

GETTING TO THE ROOT OF IT!

TEXAS A&M
AGRILIFE
EXTENSION

Looking at the phases of grassland ecosystem response to aridification through belowground plant traits and their ecosystem functions.

1. VEGETATION DECLINE

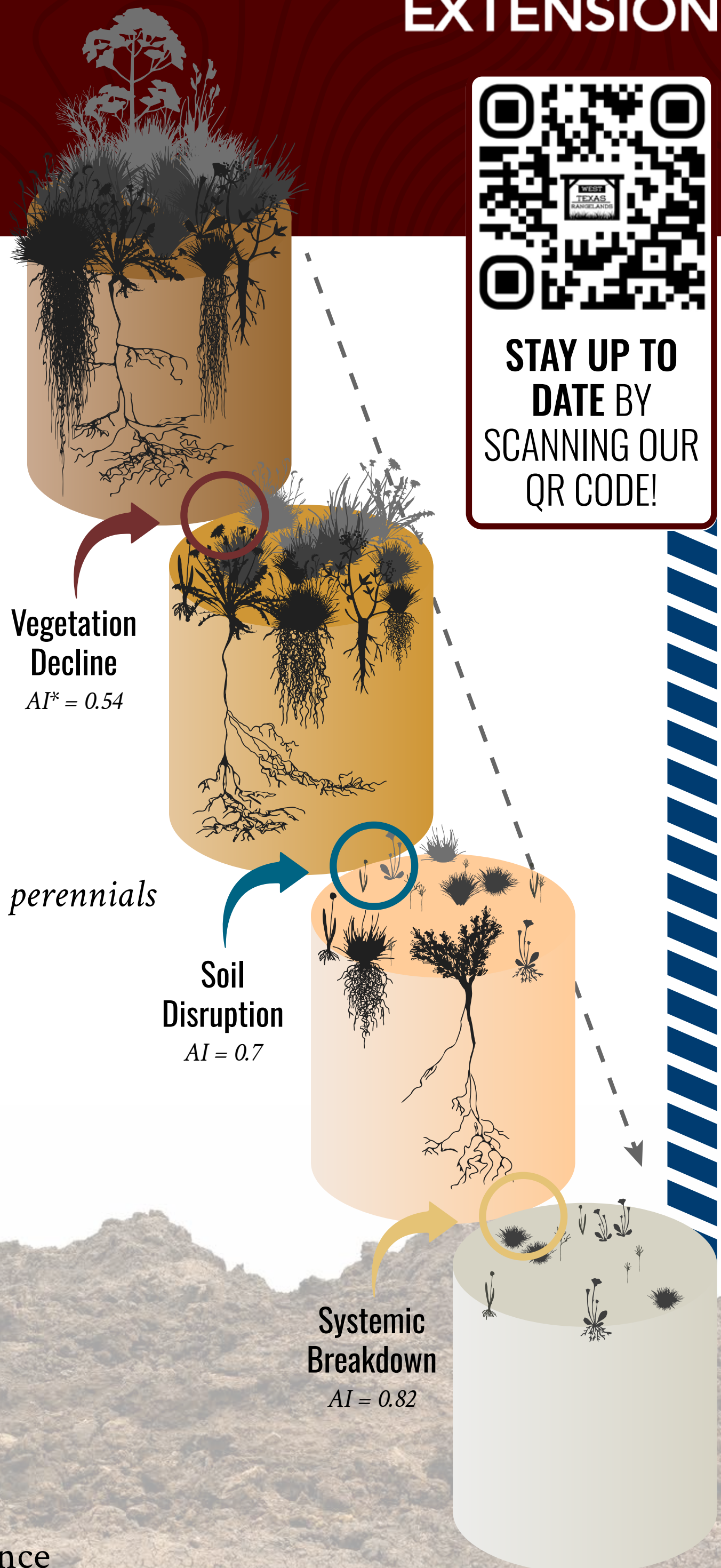
- Decreasing biomass production
- Increased drought adaptation
- Reduced below-ground lateral spread
- Increase in long-lived bud-bearing organs
- Fine roots still abundant

2. SOIL DISRUPTION

- Loss of rhizomatous species
 - Shift towards short-lived plants and deep-rooted perennials
 - Increased soil erosion vulnerability
- Fine roots decreasing
 - Loss of mycorrhizal fungi

3. SYSTEMIC BREAKDOWN

- Annuals become dominate vegetation
 - Biomass varies widely year-to-year
 - Leads to a generally unprotected soil that can be easily eroded by wind and rain
- Sparse plant cover
- Alternative state: deep-rooted shrub dominance



**The Aridity Index (AI) is a numerical indicator that measures the degree of dryness of a climate.*

Klimešová, J., Martínková, J., Bartušková, A. et al. Belowground plant traits and their ecosystem functions along aridity gradients in grasslands. Plant Soil 487, 39–48 (2023).

