Semi-Arid Canola Nitrogen and Water Requirements
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Spring canola is being adapted as a rotational crop for the high rainfall and transitional fallow zones of the PNW. This agronomic and economic diversification is improving weed control and soil quality, as well as supporting a growing regional oilseed processing and marketing industry. Field experiments were conducted over 12 site-years to define nitrogen (N) and water requirements of spring canola following wheat or fallow. Soil N supply (N_\text{s}) availability following wheat was lower than following fallow (77 vs. 205 kg N_\text{s} ha\textsuperscript{-1}) leading to higher N fertilizer requirements (47 vs. 0 kg N_\text{f} ha\textsuperscript{-1}) for canola following wheat, despite having lower water limited-yield potentials. Unit N requirements (UNRs) at economic optimal yield levels ranged from 9 to 17 kg N_\text{s} (kg grain\textsuperscript{-1}) across high to low yielding site-years, respectively.

Higher UNRs and lower N use efficiency (NUE) in water stressed years suggests projected climate change could result in more reactive N remaining in the system. Overall, these UNRs are generally higher than other reported canola recommendations from similar production areas, due to our inclusion of greater residual soil N depths and N mineralization contributions to N supply estimates. Nitrogen fertilizer requirements were low to zero in situations when residual and mineralized N sources and/or water availability limited canola yield potential.