

# Annual forage impacts on dryland wheat farming in the Great Plains

## Abstract

Wheat (*Triticum* spp.) dominates dryland grain crop production in the North American Great Plains and other regions with semi-arid steppe climates. A common practice is to alternate winter or spring wheat with a 14- to 21-mo fallow period to allow for soil-water recharge, despite economic inefficiencies and environmental degradation. Replacing fallow with non-cereal grain and seed crops often reduces future wheat yields due to increased water stress during grain fill. The use of annual forages may not have the disadvantages associated with grain and seed crops. The objective of this review was to determine benefits and challenges of incorporating annual forages into dryland wheat systems in semi-arid steppe climates, using the Great Plains within the United States as a model system. Results indicate that: (a) cool- and warm-season, annual grass and broadleaf species can be grown for forage across the region; (b) forage production will be less risky than grain and seed crop production under predicted climate-change scenarios; (c) grazing annual forages may offer advantages (e.g., nutrient cycling, improved soil structure, added revenue from livestock) over mechanically harvesting annual forages; (d) the lack of infrastructure and local markets impede the use of annual forages to diversify wheat-based cropping systems in the region; and (e) limited networking among researchers hinders the advancement in knowledge on how annual forages can be used to improve dryland wheat system resilience.

Carr, Patrick M, Bell, Jourdan M, Boss, Darrin L, DeLaune, Paul, Eberly, Jed O., Edwards, Laura, Fryer, Heather, Graham, Christopher, Holman, John, Islam, M. Anowarul, Leibig, Mark, Miller, Perry R., Obour, Augustine, and Xue, Qingwu. "Annual forage impacts on dryland wheat farming in the Great Plains." *Agronomy Journal*. (2021): 113: 1– 25.