



## Using “Just Enough” Nutrients to Grow Horticultural Crops – Maximizing profits and minimizing environmental impact

Crops need the right supply of water and nutrients at the right time to grow, develop and achieve high quality yields. Irrigation and fertilization are effective methods of ensuring water and nutrient requirements are met. In fact, in some cases crop yields can increase 50 per cent by applying fertilizer and upwards of 90 per cent by using drip irrigation.

There is such a thing as too much nutrient supply, however. Not only are nutrients finite resources but the over-application of nutrients, such as phosphorus (P) and nitrogen (N), causes adverse impacts on the environment, such as eutrophication, which depletes oxygen availability, causing severe reductions in fish populations and water quality. It also impacts the aesthetics of the water, making it cloudy and a shade of green, yellow, brown or red.

Dr. Tiequan Zhang, Agriculture and Agri-Food Canada (AAFC) soil fertility and water quality specialist, and a team of AAFC research scientists at the Greenhouse and Processing Crops Research Centre (GPCRC) in Harrow, Ontario, are studying nutrient-soil dynamics to develop new technologies that maximize producers' profitability while minimizing adverse impacts on the environment. These studies include high-value horticultural crops such as tomatoes and green peppers, sweet corn, and Chinese cabbage.

*“Nutrient requirement and optimal application rates for high-value crops could dramatically change with improved irrigation, crop variety, and other cultivation practices, such as the use of plastic mulch for fresh market sweet corn,” explains Zhang. “Adjusting fertilizer application rates becomes urgent to achieve maximum economic return without causing environmental concern.”*

The research findings from Dr. Zhang's long-term research trials contribute to the implementation of Ontario's *Nutrient Management Act*, legislation that limits the over-application of fertilizers. Results are being used to develop production guidelines for farmers and to develop a database for making nutrient management plans – a core requirement of the legislation. For example, Dr. Zhang's research developed the optimal recommended nitrogen rate for processing tomatoes with drip irrigation/fertigation.

“Nutrient management legislation must be built on solid scientific evidence to ensure that adverse environmental impacts are minimized while providing continued profitability to the producer,” explains Zhang.

These research studies are done through the work of AAFC scientists, with financial support from AAFC's former Matching Investment Initiative program and from the following organizations: International Plant Nutrition Institute, Ontario Agri-Business Association, Ontario Processing Vegetable Growers, Canadian Fertilizer Institution, Ontario Tomato Research Institute, A&L Canada Laboratories East Inc., and the Ontario Fruit and Vegetable Growers' Association.

To learn more about the findings of these research studies, please contact:

**Dr. Tiequan Zhang**

AAFC Research Scientist  
Soil Chemistry & Fertility and Water Quality  
Greenhouse and Processing Crops Research Centre  
Harrow, Ontario  
Tiequan.zhang@agr.gc.ca

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