**Money for nothing and your restoration for free: a synthesis of active versus passive restoration in drylands globally.**

Or

**Something for nothing: a synthesis of active versus passive restoration in drylands globally.**

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**Abstract**

Drylands globally present challenge and opportunity. Challenges include drivers of reduced function such as invasive species and increasing drought. Opportunities include development for sustainable energy and restoration of retiring agricultural lands. Here, a global meta-analysis of restoration in drylands that focussed firstly on vegetation was completed describing over 1400 instances of reported restoration from 66 studies that met inclusion criteria. Two distinct classes of interventions were evident – active versus passive – examining the efficacy of soil, grazing, vegetation, and water as general mechanisms to restore drylands. The net efficacy of passive interventions was net negative and active was net positive. However, the general mechanism tested was important. Soils do not recover passively in the time horizons tested to date whilst vegetation and to a lesser extent exclusion of grazing can promote significant positive outcomes with minimal to no interventions. Active restoration approaches were more effective, consistently positive, and had low relative variances. This evidence suggests that something for nothing is possible for only some contexts but that investment in ecological restoration in drylands of vegetation, soils, and ameliorating water limitations yields greater returns.

**Keywords:** deserts, drylands, restoration, intervention, outcomes, vegetation, and water limitation.

**Main text** (for most top tier shorter papers – 2-3 paragraphs then methods very small at the end)

I propose only 3 paragraphs since 2500 words total

Para 1 context

Para 2 what we found

Para 3 why it matters – ie implications.

PARA 1

Drylands such as semi-arid grasslands, shrublands, and deserts are critical ecosystems for people and for other natural processes. List why we should care – biodiversity, percent of land cover, agriculture, water and carbon sequestration, and finally development such as solar or other sustainable energy. Collectively, this is both positive and negative because whilst they are likely increasing globally, water limitations and degradation of ag and natural lands continues through global change effects and also exotic species. Restoration and management seems critical – yet a global synthesis is needed to provide a roadmap for major mechanisms that focus on the building blocks of these systems such as soil and vegetation.

Para2

Then check journal – second paragraph in Nature typically gets right to it – state results – see Abstract – I would focus on what is really clear

Passive – active approaches

Four major classes of interventions

Then the net neg net positive but matters what class of intervention.

Then I would mention that no specific techniques at finer scales were replicated between studies within each of these 4 classes

aridity and experimental length – findings were significant that aridity in both passive and active instances reduced efficacy of interventions and longer durations were more likely to be positive.

Para3

There are at least three major implications here.

Resources are and will always be limiting for restoration and we cannot ignore minimal intervention strategies to manage drylands globally. This meta clearly identifies that depending on the specific outcome for stakeholders, some strategies can sustain limited investments. However, active strategies are more critical for more rapid, less variable, and more consistently positive efficacious interventions in drylands. Fundamental restoration research in dryland must not align methods tested – too few studies examine similar techniques. Aridity and drought will continue to present challenges to recovery and if longer and more sustained timeframes are possible, i.e at least 2 years, interventions will be more viable. In summary, drylands are critical to sustaining both human and other resident populations of species globally and restoration in some form is major path forward.

**Methods**

As appendix typically or included in only enough detail in small font. Haha.