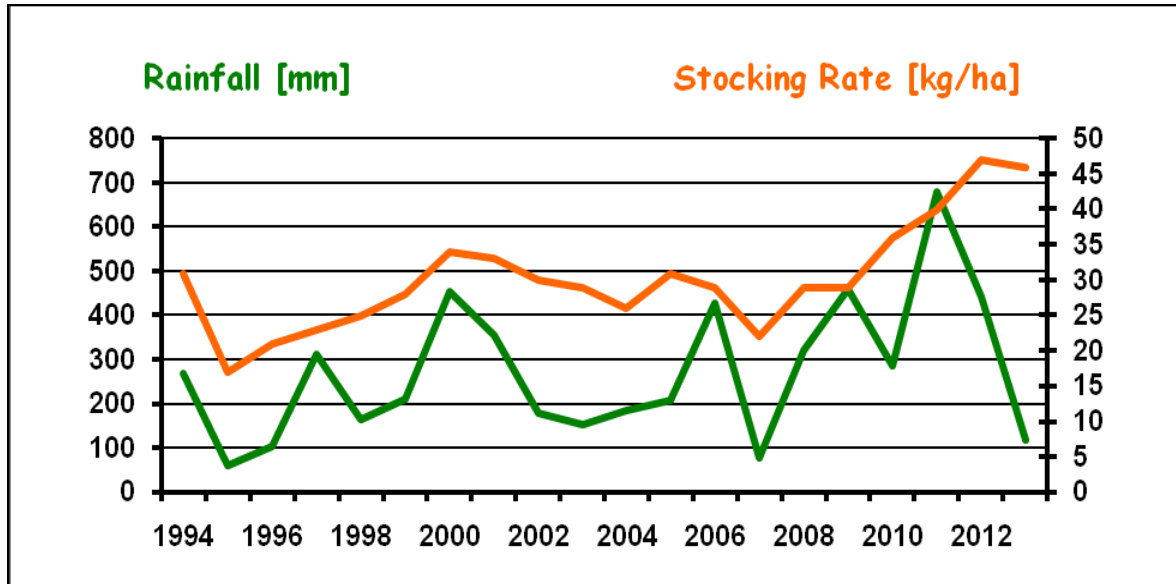


Figure 1. Stocking rate and rainfall on Springbockvley 1994–2013 (Source: J. Isele, unpublished production data 1994–2013 for Farm Springbockvley, Namibia)

**Challenges:**

At present the limiting factor for progress on Springbockvley still relates to the ability of the animals to perform exclusively on the resources present on the farm. This applies even more in the severe drought we are experiencing in 2013. Despite rainfall below half of the annual average adoption of the above mentioned rangeland management practices has enabled us to produce enough grass to keep stocking rates at 45 kg live animal mass per ha whereas most neighbours have had to drastically de-stock. However an additional limiting factor of animal condition is the very low species diversity of the grasses: 90 percent of the grass composition consists of only two relatively narrow leaved species. Even with all the emphasis on grazing management over so many years and the resulting continuous increases in fodder production and stocking rate, there is still no readily discernible increase in diversity. Higher stocking densities are required to address this aspect in general and in particular increasing resilience during times of drought, thereby enabling the animals to be better gardeners of their food. Electric fencing will be used to subdivide camps where the current infrastructure does not facilitate the water requirements of larger herds. Next year, being the year the current drought is either broken or extended, will be proof of success or failure of our rangeland management system and high stocking rates.

**Core messages and conclusions**

Increasing knowledge of and experience in sustainable rangeland management result in increasingly efficient use of rainfall, building up soil and growing more fodder as droughts no longer have the severe effects as they did before. This can be achieved in any management system be it with camps as in the case of Springbockvley or in large open areas without fencing where herding according to a grazing plan can be implemented. Thus, through the sequence of sound rangeland and livestock management that focus on time and animal impact, the vast brittle semiarid grassland regions of the world that only provide extensive grazing systems can and should be converted into active carbon sequestration pools which is the only way to reverse climate change. Consequently with increased meat production food security will be enhanced. It is time to heal our land by using organic animals. We need to convert more sunlight into money and food by feeding the soil, instead of the animals, thereby producing healthy grasslands and flourishing animals to feed the world's population!