Forage philosophy determines systems

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Look at milk processing and you see large organisations in every major milk producing nation, plus several international players that are either mega corporations or corporate acting super-cooperatives. Look at milk production and the picture is opposite, a complete absence of corporate players. Even in the most capitalist or advanced economies the milk cow has not gone the way of the pig or the hen, but has remained in the hands of a multitude of small businesses, almost all of them small family businesses.

Indian dairy buyers at Jaipur, Rajasthan inspect milk biked into the city from rural farms.

Cow keepers are amongst the most diverse and independent people in the world and so to talk of dairy systems risks only generalisation and identification of trends as there are almost as many variations in the way milk is produced as there are farmers that produce it. What is clear however, is that dairy farmers throughout the globe are experiencing a period of massive and accelerating change, driven by: regulation in Europe; climate in Oceania; demand in Asia; politics in the USA; and a mixture of all of these everywhere.

In the west, producers are beset by structural change driven by what is often described as greater efficiency but means lower prices, marked by an increasing herd size and decrease in the number of producers. Perhaps half of Europe's dairy farmers will quit in the next five years. In the east, herd size is also increasing rapidly but as demand for milk is also rising, rather than a cull, producer numbers are growing, especially in some of the major players, like India.

A typical street cow outside an internet cafe near Agra, in the

Import or imposition

There is a tendency for regions seeking a rapid advance in milk production to import dairy expertise, technology and genetics and this usually brings with it an attempt to transplant production systems from one region onto another. Examples include influence from New Zealand in Europe, the USA in South America, Australia in China, and although there are many shining successes in newly established institutions, results can also be very mixed. Particularly when introduced to the multitude of independent milk producing families that are the heart of a region's dairy industry. Common reasons for this are:

- Failure to recognise the geographical and cultural differences between the importing and exporting regions.
- Lack of understanding of why a system came to be adopted in its home region in the first place.
- Failure to match an imported system to the requirements of the importer's market.

Forage philosophy

Cows are not pigs and cannot live by bread alone, yet on too many occasions all the nutritional focus is on the concentrate portion of the ration. Forage is often seen almost as an inconvenience rather than as the essential portion of the diet fundamental to health, performance, longevity and profitability. It is her need for forage that has been a major factor in preventing the industrialisation of the milk cow and it is our approach to forage provision, what one might term the 'forage philosophy,' that determines the whole system of milk production for any dairy business. It is a limited choice as, although there is an almost infinite variety of adjustments within them, there are only three possible systems:

- Take the cow to the forage.
- Take the forage to the cow.
- A mixture of both.

Cow keeping at its most traditional was a nomadic existence as herders followed the rains that brought lush growth for their animals and the roots of this tradition can still be seen in many modern pasture based dairy businesses taking advantage of the low building, labour and machinery requirements.

Taking cows to forage

Least cost should not be confused with most efficient, most productive or most profitable and anyone committed to a cows to forage system should recognise the following limitations and vulnerabilities.

- Individual cow performance is limited by reductions in the quantity and quality of forage dry matter ingested due to:
  - Seasonal changes in dry matter, digestibility and nutrient content of the grazed crop.
  - Weather conditions affecting the cow's inclination and ability to consume and the growth rate, availability and effective dry matter content of the crop.
  - Distance to and from the grazing area reducing the time available for eating.
- Milk availability is seasonally limited as even in the most accommodating climates there are periods of reduced forage growth and/or quality resulting in production troughs and peaks through the year. This is

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not an issue in regions where production greatly exceeds demand such as New Zealand, perhaps the epitome of modern pasture grazing, and Ireland, a recent adopter of the New Zealand system. All that is necessary is sufficient manufacturing capacity to convert the peaks into the export commodities of butter, cheese and powder.

Contrast this with the UK where demand exceeds supply and milk buyers, in fear of seasonal shortages, use price premiums and penalties to discourage cow to forage systems. Thus, low costs have to be balanced against a lower earning potential for cows lead to pasture.

- Herd size is limited by the logistics of the grazing area required and, therefore, the distance cows would have to walk to and from the furthest points. So far New Zealanders have been able to adapt a grazing based system to growing herd size, now averaging 285 head, by introducing cow tracks, reducing travel time and damage to hooves and pasture.
- Climate extremes cause production limitations on all dairy systems but the cow to forage system is most vulnerable as there is nothing to feed if pastures stop growing or are inaccessible. India has seen cow numbers fall after droughts in 2002 and 2004 and these problems grow with herd size.

Difficult as it may be to feed 10 cows in a drought, imagine finding feed for 100. Recent impact of drought in Australia and flood in New Zealand has been sufficient to affect world trade and production is hit not only during the period of climatic stress, but for many months afterwards while pastures and cow numbers recover. With global warming the frequency of weather extremes may increase.

Taking forage to cows

If we lead our cow to pasture we have to take what comes, but taking forage to cows gives us control of how much, how dry, what quality and for how long. Just the option to keep her at home will at the least see her through climatic extremes and it is perhaps this that initially prompted a growing number of New Zealand producers to deviate from the cows to forage mantra and increase forage conservation, firstly as baleage to overcome the lack of storage facilities.

Typical silage feed rates of less than one tonne per cow fresh weight are 10 times lower than the UK. But once you enter the forage to cow system additional opportunities become available, including a wider range of crops and it is interesting to note that New Zealand is already making around 45% of its 1,550,000 tonnes of conserved forage dry matter as maize and cereal silages.

In Europe and North America, regions not blessed by a climate that provides year round forage growth, the mixed pasture/silage system has been the norm since silage was invented. Initially the approach was simply to conserve a sufficient quantity of forage to get cows through the winter and even as demand for year round performance grew, the nutritional focus centred on concentrate feeding. Great variation in silage quality from season to season and farm to farm lead almost to its dismissal as a production driver, with rations calculated to balance whatever turned out to be available from the forage once the analysis was known.

Arrival of effective forage additives in the mid-1980s brought the opportunity to control silage fermentations for a more reliable result and a new approach to the production capability of conserved forage. We can not control the weather, or put in an early season order for silage of a given energy, protein and intake potential but a more professional approach to forage management, with defined aims for the final analysis, means we are now looking to milk our silage.

Once you are taking forage to cows of sufficient quality to give triple benefits of higher yields, lower feed costs and a reduction in health problems caused by high grain diets, then the option of 24/7 housing becomes a viable proposition. This removes the limitations on herd size, as exemplified in the USA in particular where many farms count their cows by the thousand, and introduces the possibility of complete diet feeding.

Also removed are the limitations of location, with housed herds now moving from

traditional farms alongside the forage crops of California, to purpose built units in the deserts of Arizona and New Mexico with the forage trucked in.

Mixed systems

As cows to forage has become known as the New Zealand system, forage to cows is often called the American system. In line with its traditions, there is a temptation to refer to the mix of both as the European system, but that would suggest all dairy system development is western based.

The mix of cows to forage and forage to cows might just as easily be termed the Japanese system as successful conservation of high quality silage in small pits is the practice on hundreds of small farms across the islands. This allows Japanese cows to continue producing through often snow-bound winters and provides cow keepers with year round benefits from high milk prices.

It is really only in Western Europe that the mixed system evolved from the traditional summer grazing, winter housing pattern dictated by the temperate climate. In Eastern Europe the communist collective farms were large forage to cow herds many of which have become successful private and cooperatively owned 500 and 1,000 cow operations. This east to west differential is perhaps most apparent in now unified

Maize silage production in a brick lined, pit silo in the north Indian province of Haryana.

Germany where average herd size in the former communist east is in the hundreds while in the rest of Germany is less than 50.

Conclusion

We can lead our cow to pasture and take things as they come or adopt a professional approach, taking management steps to meet defined aims of intake, quality and production. New Zealand has shown this is perfectly possible with a cows to forage system but rising herd size and climatic extremes are forcing an increased commitment to silage production. Although initially intended to provide strategic stocks to see cows through hard times, this is beginning to look like a gradual move to a mixed system.

In the UK, traditionally a mixed system, the picture is also changing with American style 1,000 cow herds appearing in all of the main milk producing areas, accompanied by the import of USA design, technology and management practices.

This shift is more advanced in the former communist areas of East Germany, Poland, Hungary and Estonia and as Europe reduces subsidies, small farms with mixed systems will be threatened. But sophisticated forage to cow systems based on complete diets matched to the demands of high yielding cows are not the sole preserve of large herds.

In South Korea small dairy farms are able to buy in ready made complete diets by the bag from farmer entrepreneurs who have set up centralised mixing plants to maximise use of their equipment, expertise and crops.

In India, attempts to encourage groups of small dairy farmers to cooperate in joint forage conservation has had mixed results, but as consumer pressures increase the future may be a choice between making good silage together or being replaced by institutional, business and overseas funded 1,000 cow herds on the American system. ■