



Agriculture & Agri-Food Canada/Alberta  
Agriculture, Food & Rural Development

Western Forage/Beef Group

# Feed Efficient Cattle Calculated to Produce Less Methane

*Dr. Erasmus Okine, Animal Nutritionist*

Methane produced comes at a cost to the animal in energy used and represents a substantial loss in efficiency of animal production. Methane emissions from cattle range from 2 to 12% of the gross energy intake and translate to emissions of 150 to over 300 liters per day. It also contributes about 16 – 20% of global atmospheric methane. One of the main factors, which affects methane production, is the efficiency of feed use by cattle.

In recent years, results from a research team headed by Dr. John Basarab of the Western Forage/Beef Group, has clearly indicated that residual feed intake (RFI) can be used as a beef efficiency trait that is independent of body size and growth. Like a golf score, cattle with negative RFI have reduced feed intake but similar average daily gain as cattle with high or positive RFI. Since RFI is a trait that reflects the maintenance requirements of individual animals we hypothesized that cattle with low or negative RFI would produce less methane than cattle with high and /or

positive RFI. Here, are projected theoretical calculations of methane production based on the dry matter intake and other performance data of 148 steers grouped into LOW-RFI (Efficient), Medium-RFI and High-RFI (inefficient) groups by Dr. John Basarab.

The average weight of the steers in all the RFI groups was  $501 \pm 70.3$  kg and average daily gain was approximately 1.51 kg per day with no difference in gain between the steers in all the RFI groups. The High-RFI (less efficient in feed utilization) produced about 6% more methane as a percentage of gross energy than the LOW-RFI (efficient) steers. Indeed, the Low- and Medium-RFI steers would produce 3.3 kg (4583 liters) and 1.8 kg (2500 liters) of methane per year less respectively, compared to the High-RFI steers.

Assuming \$11.02 per tonne of carbon dioxide (CO<sub>2</sub>) equivalents (Canadian Cattle Assoc. 2002), one methane credit would be worth \$231.42 per tonne, based on methane having 21 times more global warming potential than one carbon dioxide. We forecast savings of \$0.42 and \$0.76 per head per year for the Medium- and Low-RFI steers, respectively, compared to the High-RFI (less efficient in feed utilization) steers. We suggest that using the new residual feed intake trait as a selection tool for cattle would lead to savings in feed costs and also lead to reduction in methane emission by cattle.

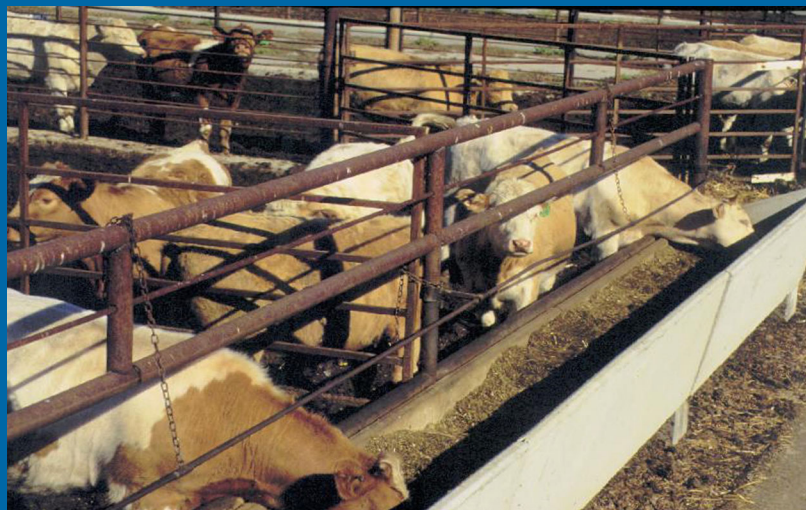
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# Cowing Up .... Cowing Down The Cattle Cycle Game

*Lorne Erickson,  
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Existence of the cattle market price cycle has been documented for over 100 years. Briefly stated, the cycle is driven by fluctuations in inventory numbers that affect beef supply.

When beef supply exceeds the needs of the market, prices for slaughter cattle fall and feedlot operators pay less for calves. To maintain income at lower prices, cow-calf operators retain fewer heifers and cull more cows, reducing the beef herd until the beef supply is less than demand and beef prices begin to rise.

In a rising market, feedlot operators bid more aggressively for calves and ranchers respond by retaining more heifers and culling fewer cows. This shortens supply in the beef market even more and prices are forced higher until the extra production reaches the market and supply exceeds demand once again. The typical cycle is 10 years long but other factors like feed surplus or shortages can shorten or lengthen the cycle.

For the cow-calf manager, knowing that the cycle exists and understanding its' parts is critical to good decision-making. But is there an overall management strategy that is more profitable given that market price cycles will occur? According to researchers at Kansas State University, the answer is yes.

Using a simulation model and historical prices from 1975 to 1999, the researchers studied the effect of several heifer replacement strategies on profitability. The constant inventory (CI) strategy held the herd constant at 100 bred cows and heifers by always retaining the same number of replacements regardless of the market prices. The counter-cyclical strategy adjusted herd size inversely to changes in the U.S. beef cow inventory. The dollar-cost-averaging (DCA) strategy retained the same total dollar value of heifers, or in other words, varied the number of heifers retained as prices fluctuated. Dollar cost averaging is a common strategy used when managing stock market investments.

In an effort to consider real world limitations like forage supply and cash flow, maximum herd size could not exceed 120 bred cows and heifers. The researchers also ran an economically

optimal (EO) scenario in which no limits were placed on herd size and the model could find the most profitable level of production for each year of the 25 year period.

The results showed that next to the unattainable EO strategy, the DCA strategy were the most profitable although the differences were not large. In a similar Iowa study, the DCA strategy increased net worth by 30% compared to the CI strategy over the study period (1970-1999). As the number of retained heifers varied, the cow herd fluctuated from a low of 86 cows to a high of 138 cows. Having this much change in herd size means wide swings in cash flow and forage resources that were either over or under utilized in some years. To recognize the real-world situation where land-base remains constant, the researchers studied a scenario that used varying numbers of purchased yearlings to even out the changing cowherd size. Under this fixed land-base option the DCA strategy still maintained a 20% net worth advantage over the CI strategy.

There are some great challenges in employing this kind of strategy to manage through the cattle cycle, beyond actually predicting when significant parts of the cycle will occur. Adjusting the pasture and feed resources needed as the herd expands and contracts means renting land, buying feed, or using a complimentary enterprise like grazing yearlings or hay production to manage the variation. Financing, cash flow and income tax implications are other factors that increases risk and keeps the DCA manager on his or her toes.

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Reference: Fanning, J., T. Marsh and R. Jones. 2002. Alternative Replacement Heifer Investment Strategies, Dept of Agricultural Economics, Kansas State University

Lawrence J.D. 2000. Alternative Cow Investment Strategies, Dept of Economics, Iowa State



# Ideas To Drought Proof Your Grazing Lands

*Duane McCartney, Forage/Beef Systems  
Agriculture & Agri-Food Canada and  
Western Forage/Beef Group*

It seems that we could be facing another year of drought and grasshoppers. At least that is what Environment Canada and grasshopper monitoring announcements are indicating. In some areas of Western Canada the fall rains did improve the soil moisture while other areas still remain dry. There are several forage and grazing management options available to producers that should be acted upon in order to conserve this moisture for the coming year. This experience, for myself, has been gained from many years of grazing research at the Agriculture Canada Research Centres in Melfort, SK and Lacombe, AB as well as other sites.

## Dug Out Management

We used to have several leaking dugouts at our Pathlow Community Pasture research site 25 miles south west of Melfort, SK. We found information from Russian scientists where they lined their dugouts with straw and covered this with a layer of clay. The process is called “gelization” and over time the decaying straw would form a blue grey layer and eventually seal the bottom of the dugout. We tried this method and rolled a round bale across the bottom of our dugouts in late November or early December when everything was frozen. We then spread about 6 inches of clay over the straw and waited for spring. The dugouts eventually sealed but in order for this to occur, we needed to fence the dugout to prevent the cattle from punching holes in the bottom. This process saved precious water and lengthened our grazing season.

Dugout water quality can be quite an issue to the cattle producer. Research at Lethbridge Research Centre has shown a beneficial effect on pumping water from a dugout to a water trough as opposed to allowing the cattle to walk into the dugout to drink. We were able to maintain our dugouts much longer by keeping the cattle out. Cattle push the sides in and a lot of water may soak away when cattle have had access to dugouts with less than ideal soil type.

Cattle producers depend on snow melt to fill dugouts. Early research at the Teremunde Research Farm at Lanagan, SK used a tree shelter or commercial snow fence



around the dugouts to trap snow. Several rows of snow fence were used. The melt from the trapped snow drifts filled the dugouts the following spring.

Currently the Prairie Farm Rehabilitation Administration (PFRA), Saskatoon have a large dugout water quality study at the Teremunde Research Farm. This research is developing different practical systems for conserving water quality for livestock.

Last summer on some large pastures the lack of stock water prevented grazing. In some cases, a portable plastic water line provided the means for sourcing water for the cattle. Several years ago at the Pathlow pasture research site we had 3 ½ miles of 1 ½ plastic pipe moving water from dugouts to rotational grazing paddocks. This

was ran by a couple of 1hp water pressure systems. In some of the dry years we also filled some of the dugouts using one to two miles of irrigation equipment.

From a plant perspective, grazing perennial pastures too early in the spring can be very detrimental to long term pasture productivity. When grasses are grazed continuously too early in the spring and summer, the plants do not have the opportunity to put down new roots and build up root reserves. Many years ago research conducted at the Brandon Research Centre showed that for every day you grazed too early in the spring you lost three days of grazing in the fall. With this in mind we have been able to graze our cow herd at the Lacombe Research Centre on over-wintered barley swaths until the first week in June. This gave the perennial pastures adequate spring growth before the cattle were turned in. If swath grazing isn't an option for you next spring, fertilizing and rotational grazing your pasture, allowing for longer rests, will be another alternative.

It was discovered that by applying about 80 lbs of nitrogen and 40 lbs of phosphorus in the late fall or early spring on the Grey Wooded soils at the Pathlow community pasture more than doubled the forage yields when adequate snow and spring moisture were normal. In this study each paddock received fertilizer every other year. All paddocks were rotationally grazed. In the years

of summer drought, paddocks fertilized that year were grazed twice in the summer while the non-fertilized paddocks could only be grazed once. You, as a manager, will need to do a soil test and check the economics of fertilizing over the options of buying feed or finding additional pasture.

The other key grazing factor to consider is litter management for moisture conservation. In drought years this is even more critical than usual. Research at Lethbridge has shown a benefit of leaving litter on the soil surface of grazing lands. The litter conserves moisture by reducing evaporation and making scarce moisture more effective. Litter shades and cools the soil, traps snow, increases water infiltration and reduces raindrop impact. This is extremely important considering the severity of last summers' grazing pressure on drought stricken grazing areas. By lacking litter these already abused pastures will be even less productive this year and take longer to recover when moisture does occur and good grazing management is applied.

There are several excellent drought management web sites with additional ideas on drought proofing your farm. Try PFRA's Drought Watch Site at [www.agr.gc.ca/pfra/drought/index\\_e.htm](http://www.agr.gc.ca/pfra/drought/index_e.htm), Alberta Agriculture's "Ropin' the Web" at [www.agric.gov.ab.ca](http://www.agric.gov.ab.ca), or the Western Beef Development Centre, Saskatoon at [www.wbdc.sk.ca](http://www.wbdc.sk.ca).

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In early December, 2002 a combined total of 900 people attended two well organized forage events for graziers - the Western Canadian Grazing Conference in Red Deer, AB and the

Manitoba Grazing School in Brandon, MB.

At the Western Canadian Grazing Conference in Red Deer, the Alberta Forage Council received some high reviews.

***"Excellent!"***

***"At a time of so much industry concern, I have not heard a negative comment here."***

***I most liked the wealth of information and the experience present at this conference."***

***"Very well done and very good food!"***

## **Interested in Obtaining Speakers' Presentations or Proceedings from the Western Canadian Grazing Conference?**

There are tapes available on the keynote speakers' presentations from the Western Canadian Grazing Conference held in Red Deer, AB. The cost for a set of six tapes is \$30 (includes GST).

If you are interested in a copy of the conference proceedings they are available for \$20 (includes GST).

Contact Richard DeBruijn, Alberta Forage Council, at 1-877-527-0772; email: [abforgco@telusplanet.net](mailto:abforgco@telusplanet.net)

**If you would like a copy of the Manitoba Grazing School proceedings, contact 204-482-5547.**

**Correction to WFBG Newsletter Article  
"What Do We Do Now?"  
November/02 issue**

On page 3, the 5th paragraph should read: "Research out of Brooks has shown that if the spring seeded winter cereals are clipped on a monthly basis, they are more productive than if they are clipped weekly or bi-weekly.

We apologize for any confusion this may have caused.

## The Expert Committee on Forage Crops

The Expert Committee on Forage Crops (ECFC) provides a national forum for communication and coordination among stakeholders in the forage and related industries in Canada. Stakeholders on the committee include representatives from industry, provincial forage councils, and provincial and federal government forage specialists. The ECFC held its 2002 annual meeting in Toronto on November 28 and 29. Member organizations gave a summary of activities during the year and then discussed issues of concern to the forage industry. In eastern Canada, 2002 was an excellent year for forage production, but the main preoccupation of western members was the devastating effects of the drought on livestock, hay, dehydrated forage, and seed production and the conduct of field research. Following are issues discussed at the annual meeting that will be followed up early in 2003:

1. Variety Registration System - The procedure to register crop varieties in Canada is under review and significant changes will be implemented in 2003. The ECFC will establish a list of species for which evidence of performance testing will be required for registration.
2. The 2006 Census - Discussions are taking place with statistics Canada to make changes to the census

questionnaire to enable a better breakdown on forages.

3. Minor Use Program for Pesticide Registration - The federal government has committed significant funding for minor use registration but has not listed forage crops as a priority for this program.
4. Prairie Farm Rehabilitation Administration (PFRA) is developing a Green Cover Program for "environmentally sensitive" areas to be seeded to forage.
5. The "Voice" for Forages in Canada - It was proposed that an organization called Forages Canada be established to represent the forage industry on challenges opportunities, and issues. It will be producer/industry driven and led through the provincial forage councils.
6. The ECFC will hold a workshop on pasture improvement through integrated brush management. Growth of shrub and tree species is a serious problem in many Canadian pastures, leading to a reduction of livestock carrying capacity. This workshop will provide an update on the present state of technology in managing brush and establish research priorities. It will be held at the Travelodge Hotel in Saskatoon, February 18 & 19, 2003.

For further information on the Expert Committee on Forage Crops, contact Bruce Coulman ([coulmanb@agr.gc.ca](mailto:coulmanb@agr.gc.ca)) or Duane McCartney ([mccartneyd@agr.gc.ca](mailto:mccartneyd@agr.gc.ca)).

## Coming Events

**Western Forage/Beef Group  
Pasture School  
June 17 - 19, 2003  
Lacombe, AB  
Contact: 403-782-8030 for more information**

**Several Pasture, Beef and Drought Workshops are being held throughout the prairie provinces. In Alberta contact the Alberta Ag Info Centre at 1-866-882-7677. In other provinces contact your nearest agricultural representative.**

**Articles included in this newsletter may be reproduced.  
Acknowledgement of author and source is requested.**



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Four New Members will be appointed  
in August/03.

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**We're on the Web!**  
**[www.agric.gov.ab.ca/  
crops/forage/wfbg](http://www.agric.gov.ab.ca/crops/forage/wfbg)**

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