Grassroots movement: HOW Rainfall reshaped the South African interior

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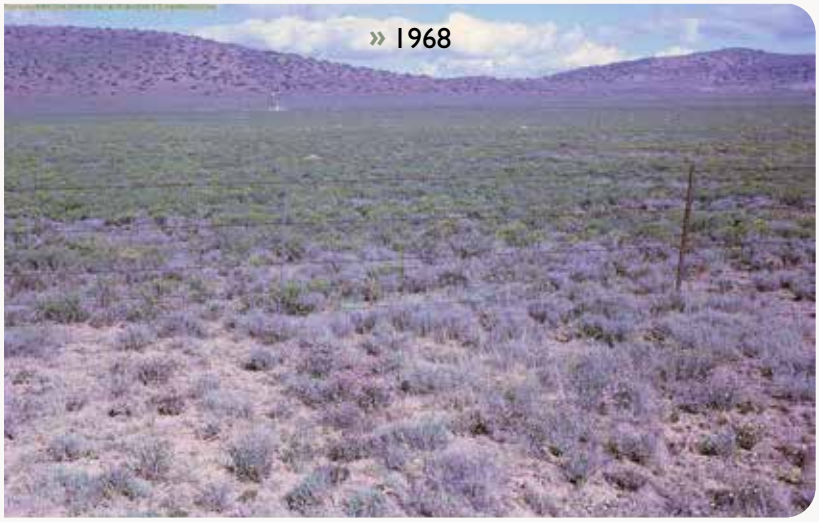
After the publication "Veld Types of South Africa" by John Acocks, the culmination of decades of fieldwork at thousands of sites across the entire country, his suggestion that the Karoo was expanding became an accepted truth. The evidence seemed water-tight: accounts of early explorers and the findings from field-trials and long-term surveys showed that the vegetation of the Karoo was marching eastward and northward, degrading productive grasslands into a shrubby wasteland.

In general, poor land management by farmers – in the form of overstocking and inappropriate grazing systems – was given as the cause, and this prompted a government-funded stock-reduction scheme, and the subsidization of millions of kilometres of wire for to allow farms to be divided into smaller camps, allowing veld a respite from the ever-present pressure from livestock.

Livestock numbers, of course, had increased by orders of magnitude over the past century: with the advent of barbed wire to restrain animals, state funds to control predators, and windmills to supply water to waterless landscapes, goats, sheep, and cattle proliferated to a level never experienced before. It was observed early on by one Dr John Shaw, in 1873, that "*the persistent and greedy system of overstocking farms has changed*

the flora", which led, in his opinion to a change in climate: "*The climate necessarily became affected. The rainfall came down less certainly and oftener in the form of thunder-torrents*…" leading to grasslands "*rapidly becoming an extension of dreary, scrubby, half-desert Karoo*".

It appears that it was a common misconception in those early days that overgrazing by livestock changed rainfall patterns. We now know that climate systems operate at huge scales, and these are largely unaffected by local conditions. What Dr Shaw was, in fact, witnessing were two separate factors: the impact of livestock on vegetation, and changes (perhaps cyclical) in rainfall patterns. It is also clear that he viewed (as did many others) Karoo vegetation as an inferior, degraded state, a product of farmers' persistent abuse of the environment. Some people still think this today.


» 1968


» 2022

So let's fast-forward to today. Has the Karoo escaped its confines and charged relentlessly into the grasslands? In short, no. In fact, we have seen the opposite – for the past two decades or so, researchers have commented on how the Karoo has become grassier, and even that the grasslands themselves might be marching south and west. This is portrayed strikingly in a photograph, reproduced here, taken between Trompsburg and Philippolis by John Acocks in 1968, and its repeat taken in 2022. It shows, in the foreground, the road-verge, and in the mid- and background farmland that would have been grazed predominantly by sheep.

The obvious change is the transition from shrubby Karoo veld to what appears to be grassland. A second, subtler, observation is that both the road-verge *and* the farmland beyond were shrubby in the first photograph, suggesting that it was not the sheep on the other side of the fence that had caused the absence of grasses. So why the transition?

The most plausible cause of the recent flourishing of grasses is an increase in rainfall. For much of the first three-quarters of the twentieth century, the central interior of South Africa experienced periods of low rainfall and several severe droughts. Arguably the worst of these was from the mid-1960s to the mid-1970s, a time of crippling deficit that would end only in 1974 with heavy rains across much of the country. Since then, records suggest that rainfall has steadily increased. Christiaan Harmse and colleagues recently reported that across the Upper Karoo rainfall has increased by approximately 1 mm per year over the past 8 decades, with the effect being stronger in the east than the west, and most of the above-average years being since the mid-1970s. Other areas, of course, have not experienced this, such as regions along the southern coast and inland for a couple of hundred kilometres. Also, extreme droughts have gripped the west coast and western interior, leading to collapses in both vegetation and farmers' incomes.

However, for the central interior, despite occasional droughts, rainfall has been high and grasses have flourished, and livestock – notably cattle – have prospered, and conditions in general have been good. Too good, perhaps. Why?

Because there are problems associated with increases in grassiness. One of the obvious ones is the risk of fire. The scene in the photograph here burnt in late 2023 following an accidental wildfire. The grasses aren't damaged – they grow from buds close to the ground that fire does not kill – but other things are. Property, especially fences, are very expensive to replace, and are readily damaged by fire; buildings, livestock, and equipment too can be destroyed. And Karoo shrubs (the 'bossies') are overwhelmingly either killed or knocked back severely, taking many years to recover. And Karoo shrubs are very valuable in a farming system – they produce high-protein forage for livestock during the autumn and winter, and are a life-saver when spring rains are late. Indeed, some farmers wonder which grazing systems would best *reduce* grass abundance, a notion that would have been beyond the realms of imagination sixty years ago. Additionally, fire begets grass growth, which begets fire, which creates a snowball effect that effectively kicks Karoo shrubs out of the picture. The end result is that if current conditions persist, these areas will increase in carrying capacity, be better suited to cattle than to sheep, but will face greater nutritional challenges during the cooler months of the year, and fire will be a new factor for farmers to deal with.