

Environment Producer Guide



Water Conservation Tips and Insights

Key Points

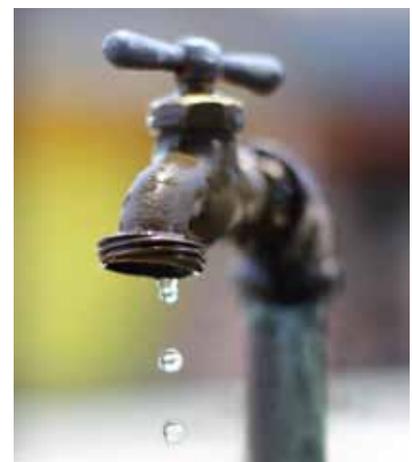
- Water conservation is essential for a sustainable pork industry and can yield significant cost savings.
- Using less water can reduce manure handling costs with reduced slurry.
- Using water only when needed for pig cooling and presoaking before power washing can reduce net water usage.
- Measuring water consumption and taking appropriate steps in and out of barns is key to overall reduction in usage.



Author: Allan Stokes

Managing Your Whole-Farm Water System

- **Measure water use.** You cannot control what you do not measure. Monitoring (metering) total water use will allow you to identify your baseline water use. Once you have the baseline, deviations from it can be identified and addressed. It is important to monitor the performance of water-delivery systems as they age and need maintenance. Monitoring deviations from a baseline also can help reveal the existence of water losses in the system that require immediate attention. In addition, metering allows you to monitor water use when no pigs are in a barn, which can help detect hidden leaks.
- **Visually check for and repair water systems leaks.** Ideally, you should check for leaks daily but no less frequently than weekly. A leak of one drop per second within a water system, whether from a valve or fitting or a drinker itself, will result in a water loss of up to 2,190 gallons in a year. If a standard finishing barn has 80 nipple drinkers and 25 percent of the fittings or drinkers have leaks, this could result in a total water loss of more than 43,000 gallons per year. This not only results in wasted water, but it also adds to cost of production. How? Because otherwise clean water ends up in manure storage adding to cost of manure management. Also, if medication is administered through the water system water loss is even more costly.



Drinking Water

Animal drinking water accounts for about 80 percent of total water use in raising pigs. Therefore, the greatest potential reduction in water use can be made by using water-saving technologies and practices for drinking-water systems.

- **Pig drinker selection and management.** As the table below shows, intensively managing nipple drinker height and flow rate or using drinking systems like cup drinkers or wet/dry feeders can significantly reduce total site water use.

Technology or Practice	Reduction in water consumption versus conventional nipple drinkers*
Swinging nipple drinkers	11%
Managing nipple height and flow rate	16-26%
Bite style or Arato style nipple drinkers	8-22%
Cup or bowl drinkers	9-31%
Wet/dry feeders	10-34%



Changing drinkers can save water and potentially reduce production costs as well. For example, A 5 percent to 25 percent reduction in water use in a 1,000-head finisher barn with dry feeders and nipple waters that averages 1.9 gallons per pig space per day can save 35,000 to 173,000 gallons of water annually. In most barns, this is water that would end up in manure storage requiring land application.

Pig Barn and Equipment Cleaning

Barn and equipment clean-up can account for up to 10 percent of total water used at a pig production site. This will depend upon the varying performance ratings of power washers and whether you presoak barns prior to power washing.

- **Dry clean-up** practices can reduce wash time and wash water used. While the majority of pigs are raised in barns with liquid manure storage and handling systems that are cleaned with water, the practice of dry clean-up still has value. Manure solids can build up creating a “hard pack” in pen corners or non-slatted areas of facilities with partially slatted floors. Using shovels or scrapers to dislodge this hard pack saves the water that would otherwise be needed to clean these areas. A second area where dry clean-up tactics can be used is in cleaning pig transport trailers. Generally, pig transports are washed between every load. Manure solids and bedding can be removed with shovels or brooms prior to washing which will again reduce both the amount of time and water used in the washing process.
- **Intermittent presoak** rather than continuous presoak can reduce pig barn clean-up water use by approximately half. Total wash water used, including presoak and power wash, for pig finishing barns ranges from 9 to 13 gallons per pig space per year when an intermittent presoak scheme was followed versus 20 to 26 gallons per pig space per year when a continuous presoak regimen was employed.* Using an intermittent presoak scheme does not appear to reduce the presoak effect because it takes time for water to soak into the hard-packed organic materials. Presoaking saturates packed manure in pens to make removal easier. For comparison, a continuous presoak scheme is defined as 12 hours at 10 gallons per minute. An intermittent scheme is defined as five minutes out of every 30 minutes for a total of 18 hours with the same flow rate of 10 gallons per minute when a presoak system is running.
- **Wash basins** can be used for certain cleaning chores on farms. Instead of washing boots and hands with a hose, keep a basin full of disinfectant for washing boots with a brush. Only use a hose for the final rinse. When it is necessary to use hoses, ensure those hoses have spring-loaded trigger shutoffs. This stops water flow between rinses or during wash item rearrangement.
- **Shower-in and shower-out facilities** Shower-in and shower-out facilities can be equipped with low-flow shower heads to help reduce water use. Also, consider purchasing high efficiency washing machines that use less water when installing or replacing laundry equipment used to clean coveralls and other farm-provided apparel worn on farms.





Animal Cooling

When water is used to cool pigs using an in-barn cooling system, it can account for up to 12 percent of total water used on a production site.* These systems can include drip, sprinkler or misting technology as well as evaporative cooling pads. Regardless, they require air speed across the animal to maximize the cooling effect. Water required to achieve the desired cooling varies greatly with outside temperature, facility type and management. If present:

- **Use cooling systems only when needed** - generally when outside temperatures exceed 85°F.
- **Follow generally accepted cooling water recommendations** made in publications like *Midwest Plan Service - 34 Heating, Cooling and Tempering Air for Livestock Housing* (MWPS, 1990). Using the cooling rates recommended by the Midwest Plan Service and weather data, this table provides estimated water consumption for cooling using various water-cooling systems.

Estimated water use for different pig cooling systems in different geographic areas.*

Cooling Type, Location	Recommended water use ¹ (gal/pig/hr)	Number of hours ² exceeding 85 F	Annual cooling water used ³ (gal/pig/year)	Average daily cooling water used ⁴ (gal/pig/day)	Percentage of total site water use ⁵
Raleigh, NC					
Sprinkler	0.1	334	33.4	0.09	6.1%
Drip	0.75	334	250.5	0.69	11.4%
Evaporative Pad	0.6	334	200.4	0.55	9.2%
Des Moines, IA					
Sprinkler	0.1	278	27.8	0.08	5.1%
Drip	0.75	278	208.5	0.57	9.5%
Evaporative Pad	0.6	278	166.8	0.46	7.6%
Cedar City, UT					
Sprinkler	0.1	344	34.4	0.09	6.3%
Drip	0.75	344	258.0	0.71	11.8%
Evaporative Pad	0.6	344	206.4	0.57	9.4%

1. Extrapolated from cooling recommendations from MWPS, 1991.
2. Yearly number of hours with temperatures exceeding 85 F (Kjeldaard, 2001).
3. Recommended water use multiplied by recommended use time.
4. Annual use average on per day basis.
5. Total site water usage obtained from the rates listed in table 1 and production phase most suited for each cooling type. Sprinklers for swine finishing (total site water use average equals 1.5 gal/pig/day) and drip and evaporative cooling for gestation/farrowing (total site average water use 6.0 gal/pig/day).

Farm House

Although water used in farm homes is a very small portion of total farm water use, it still presents an opportunity to reduce overall water use. Every bit of water conservation can help the total water use reduction on the farm.

- **Check interior plumbing** for faucet or toilet leaks, and make necessary repairs. To detect potential leaks, listen for trickles of water or frequent water valve operations.
- **Take shorter showers** or bathe in partially full bathtubs and install water-saving shower heads.
- **Do not leave water running** for tasks such as washing dishes, preparing food, brushing teeth, and shaving. Fill the sink with water instead.
- **Use dishwashers/washing machines with full loads whenever possible.**
- **Refrain from using the toilet as a wastebasket or ashtray**, which leads to extra flushing.
- **Store a container of drinking water in the refrigerator** rather than running water from the faucet to cool it.
- **Use a broom rather than a hose** to clean outside surfaces such as patios, driveways, and sidewalks.
- **Limit watering lawns, flowers and gardens to early morning** when the evaporation rate is less. Watering in the evening may result in potential fungus development. Consider capturing rain water from downspouts on the house in rain barrels for watering plants
- **Use a bucket and hose that has a shut-off nozzle** to wash vehicles, rather than continuously running a hose.
- **Limit use water for outdoor play**, e.g., playing in the sprinkler, water toys and swimming pools.



*Water Consumption and Conservation Techniques Currently Available for Swine Production - R.V. Muhlbauer, L.B. Moody, R.T. Burns, J. Harmon, K. Stalder - Iowa State University



National Pork Board
PO Box 9114, Des Moines, IA 50306 • 515-223-2600 • pork.org