

Agricultural Niche Construction in Roman North Africa

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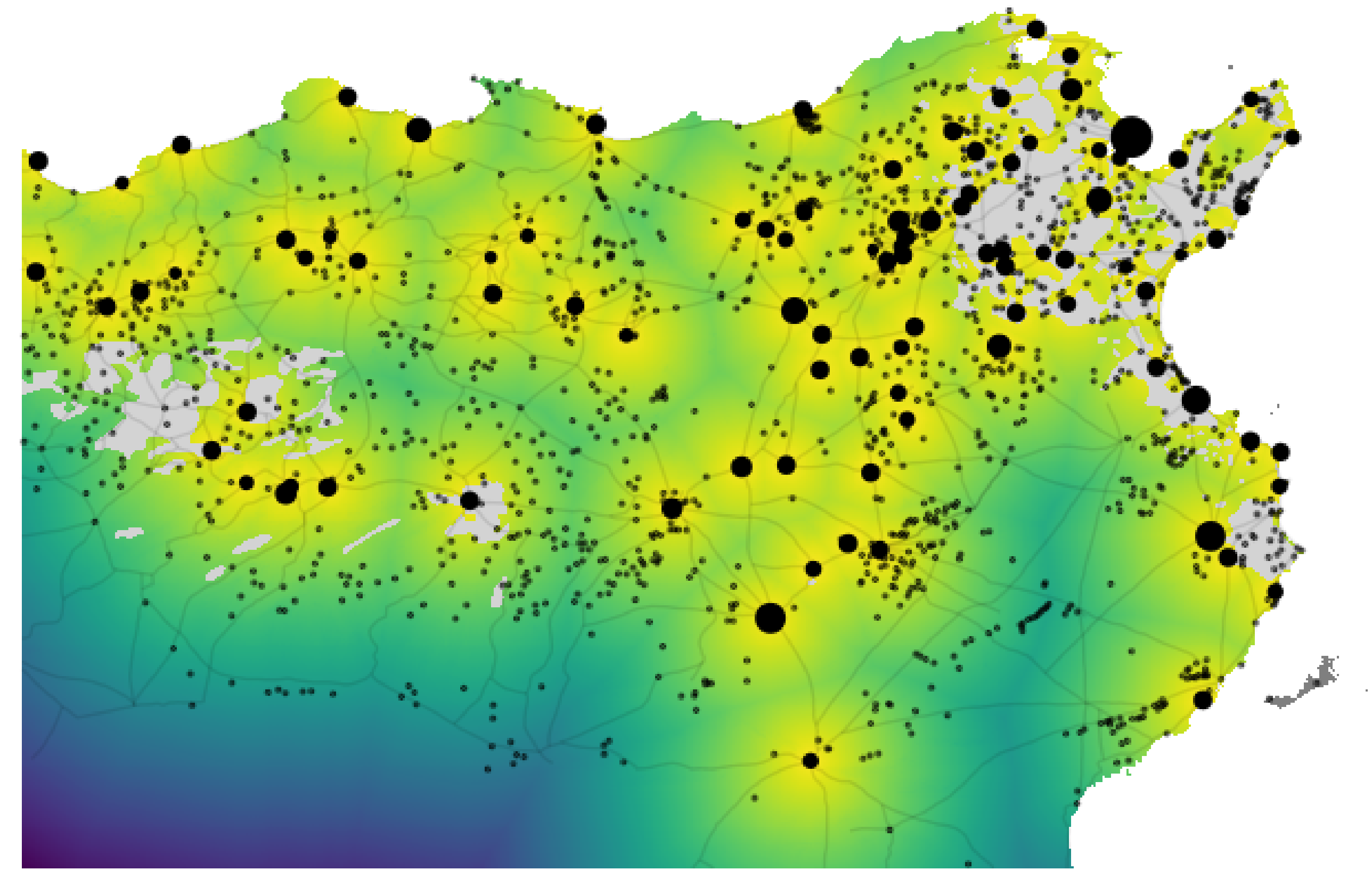
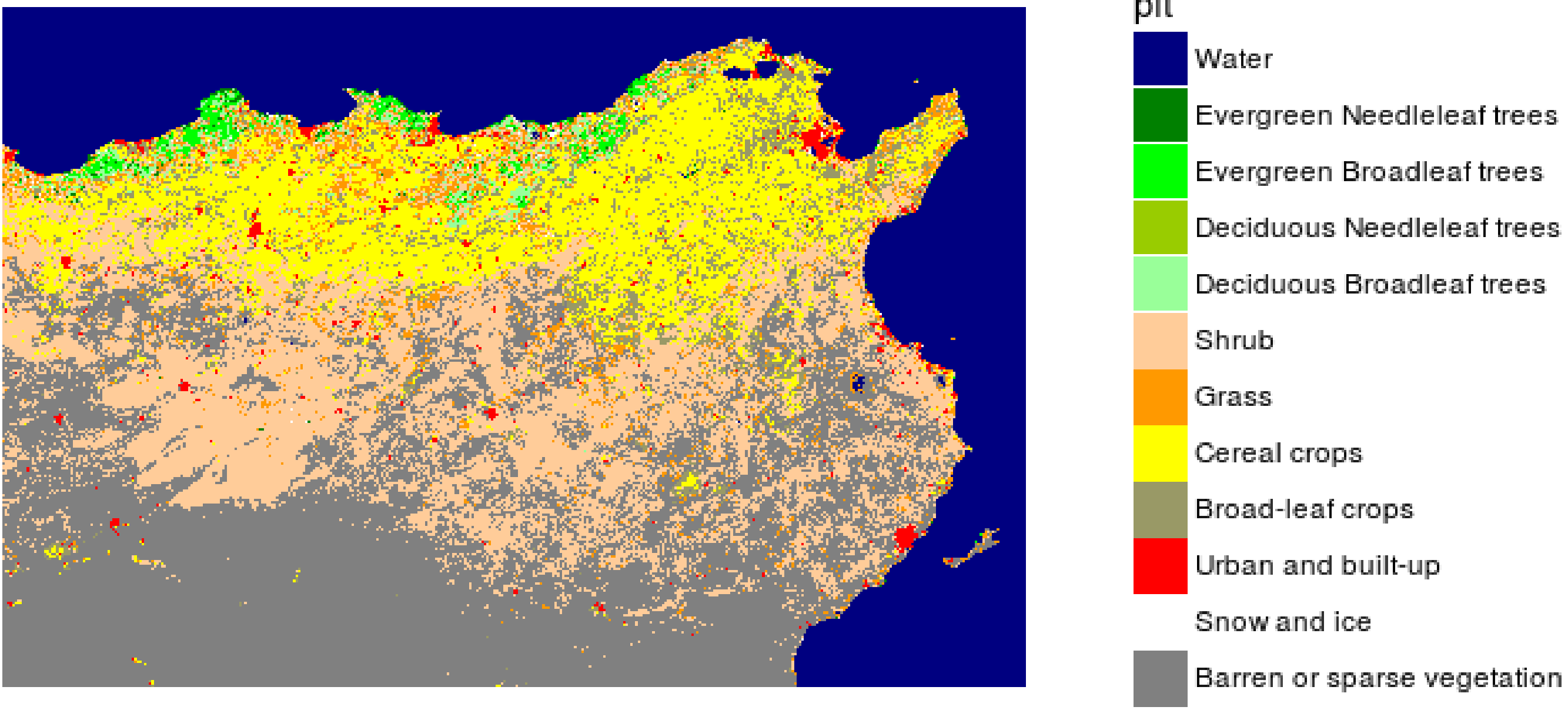


Introduction

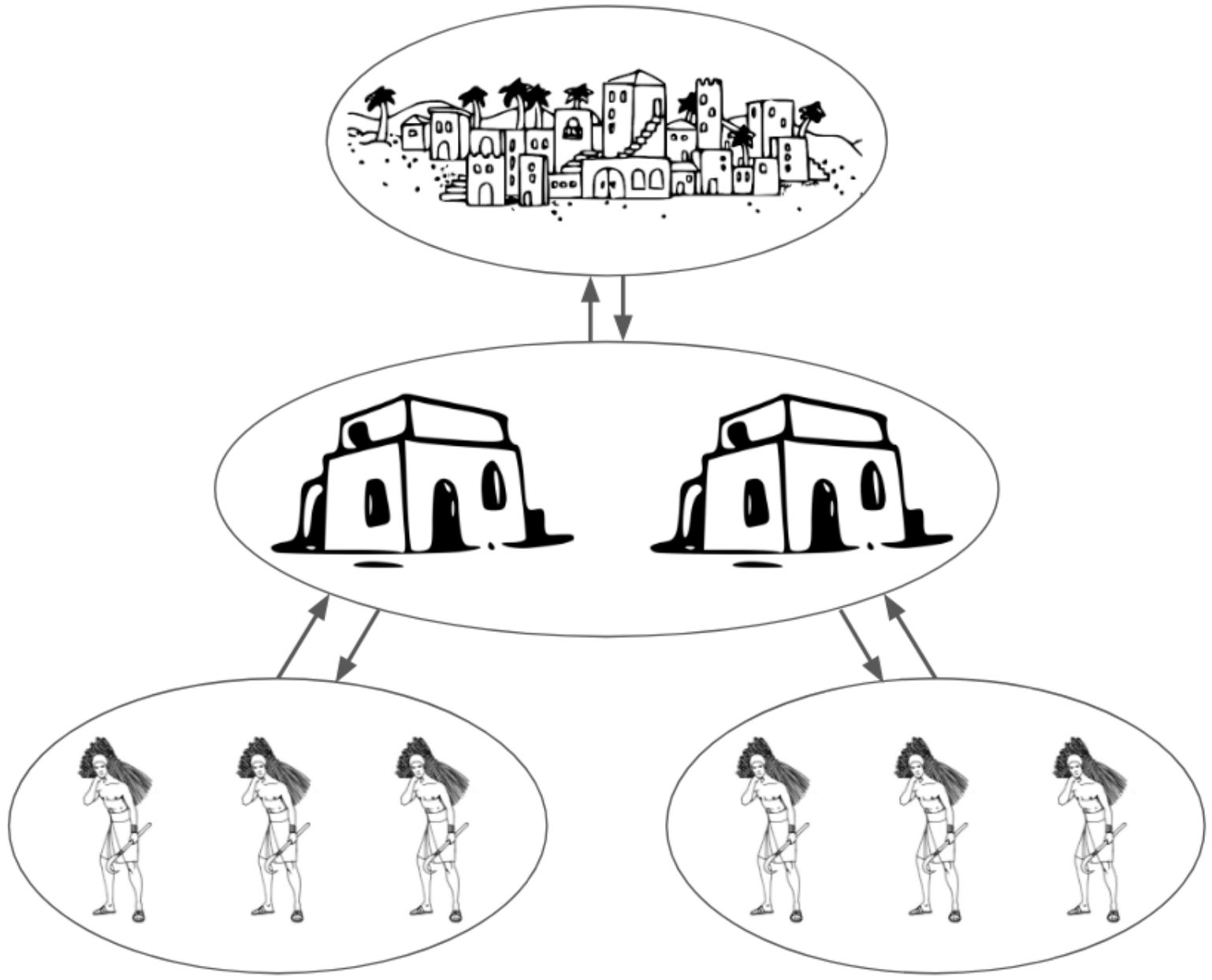
How robust were agrarian social networks to drought? The province of Africa Proconsularis roughly modern day Algeria, Tunisia, and Libya was the breadbasket of the Roman Empire. Land cover prescribed from population-based hindcasts lack feedbacks between humans and climate. North Africa is a region of tight land-atmosphere coupling, and experienced massive land-cover change during Roman Imperial period

Results

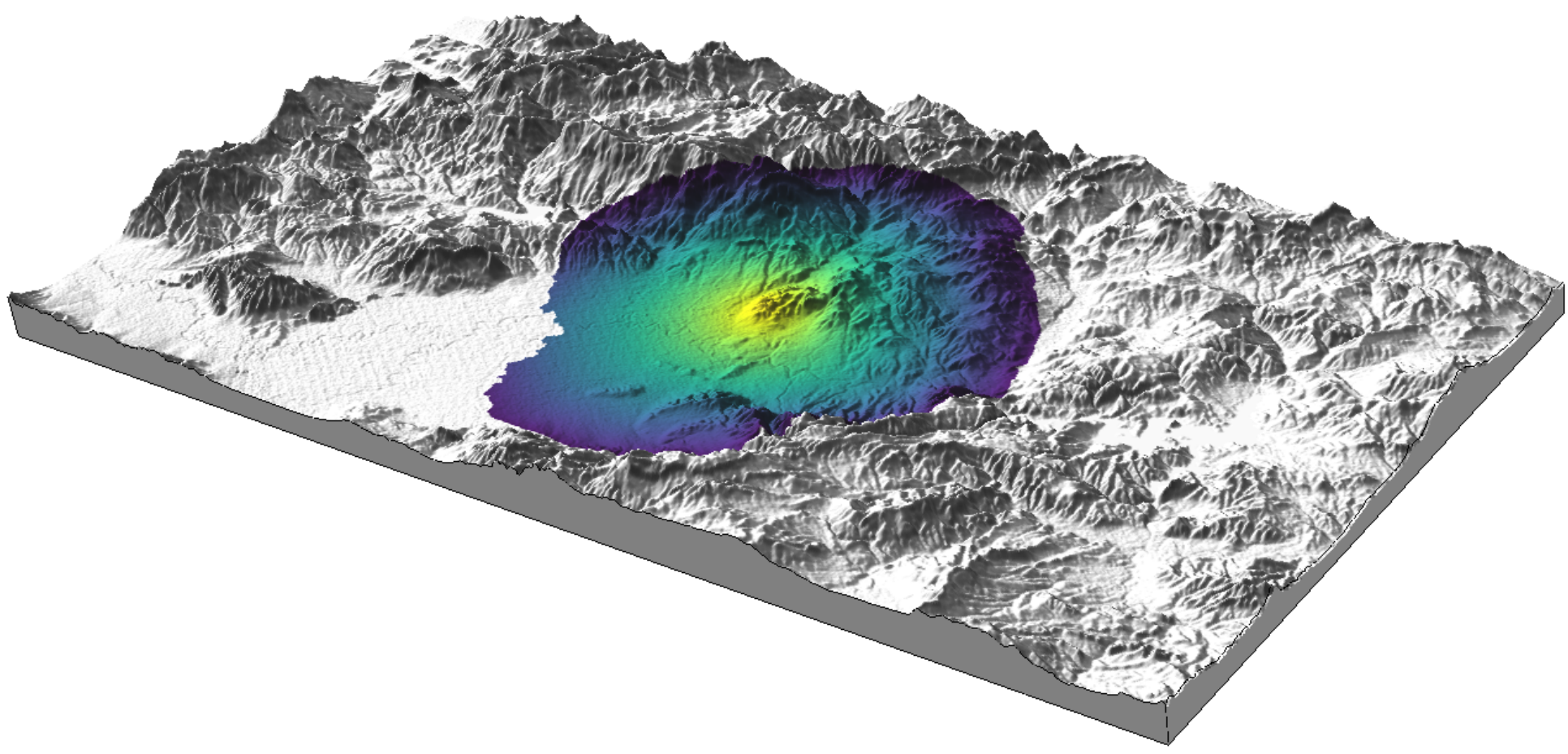
Vegetation distribution
Africa Proconsularis, present day



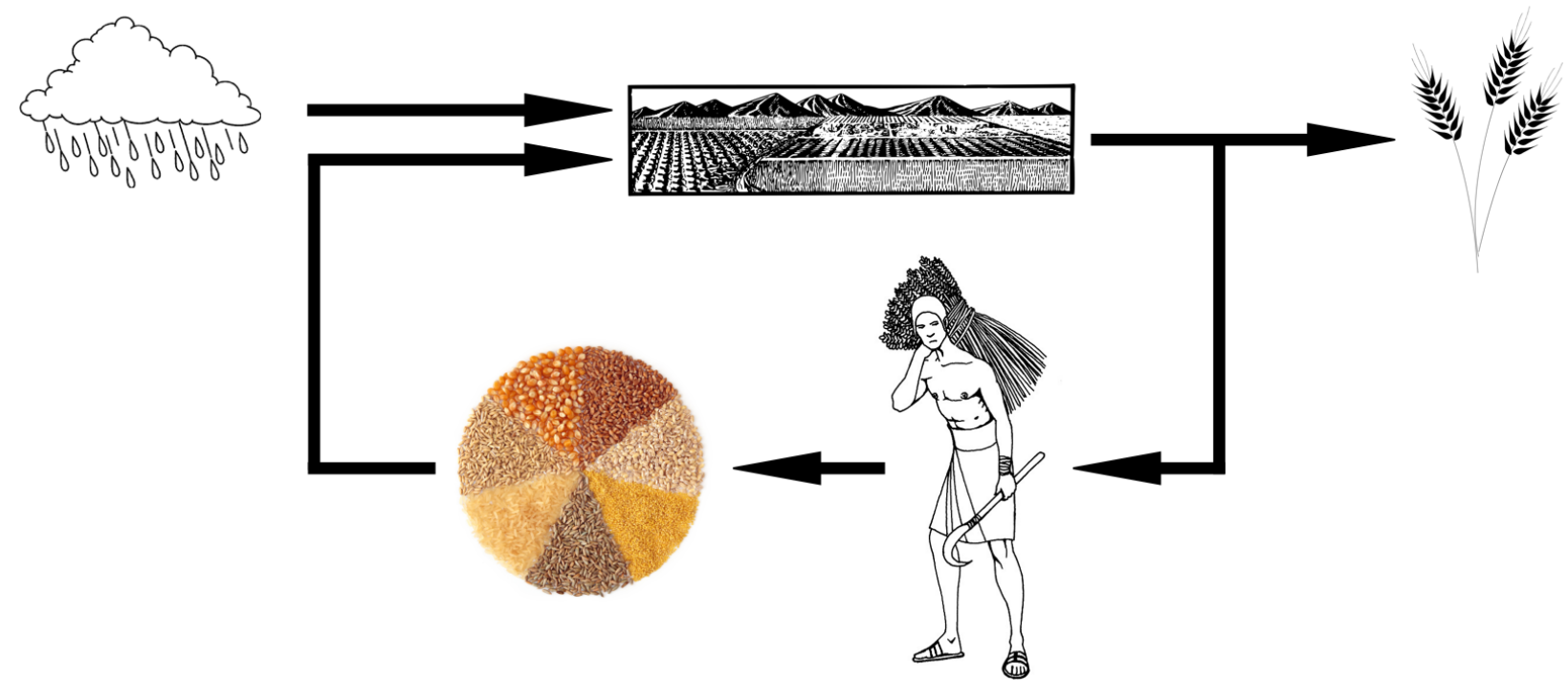
Methods 1: Social simulation



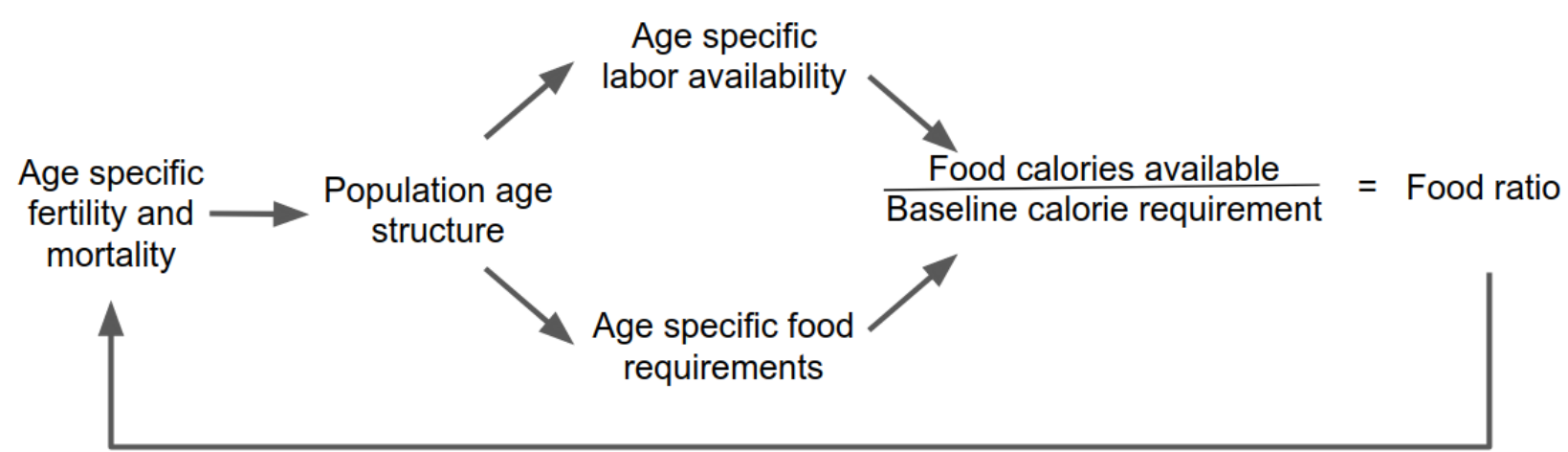
Cost distances



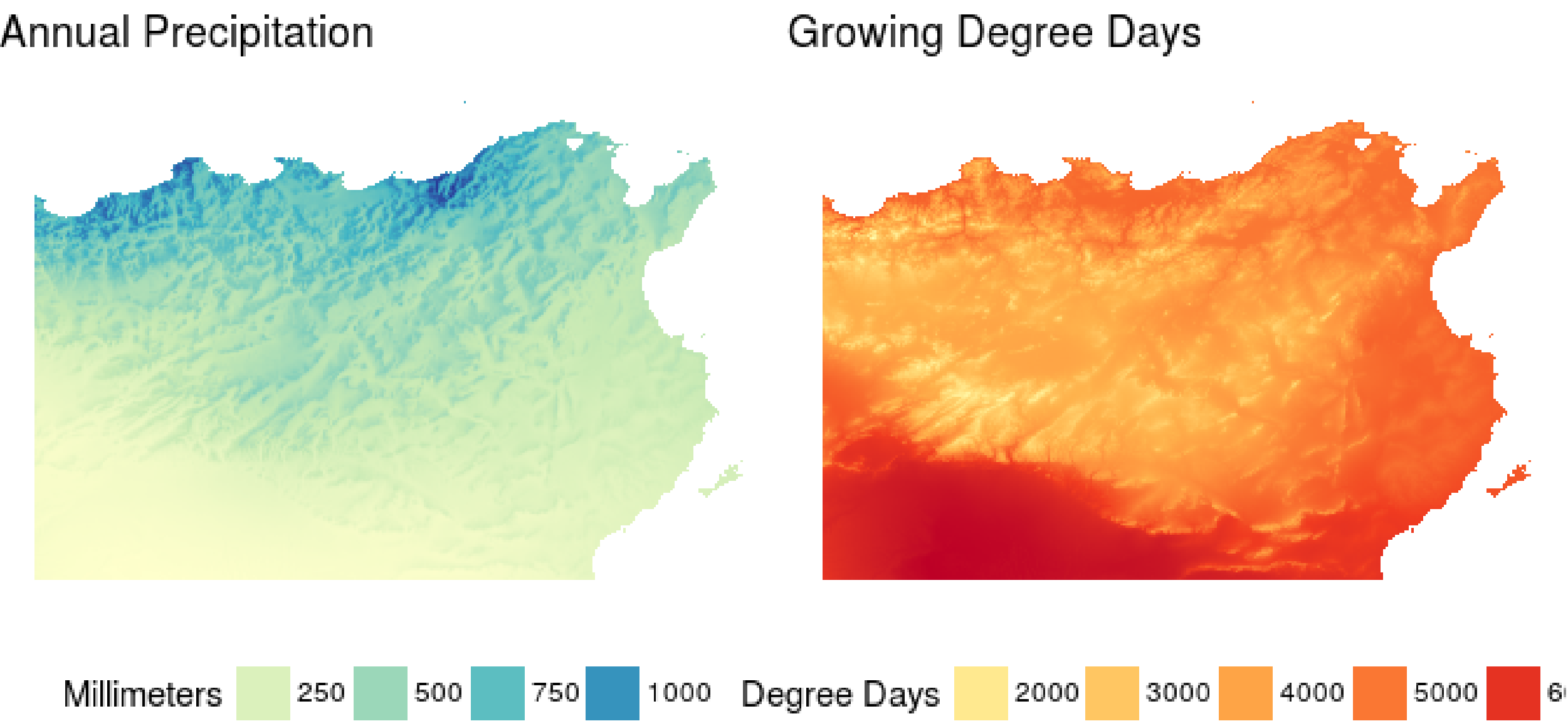
Boundedly rational time allocation



Food-limited demography



Methods 2: Climate modeling



Next Steps

The best fitting regression model includes travel time, water stress, elevation, and the 3rd and 4th EOFs as covariates. The strengths of network ties are significantly positively correlated with the third and fourth EOFs. While the remaining (non-significant) EOFs are stable through time, the spatial patterns of the third and fourth EOFs changed during the study period. Visual comparison between network dynamics and these EOFs suggests that **prehistoric social networks were sensitive to changes in drought variability.**

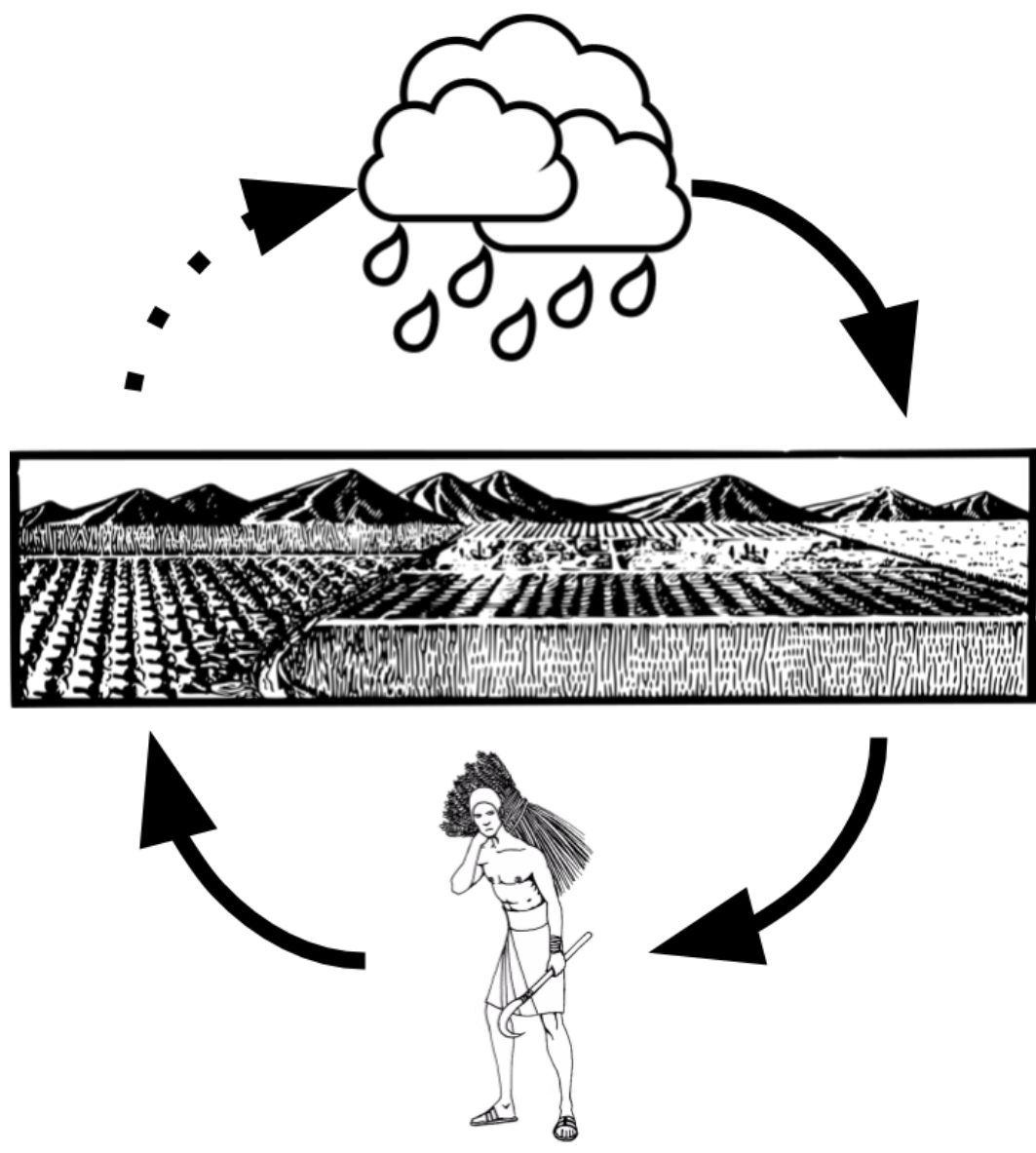


Figure 1: One simulated year of water stress (mm).

Acknowledgements

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References