

Six months after the fire, followed by good rains, the veld has recovered well and could be grazed. Shrubs were either killed or drastically reduced in size by the fire, allowing grasses to colonise areas they once held.

# Restore after

The Koopmansfontein Research Station, about 90km northwest of Kimberley in the Northern Cape, experienced a very hot fire in 2010 – which has afforded the opportunity to examine the effects of burning on vegetation in an arid savanna. Interestingly, grass recovery was very rapid, and the composition and cover in the burnt areas were not different from those of the unburnt areas. However, conditions for recovery were optimal; there were good rains after the fire and livestock were kept out of the burnt camps.



A large bush-clump that was consumed by the hot fire. Two years later, several of the original trees have re-sprouted, but palatable grasses have also colonised the bare soil.

A worse scenario would have been if the fire were followed by a dry season, and livestock were allowed to graze the burnt veld. The grazing pressure would have resulted in grasses losing their ability to regrow, and would have remained weak. Some may have died.

In essence, therefore, the recovery of veld is related to rainfall (over which farmers have no control) and to grazing pressure (which farmers can control). If the burnt veld receives good rains, a rest period of a month to six weeks before camps are restocked with livestock is likely to allow the grass sufficient opportunity to recover, after which farming can continue as normal.

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## Protecting veld against the damages of runaway fires is not only important after a fire, but also before the fire

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But if good rains do not fall, extra care is needed. It is important to ensure that livestock do not kill or radically weaken grass plants. A central point here is that a grass plant is at its most vulnerable when it is actively growing. For a grass plant to grow after a fire, it needs to use carbohydrates

stored in its roots to produce new leaves – these leaves will increase in size, and after a while will photosynthesise enough to replenish the plant's depleted reserves. This means that it is necessary to allow grass a period of uninterrupted growth immediately after rains.

Conversely, if a grass plant has grown a certain amount and then runs out of soil moisture, its leaves stop growing, stop photosynthesising and lie dormant. During this time the plant may extract what carbohydrates it can from the leaves. When soil moisture once again becomes available (ie after rain), the grass plant will produce new leaves – it will not use the old dry leaves.

The importance of this is that if veld is dry and grasses are not growing, it is not damaging to graze them – their leaves are now useless to them. However, when the rains fall, it is the time to allow them a rest.

After a fire, bare soil is exposed. This soil would previously have been covered by grass litter (old, dead leaves) and by the leaves (canopy) of living grass tufts. Moisture loss through evaporation from bare soil is much faster than from soil covered by leaves, so fire has the effect of reducing the amount of rain available to plants.



A tuft of grass about nine weeks after the fire destroyed everything. This recovering tuft needs to be rested from grazing to allow it to replace its depleted root reserves.



Burnt veld at Koopmansfontein about one month after a fire caused enormous damage.

This means that for every millimeter of rain that falls on burnt veld, the grass production will be lower than that of unburnt veld. Therefore, it is important to return to a good canopy cover as soon as possible.

However, the effects of exposed soil are not only bad – with a reduced canopy cover, seeds in bare areas have an opportunity to germinate and establish. It is often seen that, assuming adequate rainfall, there will be a flush of seedling emergence following a fire. This is often particularly evident in the bare areas left after shrubs and trees have been burnt off.

These seedlings are of course very weak at first, and will die if bitten off. Bulk grazers, such as cattle, are not well adapted to eating small grass seedlings, while sheep and goats can easily select these nutritious snacks. Therefore, one should protect veld with young seedlings from being grazed by small stock.

Of course, for seedlings to emerge there have to be seeds already present in the soil, and this will only happen if grasses have had the opportunity to go to flower and produce seed in the past few years. So protecting veld against the damages of runaway fires is not only important after a fire, but also before the fire. And one way to allow for rapid veld recovery is to allow veld to flower and set seed every few years.

### Some general principles emerge:

1. Grazing dormant veld is, within reason, not damaging to grass plants.
2. Grass plants that have been burnt should be allowed an uninterrupted period of growth once rains have fallen.
3. Manage veld to allow the canopy cover to return.
4. Sheep and goats are more likely to damage seedlings than cattle.
5. Allowing veld to produce seed every few years can be a useful way to allow veld recovery after fires in the future.

Listen to a *RSG Landbouradio* interview with Prof Hennie Snyman on this topic.



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