



Factsheet # 17

Restoration techniques for degraded communal rangelands



Challenge

- Most communal rangelands in eastern Namibia are degraded, characterized by bush encroachment, decreasing perennial grasses, low seed banks, and expanding bare soil.
- Without proper management, these rangelands risk being less resilient and less productive for livestock-dependent communities.
- Willingness among communal farmers to adopt various restoration techniques is high, but key limitations, particularly selecting appropriate techniques, hinders effective implementation (Factsheet #16).

Approach

Four rangeland restoration techniques (**Fig. 1**) selected by communal farmers were assessed as small-scale pilot schemes to test their performance under local conditions:

- **1) “Full resting”**: a field-based experiment for 2 years using grazing exclusion cages, compared to adjacent patches open to full grazing
- **2) “Bush thinning”**: monitoring of bush thinned sites (5 years prior) with intense grazing, compared to multiple patches in non-thinned sites.
- **3) “Bush thinning + resting”**: monitoring of multiple areas at two bush thinned sites compared to multiple patches in nearby non-thinned sites. At one site, bush thinning was conducted 5 years prior, with only occasional grazing by 1x bull. The other site, bush thinning was 4 years prior, and fully rested.

- **4) “Reseeding and pre-treating seeds”**: Reseeding of *Cenchrus Ciliaris* (Blue buffalo grass) and *Stipagrostis Uniplumis* (Silky bushman grass) in grazing exclusion cages for 2 years. Seeds of the same species were also assessed to test pre-treatment methods the farmers could employ to enhance germination success.

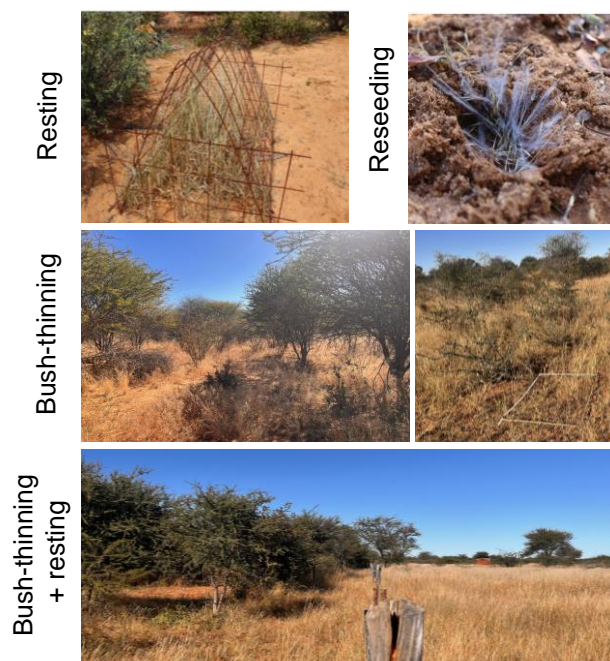


Fig.1: Different restoration techniques for degraded communal rangeland were compared; (top left) Full resting was tested in grazing exclusion cages; (middle+bottom) Bush-thinning trials compared to nearby non-thinned areas, with annual productivity measured inside grazing exclusion cages, and standing biomass outside; (top right) *Stipagrostis Uniplumis* (Silky bushman grass) seed was sown - along with *Cenchrus ciliaris* (Blue buffalo grass) seed - with germination success tested inside cages.

Bush-thinning + resting is best

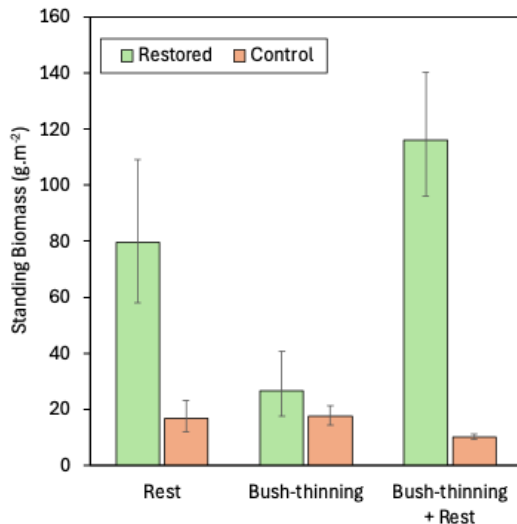


Fig.2.: Effect of restoration techniques on standing biomass i.e. the amount of herbaceous material remaining at the end of the growing season with or without grazing.

Practical Implications

- **Prioritise investigating** restoration techniques that farmers approve of and can realistically implement.
- **Sustainable recovery requires patience.** Annual plants will return first, but perennial plants require longer protection periods.
- **Combine bush-thinning with resting** to improve the abundance of pioneer perennial grasses.
- **Avoid bush-thinning alone** since it's unlikely to improve rangeland health without resting
- **Implement trials** in the local areas to clarify the potential of soil surface disturbance (e.g. through raking) for restoration

- **Bush-thinning is good** - 1.5x more standing biomass (1.6x more productivity) (5 years)
- **Resting is better** - 4.7x more standing biomass (2 years)
- **Bush thinning + resting is best** - 11.4x more standing biomass (4.8x more productivity) (5 years)
- **Sown seeds did not germinate**, in the field experiment but the soil disturbance from the planting **increased** standing biomass (1.3x). **Seed pre-treatment testing** also failed to germinate many seeds (<10% germination).

Key Findings

- All restoration techniques assessed increased forage reserves for the following winter/next growing season.
- Bush-thinning has little value if resting is not carried out at the same time.
- Short-term resting (2 years) reduces “unwanted” plant species (e.g. the invasive/non-native *Sida cordifolia*) and increases species indicative of less grazed rangelands.
- Pioneer perennial grasses (e.g. *Aristida congesta*) increased within 4 years after bush thinning in our study, while higher-quality grasses may require longer recovery periods.
- Reseeding is not straight forward and is unpredictable, but disturbance appears beneficial. More research is needed to determine best reseeding practices.

Authors

Sihlangene N. Moyo & Meed Mbidzo, Department of Natural Resources Sciences, Namibia University of Science and Technology (NUST), Namibia.

Contact: sihlangenenalimoyo@gmail.com

Mark C. Bilton, Bilton Environmental Resources / NUST, Namibia.

Contact: mcbilton.ecology@hotmail.com

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The NamTip Project

The collaborative German-Namibian research project “NamTip – A Namibian Perspective on Desertification Tipping Points in the Face of Climate Change” aims to better understand the development of ecological tipping points in dryland rangelands by assessing desertification and woody plant encroachment processes. It also explores management options for preventing such tipping points and restoring degraded rangeland ecosystems.

www.uni-potsdam.de/en/namtip

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Project Lead

Prof. Dr. Anja Linstädter

E-Mail: anja.linstaedter@uni-potsdam.de



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