

Evaluation of Water Use and Potential Water Conservation Strategies in Swine Barns

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SUMMARY

Existing water conservation management practices from published literature was identified in this study. In addition, a benchmark survey on actual water use per pig produced in different types of swine operations was conducted. Results from the literature review indicated that animal drinking represented the largest contribution (80%) to total water consumption among all other activities in the barn. The benchmarking survey revealed various options that can be pursued in order to improve water use efficiency in swine operations.

“Water conservation strategies could reduce cost of production”

INTRODUCTION

In swine operations, water is used mainly for animal drinking, cooling, cleaning, and domestic use. The rate of water use in the different stages of swine production has impact on the overall production cost and the environment. However, very little effort has been done to document the actual quantity of water used in different production stages and in different types of production units. Thus, this study was aimed to quantify current water usage in swine operations and to evaluate water conservation measures that can be adopted in swine production.

METHODOLOGY

The overall approach of this study was to conduct a comprehensive search of available information on various water conservation practices for livestock operations in various continents, conduct a benchmark survey on actual water use in different types/sizes of swine operations, and evaluate selected water conservation measures in an actual barn facility.

The literature review was aimed to gather specific information about existing water conservation practices including their description and effectiveness in reducing water use, economic cost and benefits, and their viability for application to swine production operations in Saskatchewan. Following the literature search was the benchmarking survey in different swine operations across Saskatchewan. The survey was aimed to gather information on water usage, water expenses, and production data for the past three years and consequently, to determine the average yearly water expenses per pig sold (\$/pig sold) and per 100-kg sold (\$/100-kg pig sold).



RESULTS

A. Highlights of literature review

Previous research conducted in Manitoba swine barns showed that animal drinking represented about 80% of the total water consumption in the barn. The rest was contributed by other activities, namely, animal cooling (10-15%), cleaning (5-10%) and domestic use (1%). In terms of produc-

Table 1. Water conservation strategies for swine barns compiled from published literature

Category	Water conservation practices
Animal drinking	<ol style="list-style-type: none"> 1. Use of bowl drinkers (push-lever and float types) 2. Use of nipple drinker (swinging and ball-bite) 3. Use of water trough
Cooling pigs/sows	<ol style="list-style-type: none"> 1. Use of evaporative pads 2. Use of intermittent sprayer/mister
Cleaning	<ol style="list-style-type: none"> 1. Use of hot water 2. Use of soap 3. Pre-soaking rooms
Management practices	<ol style="list-style-type: none"> 1. Wastewater recycle for reuse (i.e. pig's drinking water or flushing manure) 2. Adjustment of drinker's height

Table 2. Water usage, water expenses and production data of the 29 participating swine barns

Operation		# of participating barns	Volume of Water Use		Water Expenses	
Type	Size		Gallons per pig sold	Gallson per 100-kg pig sold	\$ per pig sold	\$ per 100 kg pig sold
Farrow-to-Finish	12 - 1250 sows	18	67 - 2070	58 - 1558	0.05 - 2.70	0.10-3.19
Farrow-to-Wean	1300 - 6000 sows	3	1907 - 4641	867 - 1856	1.15*	0.46*
Grow-Finish	4500 - 55000 feeders/weanlings	6	164 - 509	207 - 432	NA**	NA
Nursery	23360 - 24000 feeders/weanlings	2	1018 - 1684	3588 - 6122	NA	NA

*data from one barn only

**data not available

Table 3. List of existing water conservation practices employed in the participating barns

Water conservation practices	Percentage of participating barns that employed the measure
<i>Drinker</i>	
1. Use of nipple drinker (regular standard drinker)	97
2. Use of water trough	34
3. Use of ball-bite drinker	14
4. Use of wet/dry feeder	59
5. Use of bowls/cup drinker	10
<i>Cooling</i>	
1. Use of spray/mist for cooling pigs	45
2. Use of drippers	10
<i>Cleaning (pressure washing)</i>	
1. Use of soap	31
2. Use of warm or hot water	52
3. Pre-soaking rooms	76
<i>Management Practices</i>	
1. Adjustment of nipple drinker's height	41
2. Regular inspection of leaks	69

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REFERENCES

Froese, C. 2003. Water usage and manure production rates in today's pig industry. *Advances in Pork Production* 14, 215-223. St. Andrews, MB.

tion stages, farrowing stage consumed the greatest amount of water on a per head basis, followed by gestation, grow/finish, and nursery phases. However, due to the large number of animals involved, combined water use in grow-finish units comprised 64% of the barn's total water use (Froese, 2003). The different water conservation strategies implemented in swine barns that were gathered from published literature are listed in Table 1.

B. Highlights of the survey

Information on 29 participating swine barns in Saskatchewan was collected. The common source of water for the participating barns was barn-owned groundwater well (22 barns), dugout (6 barns) and municipal water system (1 barn). Summarized in Table 2 are the volume of water use per pig sold and the corresponding water expenses, which showed a wide range of values thus presenting an opportunity for savings in terms of water use and reducing spillage. In addition, savings in manure management costs (i.e. hauling/storage/application of manure) can also be achieved.

Table 3 shows the list of conservation measures and the percentage of participating barns that employed such measures. Almost all barns had pressure washer with straight nozzle attachment. Only few used soap or warm water for cleaning and 76% of the barns pre-soaked the rooms before cleaning. More than half of the participating barns used wet and dry feeder. Few barns used drippers to cool pigs/sows and 45% used spray/mist. Among the drinkers, nipple drinkers were used by most barns; only few used bowls, troughs and ball-bite drinkers. Less than half of the participants adjusted their nipple drinkers as the pigs grow and about 69% regularly inspected pipelines and drinkers for leaks. The rest of the barns fixed any leaks as the problem occur.

IMPLICATIONS

Current work demonstrated that there are various opportunities to improve water use in swine operations by carefully choosing the right combination of conservation measures and applying these to the areas where highest savings can be achieved. The benchmarking survey also showed that a large percentage of producers currently do not closely monitor the volume of water consumed and the corresponding cost of water used in their production operations. Tracking the water consumption in each stage of production would allow producers to establish water use baseline and help to detect potential problems associated with water wastage.