

# Forage Facts

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## The Economics of Water Quality

By: Marianne Krahn

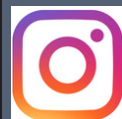
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**DID YOU KNOW?**

**Ground beef from one finished steer is enough to make about 720 quarter pound hamburgers.**

You probably heard that it's a good idea to keep livestock from drinking directly from a water source like dugout or creek. You heard that it's better for their health and might increase growth. You believe it, but wonder: to what extent?

You don't want to spend an arm and a leg for a new system, just to make a few extra dollars. And you sure don't want to spend your time fixing a system or depend on a power source that can go out anytime. So in the end, is it worth the effort?

Cattle need water to carry out biological functions: absorption of other nutrients, growth, milk production, fertility, etc. If we limit water intake, we limit the animal's ability to perform. Water intake can be affected in two ways. The availability is limited, or the quality is poor. Water availability may seem obvious but let's reiterate it: livestock need access to ample water at all time. As for quality, cattle will drink less if the water quality is poor, which affects performance, therefore your bottom line. By improving water palatability, water systems helps cattle eat and drink more, therefore perform better.

A study by Lardner et al.(2005) measured the effects of improvements in water quality on cattle performance. Two groups of cattle were analyzed: 44 Hereford yearling steers over a 5 year period and 40 Angus cow-calf pairs over a 3 year period.

Cow-calf: What Lardner et al. (2005) found out is that suckling calves whose

dams drank from water troughs gained on average 0.09 lbs per day more than calves whose dams had direct access to the dugout. Calves with access to clean pumped water were on average 18 lbs heavier at weaning time. Water and forage intake being closely related, as cows drink more water, they spend more time eating and therefore produce more milk for their calves.



Yearling Grassers: Lardner also found that yearling steers had 8-9% higher weight gain when they had access to water that had been coagulated or aerated before it was pumped compared to steers that only had direct access to dugout water. Steers with access to untreated pumped dugout water gained 3% more weight than steers with direct dugout access.

### Economics of Water Systems – Online Calculator

Based on results of Lardner et al. (2005), a water system calculator was developed to estimate the potential economic benefits and costs of alternative watering systems compared to direct access to dugout water. The calculator can be found at: [beefresearch.ca/research/water-systems-calculator.cfm](http://beefresearch.ca/research/water-systems-calculator.cfm)

Three type of watering systems are built



into the calculator: wind power, solar power, and underground water lines. There is also an option of including a solar aeration system. By default and to make it easy to use, the calculator is already populated with cost of installation for each water system. The cost sourced from the "Stockman's Guide to Range Livestock Watering from Surface Water Sources" (Prairie Agricultural Machinery Institute), Wilson and Clark (2003) and current online pricing from various water system suppliers (January 2008). The initial cost of an aeration and pumping system is estimated to be 11% higher than the pumping system only. Annual maintenance costs were estimated as 0.5% of initial investment and ranged between \$50-100 per year.

Estimated cost of alternative watering systems used on the calculator, not including the well:

- Windmill: \$13,200
- Solar: \$9,500
- Underground pipe: \$15,700

Of course, these numbers can vary from one situation to another and from one supplier to another. To give you an accurate picture of your own situation, you enter your own data.

From there, just select whether you want the cow/calf or yearling scenario. Then enter some basic information like your herd size and expected sale price. The calculator tells you what you can expect for added weight gain and pay-back for each water system.

A few notes on this:

- In the Peace Region wind is generally not consistent enough to be a reliable source of energy. For pumping water, a windmill can be paired with a solar system to make up for the shorter days in winter.

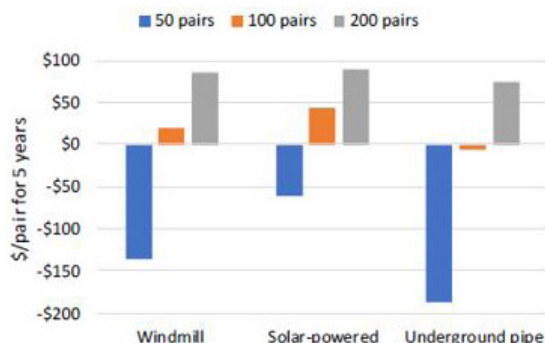
- Some producers are using an above ground pipe system successfully. While it doesn't work in every situation, it immensely reduces the installation cost compared to an underground system.
- Maintenance of a remote water system relying on technology is a major concern. While remote monitoring systems exist, development is still needed.

### Cow/Calf Scenario

Based on the increase in weight gain and the cost of installation and maintenance, we are able to calculate the pay-back period. The table below show the number of years it would take to pay-back the initial cost, with calf price at \$2.18/lb

| Calves Sold per Year | Windmill (Years to Pay Off) | Solar Power (Years to Pay Off) | Underground Pipeline (Years to Pay Off) |
|----------------------|-----------------------------|--------------------------------|---|
| 50                   | 8.69                        | 6.56                           | 10.10                                   |
| 100                  | 4.34                        | 3.68                           | 5.05                                    |
| 200                  | 2.48                        | 2.40                           | 2.80                                    |
| 300                  | 1.65                        | 1.74                           | 1.86                                    |
| 400                  | 1.73                        | 1.58                           | 1.53                                    |
| 500                  | 1.39                        | 1.35                           | 1.23                                    |

Usually the larger the herd the shorter the pay-off period. However because systems are designed for a certain pumping capacity, an additional unit needs to be purchased beyond that maximum capacity. For instance, if the Windmill system can supply



Net Returns of an Off-Site System based on Cow/Calf Herd Size over 5 Years

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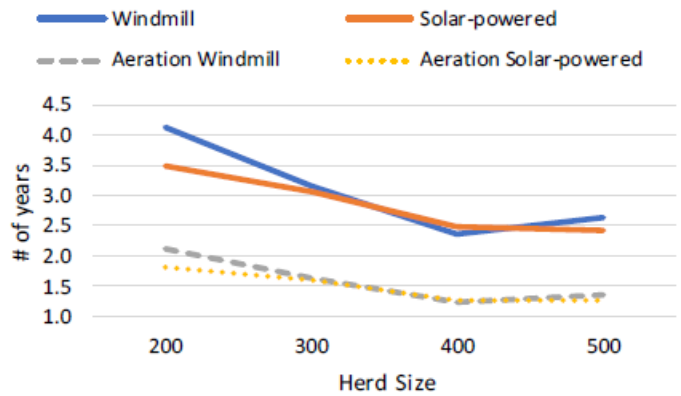
water to maximum 300 head, cost per head is cheaper for a herd of 300 head than 400. This indicates that matching water requirement with water system capacity to reach the optimum utility rate is a factor to consider when choosing a watering system.

### Yearling Grasser Operation

As adding aeration treatment results in only an 11% increase in the initial costs of the pumping systems with a more than double increase in ADG, the results show that it will take a yearling grasser operation less time to pay off a water system that includes an aeration treatment based on the improved gains (22 lb/year vs 10 lb/year) observed by Lardner (2005). The time taken to pay off the initial costs flattens between 400 and 500 head as additional infrastructure is needed, offsetting the benefits from economies of scale. This graph is based on \$1.78/lb. At over \$1.95/lb right now, pay-back is even quicker.

### Conclusion

It is well documented that yearlings and suckling calves whose dams have access to pumped water gain better when kept out of a dugout. However, the economics of water systems goes well beyond weight gain. We



Net Returns of an Off-Site System based on Yearling Herd Size

haven't started talking about the benefit of water systems when it comes to herd health: water transmitted disease, foot rot, viruses, etc, which have a huge economic impact! Then add the environmental benefits such the protection of riparian areas and wildlife habitat and water systems make even more sense.

To conclude, let's remember that one of the most precious (yet free!) resource we all share is WATER. You and I depend on it. Cows depend on it. Everything that lives depends on it. Let's not take it for granted, let's take care of it. It might pay more than you think.

## The Fourth Principle of Soil Health

By Katie McLachlan

The fourth principle of soil health is to keep a living root in the soil for as long as possible throughout the year. If we do not have a living root in the soil putting out root exudates, we have nothing feeding our soil biology, or underground livestock. If we are not feeding our soil biology, we are not cycling nutrients.

A great analogy that Gabe Brown uses in his presentations summarizes this concept quite beautifully, "A farmer would never leave their livestock unfed for months at a time. Why, then, do farmers not think to feed their 'underground livestock' through the winter?" (*Dirt to Soil* Brown, Gabe. 2018)

Another great reason to keep a living root in the

soil for as long as possible is because of our water holding capacity. If you are in a typically dry area, being able to hold as much water as you can is very important! One of the best ways to increase the water holding capacity of your land it to increase the organic matter of your soil.

Did you know that increasing soil organic matter by 1%, increases water holding capacity by 20,000 - 25,000 gal/acre. ([nrdc.org/experts/lara-bryant/organic-matter-can-improve-your-soils-water-holding-capacity](http://nrdc.org/experts/lara-bryant/organic-matter-can-improve-your-soils-water-holding-capacity)). Studies have shown that approximately 2/3 of soil organic matter comes from plant roots. So the more roots, the more soil organic matter! By growing a diverse set of plants with various different roots, that live throughout the season - and avoiding tillage - you can increase your soil organic matter and with it, the water holding capacity of your land!



# Upcoming Events

| Event   | Date  | Location   |
|---|---|--|
| Beef Nutrition Webinar with Barry Yaremci           | November 5th<br>7 pm                                  | Everywhere Online!<br>Get the link by calling the office or visiting our event page:<br><a href="http://peacecountrybeef.ca/nutrition">peacecountrybeef.ca/nutrition</a> |
| Soil Health & Carbon Workshop with Dr. Kris Nichols | November 14th<br>10 am Registration<br>10:30 am Start | Rycroft Ag Society Hall  |
| Soil Health & Carbon Workshop with Dr. Kris Nichols | November 15th<br>10 am Registration<br>10:30 am Start | Triangle Hall, High Prairie  |
| Environmental Farm Plan & CAP Grant Workshop        | November 21st<br>1 pm- 3:30 pm                        | Northern Sunrise County Ag Services Office, Nampa  |
| Extended Grazing & Watering Tour                    | November 23rd<br>11 am Registration<br>11:30 am Start | Room AC 144, GPRC Campus, Fairview   |
| Winter Watering Systems Tour                        | November 28th<br>11 am Registration<br>11:30 am Start | Joussard Hall  |
| Livestock Health Workshop                           | November 29th<br>5:30 pm- 8:30 pm                     | Blueberry Hall   |

**For More Information or to Register for any of these Events, Visit [peacecountrybeef.ca/upcoming-events](http://peacecountrybeef.ca/upcoming-events) Email [info@pcbfa.ca](mailto:info@pcbfa.ca) or Call 780-835-6799 ext. 3**

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