



Can landscape memory affect vegetation recovery in drylands?

Jantiene Baartman (1), Angeles Garcia Mayor (2), Arnaud Temme (3), and Max Rietkerk (4)

(1) Soil Physics and Land Management Group, Wageningen University, Wageningen, Netherlands (jantiene.baartman@wur.nl), (2) Biometris, Wageningen University, Wageningen, Netherlands, (3) Soil Geography and Landscape Group, Wageningen University, Wageningen, Netherlands, (4) Copernicus Institute of Sustainable Development, Environmental Sciences Group, Utrecht University, Utrecht, Netherlands

Dryland ecosystems are water-limited and therefore vegetation typically forms banded or patchy patterns with high vegetation cover, interspersed with bare soil areas. In these systems, a runoff-runon system is often observed with bare areas acting as sources and vegetation patches acting as sinks of water, sediment and other transported substances. These fragile ecosystems are easily disturbed by overgrazing, removing above-ground vegetation. To avoid desertification, vegetation recovery after a disturbance is crucial.

This poster discusses the potential of 'landscape memory' to affect the vegetation recovery potential. Landscape memory, originating in geomorphology, is the concept that a landscape is the result of its past history, which it 'remembers' through imprints left in the landscape. For example, a past heavy rainstorm may leave an erosion gully. These imprints affect the landscape's contemporary functioning, for example through faster removal of water from the landscape.

In dryland ecosystems vegetation is known to affect the soil properties of the soil they grow in, e.g. increasing porosity, infiltration, organic matter content and soil structure. After a disturbance of the banded ecosystem, e.g. by overgrazing, this pattern of soil properties – favourable for regrowth, stays in the landscape. However, removal of the above-ground vegetation also leads to longer runoff pathways and increased rill and gully erosion, which may hamper vegetation regrowth. I hypothesize that vegetation recovery after a disturbance, depends on the balance between these two contrasting types of landscape memory (i.e. favourable soil properties and erosion rills/gullies).