FARMING PRACTICE
COVER AND CATCH CROPS

IMPACT: NUTRIENT LEACHING AND RUN-OFF

Reference 8

Bai, XL; Zhang, ZB; Cui, JJ; Liu, ZJ; Chen, ZJ; Zhou, JB 2020 Strategies to mitigate nitrate leaching in vegetable production in China: a meta-analysis Environmental Science and Pollution Research 27, 18382–18391 10.1007/s11356-020-08322-1

Background and objective

Nitrate leaching is a main nitrogen (N) loss pathway in vegetable production. Although there are numerous mitigation practices that control nitrate leaching, an integrated assessment of these measures is lacking. To evaluate the efficiency of mitigation strategies for nitrate leaching from vegetable production. We hypothesized that optimum management practices would control nitrate leaching without compromising yield in vegetable production.

Search strategy and selection criteria

We surveyed peer-reviewed publications before January 2018 related to nitrate leaching mitigation measures in vegetable production using the ISI-Web of Science (Thomson Reuters, New York, NY, USA), Google Scholar (Google Inc., Mountain View, CA, USA), and China National Knowledge Infrastructure database (CNKI). Terms including nitrate leaching, nitrate leaching management, the use of nitrification inhibitor (NI), water management, catch crop, comprehensive regulation of fertilizer and water management, and vegetables were used to search for publications on nitrate leaching mitigation management practices in vegetable production in China. (1) studied nitrate leaching in vegetable fields rather than in soil columns or pot experiments; (2) carried out study for at least one growing season; and (3) measured nitrate leaching in terms of mass of N lost by suction cup, lysimeter, or soil sample methods.

Data and analysis

The mean effect sizes of the confidence intervals (CIs) were calculated by Meta-Win 2.1 (Rosenberg et al. 2000). The 95% confidence intervals (CIs) of the weighted effect size were generated using bootstrapping (4999 iterations). A mitigation strategy was considered significantly different from conventional treatments if the 95% CIs did not overlap with zero.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
4	solar greenhouse and open-field vegetable production systems in China. The distribution of the selected articles was as follows: greenhouse vegetables 14 (58.3%) and open-field vegetables 14 (41.7%)	Catch crops	no catch crops	Metric: Total nitrate leaching; Effect size: Logarithm of ratio of the considered metrics in the intervention to the considered metrics in the control	68.75

Results

- The use of catch crops significantly reduced nitrate leaching by 35% (n=4).
- NULL
- NULL
- NULL
- NULL

Factors influencing effect sizes

- No factors influencing effect sizes to report

Conclusion

The use of catch crops significantly reduced nitrate leaching by 35% (n=4).