



# Cattle Producer's Handbook

## Management Section

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## Beef Cow Efficiency in Western Rangelands

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In general, efficiency is the optimum use of resources toward a sustainable level of production. In beef production, production efficiency can be expressed as the ratio of pounds of calf weaned per unit of forage consumed. Rainfall and forage production, however, can be highly variable in the western states, and cows are commonly required to be highly productive on a limited forage supply.

More practical, therefore, is to measure production efficiency as total pounds of calf weaned per pound of female exposed to a bull (or, if scales are not available, simply per female exposed to a bull). This measure combines both the reproductive performance of the cow herd and the growth characteristics of the calves relative to the total weight (or number) of cows in the breeding herd.

In the West, pasture forage (that is, payment on purchased or leased land) is generally one of the largest fixed costs. It is important, therefore, to match cow type to the forage supply to achieve maximum efficiency in harvesting the forage and converting it to a cash commodity—the calf.

Many factors can affect production efficiency in the cow herd. Major factors include cow size, milking ability, and reproductive performance. This paper addresses the relationship among these factors and beef production efficiency in the western states.

### Cow Size

Energy intake comprises a large portion of the input into the cow herd. Maintenance energy (the amount of energy required to maintain body weight) can represent 70 to 75 percent of the total energy consumed annually by the cow herd (Ferrell and Jenkins 1985). A cow's size or body weight does not influence her energy use efficiency (Ferrell and Jenkins 1984a, 1984b), but larger cows require more energy than smaller cows. However,

researchers from Wisconsin (Davis et al. 1983b) have shown that smaller cows can wean more pounds of calf per pound of feed than can larger cows.

The same research group (Davis et al. 1983a) in a different study found that feeding larger cows a higher-energy diet did not increase the number and total weight of calves weaned enough to offset the higher level of energy intake. In other words, supplying larger cows with more energy did not increase their production efficiency.

The conclusion is a larger cow can produce a larger calf, but her production efficiency may be sub-optimal. In general, cows can be selected for improved efficiency in a certain environment, but they may not be as efficient in other environments (Ferrell and Jenkins 1985).

In an environment where feed resources are unlimited, larger cows may be able to offset the greater feed requirement by weaning larger calves. However, on western rangelands where forage supply often is limited, larger cows are generally not as efficient as smaller cows.

### Cow Milk Yield

Milk yield is related to preweaning calf growth (Clutter and Nielsen 1987), so increased milk yield often is considered an advantage in a cow-calf operation. But milk production requires high levels of energy input by the cow, and, if feed resources are limited, milk production can have a negative effect on the overall efficiency of beef production.

Researchers from the Meat Animal Research Center in Nebraska (Ferrell and Jenkins 1984a, 1984b, 1985) have shown that energy use is less efficient in higher-milking cows. This is attributed, in part, to the higher-milking cows' larger internal organs and faster metabolism compared with lower-milking cows. The low energy use efficiency of higher-milking cows means that they require more energy per pound of body weight than do lower-milking cows. Therefore, a higher-milking cow