

# 10 golden rules of ecological restoration | #Know

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*Whether you are part of a restoration or a carbon-sequestration project, always be guided by these 10 environmental rules*

**OCT 19, 2021 | BY RUPERT KOOPMAN. PHOTOGRAPHS: PATRICIA HOLMES**

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## **10 golden rules of restoration**

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PLENTY OF PLANNING and doing will happen during this [UN Decade on Ecosystem Restoration](#). Everything starts with Rule 1 of restoration (borrowed from the medical fraternity): First, do no harm.

This is the Rule of Rules. It urges us, whenever we can, to make sure that intact, functioning natural habitat stays that way.

Whether you're looking after natural habitat or restoring badly degraded land, you need to start with the 10 Golden Rules for Restoration, compiled by a group of ecologists from around the world.



Above: Frost and fire limit screens to gorges and rocky trees near Sabi, Mpumalanga, but grasslands are rich in plant species, particularly herbs and bulbs.

## 1. PROTECT EXISTING HABITAT FIRST

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Halting ongoing destruction of intact habitat should be your priority. Always do your best to keep natural ecosystems in their original state if you can. Concentrate on managing existing natural habitat well and clearing invasive alien species. Carefully planned, legally approved development can continue.

We depend on the fynbos and grasslands of mountain catchments for our water. The grassy shrublands support much of our livestock. Undamaged ecosystems include species that are more resilient to fire, storms and droughts than plants introduced from other habitats and regions. Threatened habitats such as coastal shrublands/grasslands, seasonal wetlands and the succulent Karoo need much greater protection.

## 2. WORK LOCAL

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Local people receive many benefits from nearby healthy habitat. That is why listening to existing land users and creating your project together is key to successful planting, alien species clearing, erosion control and other restoration projects. Earn trust by consulting consistently and transparently.

## 3. MULTI-PURPOSE, MULTI-SUCCESS

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Any restoration effort needs to follow general good practice and also have a well-written restoration plan that is multi-purpose and has several goals. Make sure your plan is transparent and have it vetted by professional botanists and plant ecologists.

It is particularly important to plan on maximising the diversity of locally occurring species. Choose protected germination sites that are as safe as possible from predators or fire. This promotes ecological resilience – which helps vegetation recover from natural disasters such as fire or drought.

Multiply your impact by using multiple species that play similar roles. This reduces the shock of losing one from the group, increases conservation value and supports insects, birds and mammals that are essential for pollinating flowers and spreading seeds.

**Other core restoration goals include:**

- Using appropriate indigenous species of local origin
- Buffering climate-change effects
- Making degraded ecosystems function better
- Linking projects directly to conservation goals and principles
- Coordinating your planning with other sectors for smoother implementation
- Supporting local economies and generating cultural benefits

#### **4. CHOOSE YOUR SITE CAREFULLY**

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Plant trees only in degraded areas that were historically indigenous forest or ecosystems with trees, such as savanna. Remember that less than 0.6% of South Africa's area was covered by natural forests. Make sure that trees selected for restoration are indigenous and were originally part of that habitat type.

Do not plant trees in habitats such as grasslands, shrublands, thickets or wetlands. At first glance, habitats such as seasonal pans, gravel or quartz patches can look degraded or bare – but planting these up with trees or shrubs chosen for their capacity to sequester carbon would be a mistake.

Ask expert botanists or plant ecologists to screen proposed sites to be sure that restoration or planting would be useful. Establish restoration protocols that specifically apply to the vegetation you are dealing with.

Restoration projects need to have baseline studies, reference sites and plans for monitoring by experienced plant ecologists – all included in the budget from the outset. You will also need people with experience and knowledge of growing diverse indigenous plants.

#### **5. GET FAMILIAR WITH THE LAW**

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In threatened ecosystems, any form of large-scale planting might need to be authorised under the National Environmental Management Act (NEMA), Forestry Act or Water Act. While planning and before you start restoration and other activities, make sure your



restoration effort complies with relevant laws and bylaws.

Even in a degraded ecosystem where vegetation has naturally begun to recover and the disturbance was more than 10 years ago, your restoration efforts could still trigger NEMA. This is especially so in wetland systems and near drainage lines or any water features.



Above: You may need to propagate local threatened species to boost their plant numbers – these cuttings of Cape Flats conebrush (*Leucadendron levisanus*) were first grown in soil from the restoration site then planted out during the rainy season.

## 6. START WITH NATURAL PASSIVE REGROWTH

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Remove whatever was degrading the site, such as invasive alien plants, over-grazing or ploughing or badly planned construction. Then let pioneer species grow back naturally, which can be cheaper and more efficient than planting or reseeding. This is most likely to be successful if your site is in or next to intact functional vegetation.

This natural passive regrowth allows vegetation cover or nurse plants to develop that will shield more sensitive species when you introduce them later. Understanding such plant succession in your particular target ecosystem is vital.

It helps you anticipate how height, density and species composition of plant communities develop over time. This gives you a better idea of what missing species might need to be added to restore the vegetation as habitat for insects and animals.



## 7. CORRECT SPECIES, TOP BIODIVERSITY

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Picking the right species is crucial if you need to plant or reseed. It is tempting to select a number of hardy, fast-growing plants but these could come to dominate your site, reducing diversity and preventing natural plant succession.

Choose several species representing each major growth form in the vegetation type – succulents, non-succulent shrubs, trees, grasses and bulbs – to restore your ecosystem's structure, resilience and good functioning.

Botanists and ecologists advise that you should select a mixture of species which are naturally found in the local area and that are suitable for the local climate – and how it might change in the future. Include also some rare species and some of economic importance.

Before starting restoration work in the field, find out where to source seeds. Work with local experts, authorities such as SANBI and the provincial conservation authority and landowners to secure seed-collecting permits.

Reintroduce plants by growing from local seed or rootstock. This makes plants more likely to adapt easily to their new site and ensures genetic integrity. It also helps maximise genetic diversity and minimise the risk of potentially introducing pathogens sometimes found in soils introduced with bagged plants from nurseries. This is also a risk if you bring seed or plants from distant areas, even if they are of the 'correct' species.



Above: Try to find a remnant of indigenous local vegetation where you can source suitable seeds and cuttings material for active restoration. Make sure to have the necessary permits and permission from the landowner.

## **8. LEARN BY DOING**

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Combine scientific knowledge with local knowledge and practical experience. Establish small work groups including researchers, practitioners and local residents. Ideally, run small-scale trials before you begin large-scale restoration. Arrange regular sessions when your groups review and share trial results.

## **9. BE FINANCIALLY SUSTAINABLE**

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Your project's success relies on sourcing adequate funding ahead of time so professional and contract participants can be fairly remunerated. It would be an advantage to have a network of nurseries, seed suppliers and adequately resourced volunteers working to a plan.

Remember to think long term – a large-scale restoration in arid ecosystems would take many decades.

## **10. NATURAL LEGACY**

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Ultimately, restoration is about our generation's legacy for future generations. This includes restoring the value of natural resources that have been eroded. Rebuilding natural resources and ecosystem services is particularly important for future rural livelihoods given the predicted impacts of climate change.

[LISTEN TO OUR PLANT CONSERVATION WEBINAR: An introduction to ecological restoration](#)

### **When to say no to trees**

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Tree-planting projects might be started with the best of intentions – to store carbon and create jobs, for example. But if trees are planted in the wrong place, they become destructive.

Most people know that, apart from forest, South Africa has other priority ecosystems under severe pressure from habitat loss because of degradation, threat from invasive alien plants (such as South American mesquite and Australian wattle) and several other impacts including climate change.

But quite a few people are not aware that these priority ecosystems have their own superb adaptations to local conditions – which include being able to store considerable carbon in limestone, soils and plant material.

That is why Rule 1 remains sacrosanct. Our guiding principle is making sure that intact functioning habitat stays that way.

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Adapted with permission from Dr Kate Hardwick from the paper 'Ten Golden Rules for reforestation to optimise carbon sequestration, biodiversity recovery and livelihood benefits' (Di Sacco, Hardwick et al 2021), the associated press release and popular articles. Mike Powell, Dr Patricia Holmes, Dr Donovan Kirkwood and Dr Sue Milton-Dean gave helpful input on the version published here.



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