

Effective Water Conservation

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In order to reduce water wastage in finishing barns, a trough with side panels and an integrated nipple drinker was shown to be a beneficial option compared to standard nipple drinkers. At the farm scale, a reduction of manure is to be expected when this option is used.

This article presents the results obtained from an on-farm demonstration activity carried out in a finishing barn in Saskatchewan by the Prairie Swine Centre. A similar project was also carried out in a nursery barn in Quebec by the CDPQ (Centre de développement du porc du Québec). Results obtained from the nursery barn are presented in another article.

Water is an essential nutrient in pig growth and sometimes can be an easily overlooked part of pig production. Research has found that finisher pigs waste 25% of water from nipple drinkers, even when they are properly adjusted (700 ml/min and positioned 5 cm higher than the shoulder height of the smallest pig)¹. However, on commercial farms, water wastage from nipple drinkers is reported as high as 40 to 60%. The difference between these results may partly be attributed to the improper drinker height and flow rate on farms.

Recent audits of 24 farms across Canada indicate that approximately two-thirds of nipple drinkers (in finishing) provided water volumes that exceeded the pig's requirement. In some cases, measured values were more than double of the required flow rates.

Water conservation

Barn evaluations of selected water conservation measures indicated that, relative to conventional nipple drinkers, the use of a drinking trough with side panel (and constant water level) saved a significant (60%) amount of water mainly due to reduced water wastage, without adversely affecting pig performance². With the promise associated with this innovation, based on the results of work conducted at Prairie Swine Centre², it was decided to implement the trough with the side panel setup on a commercial farm to understand if similar water savings can be achieved.

As seen in Figure 1, a single room was split into two distinct areas with pens 8 to 14 containing a wet/dry feeder and single nipple drinker per pen, which represents a typical room setup. Pens 1 to 7 also contained a wet/dry feeder however the water source was modified to include a trough with side panels integrated with the nipple drinker (Figure 2). In order to measure water disappearance, water meters were installed for each system within the room, and water disappearance rates were measured for two room turns (12 weeks/turn) between May and October 2017.

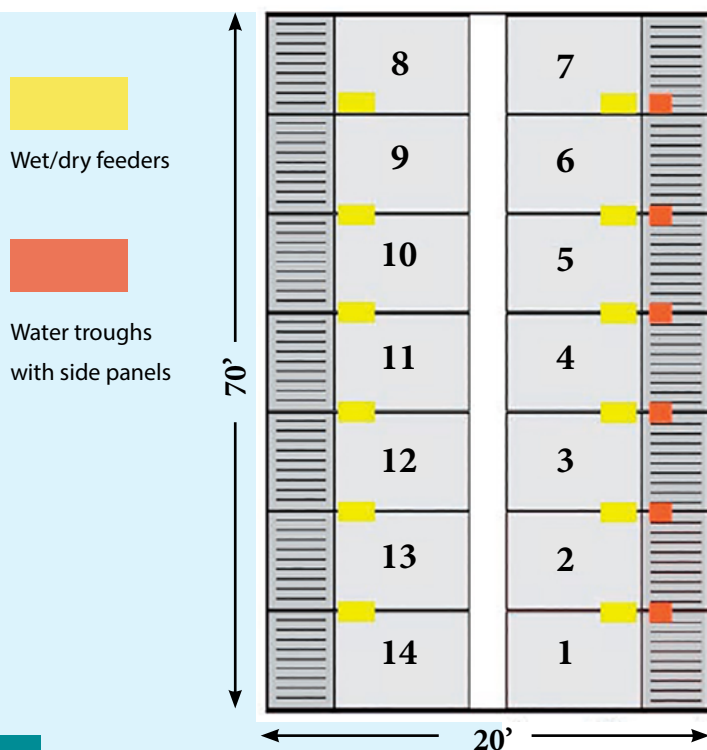


Figure 1. Room layout and setup for demonstration at the commercial farm.

Economics

The following example provides an overview of potential savings for one specific site in Saskatchewan. Over the 24 weeks that the demonstration project was carried out, water disappearance in pens 1 to 7, where troughs with side panels were installed, was 20% lower when compared to the traditional nipple drinker setup.

Assuming that finishing pigs consume 7 litres of water on a daily basis, the difference in total water disappearance over one year would be 89,250 litres for 170 pigs (Table 1). Also, assuming a manure disposal rate of \$0.0175/gal and that the (water disappearance) difference winds up in the manure pits, this would translate into a total additional manure disposal cost of \$343 for 170 pigs or \$57/pen.

For this specific site, the producer could expect a 2 to 3.5-year payback on an investment when implementing troughs with side panels in finishing barns. It must be noted that potential water savings and costs are very farm-specific. For example, some farms may be part of a rural water utility and need to also include the cost of water in their analysis. Every producer should take the opportunity to assess potential savings related to manure disposal, water use, and pumping costs on a regular basis.



Figure 2. Installation of the water trough with side panels at the commercial farm.

Table 1. Economics of water disappearance

	WATER SYSTEM	
	Nipple drinker with side panels	No side panels
# of Days	350	350
# of pigs	170	170
L/Pig	7	8,5
Total Water Disappearance (L)	416,500	505,750
Difference (L)		89,250

Potential Savings

Manure Disposal

Manure application rate - \$0.0175/gallon

Additional manure volume – 89,250 L or 19,658 gallons

Additional application cost - \$343.57 for 170 pigs over 350 days.

Water Use

Cost of water - \$10.00 per 4,546 litres (1,000 gallons) or \$0.0022 /litre

Additional water cost – 89,250 L @ \$0.0022/L = \$196.33 for 170 pigs over 350 days.

Installation Costs

Labour: 2 employees @ \$20/hour @ 10 hours = \$400 total labour cost to install a trough with side panels integrated with the nipple drinker in 7 pens.

Materials and Supplies

Trough with side panel (custom fabricated, aluminum) - \$100 /pen

Additional hardware and fittings \$10 /pen

Total installation cost - \$1,170 for 7 pens or \$167 /pen

Implementation

As with any new technology, proper implementation and training is key to ensuring proper assessment of its use. One of the first questions often asked by staff is: "Will it make my life easier?" After all, this would be the ultimate goal of adopting any new technology. By reviewing the results of the demonstration site, several distinct advantages and disadvantages have become evident (Table 2).

Table 2: Advantages and disadvantages in implementing troughs with side panels

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none">• Significant water savings• Reduced manure volume• Installed with off-the-shelf components• Improved biosecurity – less traffic to the barn site.	<ul style="list-style-type: none">• One more thing to wash - corners• Higher potential contamination of water in the trough
<p>Some sites require manure removal in spring and fall. If water wastage can be reduced farm-wide, manure removal may be reduced to a single application per year.</p>	



Conclusion

Based on the results generated from the demonstration project, the producer involved will continue to utilize the trough with the side panel setup within the facility. For this producer, the most interesting advantage was the significant water savings combined with the associated reduction in manure volume produced in the pens where the trough with side panels were installed.

Other Considerations

Research indicates that finishing pigs waste more water when the flow rate is higher¹. Audit results also show approximately two-thirds of finishing nipple drinkers provide flow rates higher than required by pigs³. Producers are well aware of the advantages associated with fine-tuning their water management, however they sometimes lack the resources – time – to ensure it is being carried out on a timely basis. Perhaps incorporating this innovation on the farm can act as an insurance policy when it comes to water management and reducing water wastage.

For more information on this project, please contact Ken Engele at Prairie Swine Centre: ken.engele@usask.ca

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For Further Reading

¹ Reducing Water Wastage from Nipple Drinkers by Grower Finisher Pigs (English)

<http://www.prairieswine.com/reducing-water-wastage-from-nipple-drinkers-by-grower-finisher-pigs/>

² Developing Strategies for Water Conservation in Swine Production Operations (English)

<http://www.prairieswine.com/developing-strategies-for-water-conservation-in-swine-production-operations/>

³ Water Management: Auditing Best Management Practices – Part 8 (English)

<http://www.prairieswine.com/wp-content/uploads/2018/03/Part-8-Water-Management.pdf>

From Innovation to Adoption: On-farm Demonstration of Swine Research

The demonstration activity presented in this article was conducted within Swine Innovation Porc's (SIP) Swine Cluster 2 research program. One of the objectives of this program was to accelerate the speed of adoption of new technologies and strategies by end-users: Canadian hog producers.

The results of other on-farm demonstrations carried out within the framework of the SIP program are available on Prairie Swine Centre's website: <http://www.prairieswine.com/from-innovation-to-adoption/>

