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RAISING VERSUS PURCHASING REPLACEMENT HEIFERS: PRODUCTION, VALUE AND COSTS CONSIDERATION

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The age-old question, "Should I raise replacement heifers, or should I buy replacement heifers?" has been asked by most cow-calf producers at some point. It may then be followed by, "Which one is most cost effective and makes me the most money?" Similarly, agricultural economists and bankers have worn out the erasers of numerous No. 2 pencils trying to determine the cost or value of replacement heifers. Meanwhile, production specialists have tried to help guide the aforementioned parties in the production practices necessary to develop replacement heifers.

At first glance, these two questions appear fairly simple, and it would appear they could be answered on the back of a feed sack or envelope. For instance, the rather straightforward answer would be to assign a dollar value to a weaned heifer calf, calculate the feeding costs (supplements and grazing), calculate the breeding costs, and add them together to obtain the replacement heifer cost. However, that is only the beginning of determining the overall cost of the replacement heifer. Any change in the replacement rate requires adjustments in the cost of the replacement heifer. For instance, production from a replacement heifer (calf weaning weights and percent calf crop weaned) is generally lower than from mature cows. Understanding the management of replacement heifers greatly affects the level of production and ultimately costs. Other considerations requiring increased management may include calving difficulty, sire selection for heifers and subsequent reproductive issues (Feuz, 2002).

The answer to the debate of raising or purchasing replacement heifers can be vital to the profitability and economic viability of an operation. However, there is not a one-size-fits-all answer for every producer. The correct decision for an individual producer will depend on their cost structure, management skills, available resources and a number of producer specific variables.

Producers need to weigh the advantages and disadvantages of each replacement heifer alternative while also considering available resources and management and economic issues specific to their operation. Factors that should be considered include:

- Economics
- Purchasing replacement alternatives
- Herd health
- Genetics and herd quality (own herd and purchased replacements)
- Resources and herd size (land, labor, management)
- Current and future market prices
- Convenience

The purpose of this publication is to evaluate the production practices of heifer development and the economic considerations of the heifer replacement decision while also providing a budgeting template. Thus, this will provide necessary information to assist in the decision to raise or purchase replacement heifers.

REPLACEMENT RATE AND ALTERNATIVES

A starting point for the decision-making process is determining the number of replacement heifers needed as well as the resources available to develop or obtain replacement heifers. Replacement rates vary from operation to operation and may vary from 10 percent to 30 percent with the long-term average replacement rate for most herds in the 15 percent to 25 percent range (Feuz, 2002). Variability in this rate is due to herd size, available resources, management, heifer conception rate and death loss. Some producers maintain the same number of breeding stock every year while others allow the number to fluctuate, which impacts the replacement rate. Similarly, some producers may only cull cattle with a physical defect (lameness, cancer eye, lumpy jaw). Other producers may cull based on age, and some may cull based on productivity or by any combination of these methods.

Once a producer has a good grasp on the number of replacements required, the producer can then start evaluating the replacement heifer source alternatives. Replacement heifer alternatives include developing one's own heifers, contracting with a custom heifer developer/grower to develop one's own heifers, or purchasing bred heifers. Each alternative should be considered and analyzed to evaluate the decision. A producer may decide to use more than one alternative in a given year when considering available resources and the replacement rate.

ECONOMICS

Every decision has costs and benefits which affect profitability and economic viability. Economic factors worth considering when making the heifer replacement decision include opportunity costs (the opportunity to use resources for some other endeavor), direct costs (feed, vet/med, hired labor), resources (pasture, own labor, management, working facilities), interest, tax implications, conception rates, cull rates and bull costs (especially if it is necessary to have another bull for breeding heifers).

The decision to develop heifers on the farm, utilize a custom heifer development program or purchase replacement heifers should be analyzed separately from the rest of the cow-calf operation. For example, consider the alternatives of developing heifers on farm versus purchasing replacement heifers. Heifers born on the farm can either be retained as replacement heifers or be sold and the revenue used to purchase replacement heifers. When the decision is made to retain said heifers then revenue is foregone from not marketing heifers at that time. At the time of the decision, a market price exists for the heifers being retained. Thus, the decision should be charged to the development of replacement heifers just as if they were being purchased on that day. Similarly, if the heifers were marketed, then revenue is generated with the expectation of being reinvested in replacement heifers. An individualized budget should be constructed to determine direct costs and opportunity costs of the decision.

Replacement heifer development costs vary from operation to operation. Thus, it is difficult to make a blanket statement to which is the most economical with regards to retaining versus purchasing. The individual operation's cost structure and desired outcomes are key to the decision-making process. Due to economies of size (scale), smaller operations (less than 50 cows) may be better off purchasing bred heifers while larger operations (50 or more cows) may receive a greater benefit from retaining and developing heifers (Cleere, 2006). However, producers should not let the number of breeding cows determine the replacement alternative decision, but producers should determine the costs and benefits of the alternatives to aid in their decision. Larger operations require a larger quantity of replacements and in general are able to spread labor and management costs over a greater number of replacements, which reduces per head cost of development if developed on farm. In other words, the more heifers being developed at one time, the lower the per head development cost.

Custom heifer development programs use a similar strategy by spreading management, labor and fixed costs associated with heifer development over a larger number of animals reducing per head development cost. A second benefit offered by the custom heifer developer is management expertise in heifer development. Replacement heifers and mature cows require different

management practices, and many times cow-calf producers can benefit from another party managing heifers while the cow-calf producer manages the mature herd. A third cost savings measure offered by many custom heifer development programs is breeding services. Many times, cow-calf producers utilize calving ease or low birth weight bulls when breeding heifers to minimize calving problems. This practice may require ownership of a bull solely used for breeding heifers while a different sire services the mature herd. In particular with small herds, ownership costs associated with a bull that only services a small number of heifers can result in larger breeding costs compared to the cost of breeding services offered by a custom heifer developer.

PURCHASING REPLACEMENT

In order to make the most informed decision, multiple sources of replacement heifers should be evaluated if possible. Only considering bred heifers, information that may be beneficial in making purchasing decisions include how long they have been bred, breed of the sire used to service the heifers and fertility and growth characteristics of the dam and sire. Identifying and evaluating all alternatives fosters the decision-making process and usually results in the most beneficial choice being made and implemented. It can be difficult to identify every alternative during the decision-making process, but it is an effective and efficient method.

On average the conception/pregnancy rate of virgin heifers ranges from 85 to 93 percent (Cleere, 2006; Funston and Deutscher, 2004; Roberts et al., 2009), but the final pregnancy rate is lower than the conception rate. The fertility and conception rate of heifers is integral because development cost is the same for a heifer that does not breed as a heifer that does prior to pregnancy checking after which time open heifers could be marketed either as an open heifer or a feeder heifer. The failure of a heifer to breed increases the overall cost of a heifer development program and thus increases the average cost of each heifer in the program that did breed. The implication is that bred heifers could be purchased for the average cost associated with heifers in the development program that did breed and be just as well off. Similarly, first calf heifers go through a stressful calving situation while at the same time supporting a calf through lactation and still growing to reach mature weight. If a first calf heifer is not meeting her nutrient requirements, then it may be difficult for her to be rebred and thus be profitable.

HERD HEALTH

Herd health is a key component when making the decision to develop or purchase replacement heifers because the introduction of purchased heifers could place other animals in the operation at unnecessary risk if the purchased animals are not healthy and have not received a recommended vaccination protocol. Many cow-calf producers manage herd health very closely. Producers realize a healthy calf is more valuable than a sick or dead calf, and it all starts with healthy breeding stock. Strong vaccination programs in the cattle herd as well as a regular deworming schedule among other herd health practices are beneficial for all aspects of the operation. Purchasing animals from an off-farm source and commingling the purchased cattle with the established herd can result in the introduction of diseases to the herd. Producers can institute a biosecurity plan, actions to prevent the introduction and spread of disease-causing agents, to minimize associated risks. Biosecurity plans can range from maintaining a closed herd (never introducing animals from outside the herd into the herd, highest level) to having no quarantine time for new animals being introduced into the herd (lowest level).

A few steps can be taken to minimize the risk of introducing diseases to the herd from purchased animals:

- Maintain a thorough vaccination program.
- Quarantine new cattle regardless of the source.
- Purchase cattle from known and reliable sources.
- Consult a veterinarian.
- Use common sense. Observe the animals to see if they physically display characteristics of unhealthy cattle. If they appear sick, then they probably are!

When trying to determine between developing one's own replacement heifers versus purchasing replacement heifers, it is imperative to know the health background of the heifers available to purchase. An unknown health background may place undue risk on a

cattle operation, which may mean developing one's own heifers as replacement females may be a better option even if it is a little more expensive on the front end. At the same time, sellers of bred heifers should be able to provide all of the information related to the health protocol they provided the females.

GENETICS AND HERD QUALITY

Herd quality is highly dependent on the genetics of the cow herd. Regardless of the breed, purebred breeders are continually searching for better genetics to improve the quality of animal being produced. The majority of cattle operations in the U.S. produce commercial cattle, and the most important characteristic of commercial cattle production is successful reproduction and producing animals that grow fast and efficiently. Performance is especially important if the producer intends to raise the animals through slaughter. Profits increase as feed efficiency increases, and as carcass quality improves. The beef industry is a dynamic industry exhibiting constant change. Thus, producers must adapt to those changes. Genetics are one of the quickest ways to convert the herd to fit industry dynamics.

Many producers have worked numerous years to improve the genetics of their herd and thus the quality of the animals produced, resulting in intentions of retaining their own heifers. Retaining one's own heifers can be advantageous because the genetic makeup is well known by the producer. A management practice of this sort lends itself to the cow-calf producer either developing the heifers on farm or contracting with a custom heifer developer to prepare the heifers for first breeding. There are two traditional ways to change overall herd genetics. The first and most common method is using sires with improved expected progeny differences, either through artificial insemination or natural service, to better the genetic package and then retain heifers for development. This method introduces the sire's genetics into the herd. The process can be continually repeated with the intentions of the next sire improving the genetic package relative to the previous sire, resulting in improvements in breeding females retained.

Another method that is commonly used to change overall herd genetics and quality is through the purchase of breeding females with improved genetics. This method can be a faster process of changing the overall quality of the herd if used in conjunction with higher quality sires. However, producers must be wary when selecting heifers for purchase as additional risks are present. It is a good practice for the buyer to gather information related to the age of the heifer, ask if she bred on the first cycle when exposed to the bull, analyze the heifers dam and other herd mates if applicable, and finally, analyze other calves out of the herd. Not to be overlooked, embryo transfer is a method used to generate multiple progeny in a year from a single breeding female with "superior" genetics. However, this process is not commonly utilized in commercial herds due to the cost associated with the practice.

Retaining and developing heifers allows a producer to select replacements based on maternal characteristics, fertility, growth and carcass traits. In addition, producers are able to select replacements based on those born early in the calving season. This is important because heifers born early in the calving season usually reach puberty earlier than their later born herd mates simply due to age when comparing animals with similar genetics. Therefore, heifers born early in the calving season should have the opportunity of being bred early in the breeding season, which then impacts the subsequent breeding season. It is imperative to note that genetics impact the herd for many years and thus profitability of the operation.

RESOURCES AND HERD SIZE

Resources on any operation are limited and can be a determining factor of the decision to retain and develop heifers or to purchase breeding females. Resources that tend to be limiting include land, labor, capital and management. Developing heifers requires increased management relative to the mature cow herd and must be managed separately from the cow-calf operation. Increased management is necessary to maintain healthy heifers that develop adequately, grow efficiently and reach puberty by the start of the breeding season (reach puberty between 13 and 15 months and calve near two years of age). Since heifers must be managed separately from the rest of the herd, additional land and/or facilities may be needed to properly develop heifers. Therefore, if the total amount of land available is fixed, then the mature cow herd might have to be smaller than if replacement females were being purchased or custom developed. Additionally, if cattle production is not the primary source of income, then labor may be a constraint in developing replacements.

Herd size also may be a determining factor in the decision to develop heifers or purchase replacements. As previously stated, economies of size play a significant role in the costs associated with retaining and developing heifers for replacements. During the development stage, larger operations are able to spread fixed costs over a larger quantity of replacement heifers than small producers, which results in a lower total cost per head of developing heifers. Nevertheless, if expanding the cattle herd is an objective then a few more intricacies must be evaluated, even for a large herd. Developing heifers requires land, labor and management that could otherwise be devoted to a larger mature cattle herd. However, if these resources are not limiting and the operation does not produce enough quality replacement heifers to expand the herd to the desired size, then a hybrid system of developing heifers and purchasing breeding females may be an option.

CURRENT AND FUTURE MARKET PRICES

Current and future market prices of cattle are integral in the heifer replacement decision. Prices are primarily driven by supply and demand. Therefore, if demand is constant then the price of cattle decreases as supply of cattle increases and vice-a-versa. High calf prices for a given time period are an indicator that the industry is calling for herd expansion. Therefore, when calf prices are high, heifers are retained to enter the breeding herd, and sometimes producers attempt to squeeze a couple more productive years out of older cows to capitalize on higher cattle prices. Stretching the age of the cow herd may or may not be a good business decision and must be made considering cull cow prices and the non-ambulatory rule. In the short term, retaining more heifers for the breeding herd reduces the number of cattle going through the feeder system, which provides support for calf and feeder cattle prices for two to three years. In the longer term, the retained heifers increase the overall herd size and start producing offspring (first calf at two years of age), which results in a larger supply of calves and feeder cattle. The increased supply depresses prices initializing a liquidation phase resulting in fewer breeding females and thus completing what is commonly known as the cattle cycle. Supply and demand tend to be the key drivers of the cattle cycle. However, persistent drought and high crop prices have the ability to extend or shorten periods of herd liquidation and expansion.

Cash flow also is a consideration when building the cattle herd. All else being the same, when cattle prices are high, producers can market fewer cattle and continue to cash flow which allows heifers to be retained or the ability to purchase replacements. Alternatively, when cattle prices are low, producers must sell more heifers to meet cash flow needs and cannot retain or purchase heifers. This cycle does not lend itself to the most efficient management practices, as it would appear the cattle industry is buying when cattle prices are high and selling when prices are low. It is important to remember the value of all the calves produced by the cow plus the salvage value of the cow when culled must be greater than the cow purchase price or development cost to make a profit.

CONVENIENCE

Convenience factors are another consideration when deciding between replacement female alternatives. Such considerations may include the source of replacement females, characteristics of replacement females, and if it is a repeatable practice to purchase females (Whittier, 2001).

One of the most difficult aspects of purchasing replacement heifers or utilizing a custom heifer developer is locating a quality source (Whittier, 2001). A quality source is a source that is honest and trustworthy; uses acceptable production, handling, and management practices; has a convenient and accessible location; and provides a genetic program consistent with the purchaser's needs. It is imperative the source is an operation in which the purchaser feels comfortable making business decisions. Locating a source with the stated characteristics can be a difficult and time-consuming process. Therefore, it is important the source be able to replicate the same or better results year after year so that a working relationship or "partnership" can be established between the purchaser and the seller or custom developer. Replication can be highly dependent on the buyer and seller each having similar definitions and perceptions of value compared to price.

BUDGETING TEMPLATE

A budgeting template has been developed to assist in estimating the cost of developing a bred heifer. The budgeting tool provides flexibility by allowing the user to adjust the starting value of the heifer and apply any production costs during the development phase. For example, the tool can be used to estimate the total cost from weaning until calving, or the user could estimate the cost of heifer development from purchasing a yearling heifer until she is six months pregnant.

After estimating the cost of developing a bred heifer, the user can then use this information to assist in determining if developing owned heifers or purchasing bred heifers is most cost effective. Similarly, the tool could be used by heifer development operations to estimate what they must sell bred heifers for to earn a profit when marketing replacement females. The budgeting template can be found at **tiny.utk.edu/HeiferBudgetExcel**.

CONCLUSION

The method used to obtain replacement heifers in a herd is a decision that can greatly impact the profitability and economic viability of a cow-calf operation. Profitability largely hinges on management decisions, and the decision to develop versus purchase replacement heifers is a management decision with tremendous implications on profitability. No single method of replacing breeding females is going to be the best valued option for every producer. The manner of replacing breeding females best suited for an individual producer is dependent on the resources available and the objectives of the operation. The best option will not always be the lowest cost option either. The best option is the one that meets the goals of the operation at the lowest cost and, therefore, provides the highest value to the operator.

It is necessary to thoroughly evaluate all feasible replacement alternatives so an educated decision can be made. After identifying the alternatives, the economics, herd health, genetics, herd quality, resources, herd size, current and future market prices and convenience of the alternatives should be considered. This may not be an inclusive list of all the factors that should be considered, but it does provide a starting point for evaluating alternatives and hopefully fosters the decision-making process as it is related to the replacement of breeding females.

REFERENCES

Cleere, J. 2006. Buying vs. Raising Replacement Heifers. AgriLIFE Extension, Texas A&M System. Publication: E-371. **https://agrilifelearn.tamu.edu/s/product/buying-vs-raising-replacement-heifers/01t4x000004OfZ3AAK**.

Feuz, D. 2002. The Cost of Raising Replacement Heifers and the Value of a Purchased Versus Raised Replacement. University of Nebraska, Managing for Today's Cattle Market and Beyond. **https://valueaddedag.org/cattlemarket/Cost_of_Raising_Replacement.pdf**.

Funston, R.N and G.H. Deutscher. 2004. Comparison of Target Breeding Weight and Breeding Date for Replacement Beef Heifers and Effects on Subsequent Reproduction and Calf Performance. Journal of Animal Science, 82(10):3094-3099.

Roberts, A.J., T.W. Geary, E.E. Grings, R.C. Waterman, and M.D. MacNeil. 2009. Reproductive Performance of Heifers Offered Ad Libitum or Restricted Access to Feed for One Hundred Forty-Day Period after Weaning. Journal of Animal Science, 87(9):3043-3052.

Whittier, J.C. 2001. Purchasing versus Raising Replacement Females: To Outsource or Not to Outsource? Range Beef Cow Symposium. University of Nebraska – Lincoln. DigitalCommons@University of Nebraksa – Lincoln.

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