

PROJECT 2013-2018

# WATER FOOTPRINT ASSESSMENT AND OPTIMIZATION FOR CANADIAN DAIRY FARMS



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OMAFRANumber of students trained  
(MSc, PhD, Post-Doc):

9

TOTAL BUDGET

\$296,550

**INVESTMENT PARTNERS**Agriculture and  
Agri-Food Canada**OBJECTIVE:**

To characterize the water footprint of dairy farms and to identify options for reducing it.

**KEY OUTCOMES:**

- On a whole-farm basis, over 99% of all water loss from rain-fed farming is from crops and pastures, with the remaining from cattle intake.
- Working with the Water Footprint Network framework, the researchers of the project on dairy farms (including evaporation), resulting in a smaller water footprint, and noted that the Internet of Things (IoT) can be used on water that is extracted (blue water) from the ground, leading to a much smaller footprint.
- Using data from various farms, the researchers found that on-farm sites, in addition to manure, grey water (blue water) (pumped water) use on a small farm was 35 L of water per L of milk on average, and blue water use on a large free-stall was 6.19 L/L on average.
- Total farm water use by milking system across the 19 followed farms in Ontario was: 74.7 L/cow/day for robotic systems, 20.5 L/cow/day for parlour systems and 30.2 L/cow/day for pipeline systems.
- Finding and eliminating water leaks can lead to significant water savings around the farm.
- The pollutant load in grey wash water, containing milk solids, water from pipeline rinses and often manure and grit from floor washings could be reduced by 97% by cycling through an aeration system and constructed wetland.
- Nutrient leaching loss was reduced by applying manure in spring, avoiding fall manure application, and minimizing the use of mineral fertilizer.
- Alfalfa is more efficient than corn or soybeans in reducing nitrate leaching.

*The results are listed in bullet form and plain language used for easy reading.*

*Click on the links to access the KTT information listed.*

**LINK TO KTT TOOLS****VIDEOS:**Treatment of Milkhouse Washwaters using a Constructed Wetland: [youtube.com/watch?v=x4D4r1umPDg](https://youtube.com/watch?v=x4D4r1umPDg)

Why is Water Use Efficiency Important for Ontario Dairy Farms: Series of videos:

Video #1 Overview: [youtube.be/mg9RbTyIyg](https://youtube.be/mg9RbTyIyg)Video #2 Tie Stall: [youtube.com/watch?v=PaccZYIgyU4](https://youtube.com/watch?v=PaccZYIgyU4)Video #3 Rotary: [youtube.com/watch?v=nmus8CD0IQE](https://youtube.com/watch?v=nmus8CD0IQE)Video #4 Flush Robotic: [youtube.com/watch?v=MEW8ey7tdZ4](https://youtube.com/watch?v=MEW8ey7tdZ4)Video #5 Free Stall: [youtube.com/watch?v=njmkhBM1\\_n8](https://youtube.com/watch?v=njmkhBM1_n8)Video #6 Pond-Fed: [youtube.com/watch?v=ZOUiYkH7oyE](https://youtube.com/watch?v=ZOUiYkH7oyE)**FACT SHEETS:**A Subsurface Flow Constructed Wetland to Treat Milking Centre Washwaters  
[orwc.uoguelph.ca/Resources/newsletters.html](http://orwc.uoguelph.ca/Resources/newsletters.html)Water Use on Canadian Dairy Farms  
Preserving Water Quality  
[dairyresearch.ca/environment.php#self](http://dairyresearch.ca/environment.php#self)