



PROJECT 2013-2018

WATER FOOTPRINT ASSESSMENT AND OPTIMIZATION FOR CANADIAN DAIRY FARMS



Principal Investigator:

ANDREW VANDERZAAG

Agriculture and Agri-Food Canada, Ottawa

COLLABORATORS:

Robert Gordon
Wilfrid Laurier University

Ray Desjardins
AAFC-Ottawa

Ward Smith
AAFC-Ottawa

Roland Kroebel
AAFC-Lethbridge

Yves Arcand
AAFC-St-Hyacinthe

Keith Fuller
AAFC-Kentville

Chris Kinsley
University of Guelph

Tom Wright
OMAFRA

Number 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 considered all water on farms (including evaporation), resulting in a very high reported footprint, and noted that the International Dairy Federation focuses on water that is extracted (blue water) and polluted (grey water), leading to a much smaller footprint.
- Using data from various farms in Ontario and at experimental sites, in addition to modelling, specific findings include: blue water (pumped water) use on a tie-stall dairy farm was 5.35 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.

LINK TO KTT TOOLS

VIDEOS:

Treatment of Milkhouse Washwaters using a Constructed Wetland: youtube.com/watch?v=xD4rjumPDg

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

Video #1 Overview: youtu.be/rmq9RbTyLyg

Video #2 Tie Stall: youtube.com/watch?v=PaccZYIgyU4

Video #3 Rotary: youtube.com/watch?v=nmus8CD0fQE

Video #4 Flush Robotic: youtube.com/watch?v=MEWBey7td24

Video #5 Free Stall: youtube.com/watch?v=njmkhBM1_n8

Video #6 Pond-Fed: youtube.com/watch?v=ZOUiYkH7oyE

FACT SHEETS:

A Subsurface Flow Constructed Wetland to Treat Milking Centre Washwaters
orc.uoguelph.ca/Resources/newsletters.html

Water Use on Canadian Dairy Farms Preserving Water Quality
dairyresearch.ca/environment.php#self