

Herd Bull Replacement Economics - Costs of Alternatives Decision Aids

Large commercial cow-calf operations have a number of alternative ways to meet the herd bulls' replacements. This is an important production cost, cash outflow and capital investment. Once it is clear what genetics are desired all options can be open to select from alternatives. Low birth weight bulls to breed replacement heifers will differ from those for mature cows. Terminal cross bulls will differ for straight bred bulls. The decision to change herd genetics is another consideration.

These five decision aids facilitate calculation of costs to compare purchased bulls to raising bull alternatives. These decision aids facilitate the calculation of the costs of purchased to producing herd sires including using sexed semen or conventional artificial insemination (AI) or embryo transfer (ET) technology. Raised alternatives are important especially, costly sire genetics is in high demand. The following decision aids are included:

1. Sexed Semen AI Produced Raised Cost
2. Conventional AI Raised Cost
3. Sexed Embryo Transfer (ET) Raised Cost
4. Embryo Transfer (ET) Raised Cost
5. Herd Bull Purchased or Raised Summary of Costs: A Planning Decision Aid

Using Sexed Semen or Conventional AI or Embryo Transfer (ET) to Raise Herd Replacement Bulls

Raised bull cost can be compared with similar genetics that can be purchased. Four raised bull alternatives are considered in separate spreadsheets.

Using **sexed semen AI** with the herd's "best cows" can offers an economical and practical alternative as most commercial ranches using low birth weight sire AI for breeding replacement heifers. Selecting mature cows to AI with the desired genetics for the herd can be cost effective utilizing skills for AI breeding replacement heifers. Conventional AI offers the same opportunity.

Embryos transfers allow use of owned cows as recipients to produce the genetic desired. Knowing the cost of this ET option can be a guide for cost of genetic using the purchasd cost options. These decision aids can assist in evaluating alternatives.

The four decision aids and sheets are each decision aid are as follows:

1. Sexed Semen Artificial Insemination (AI) Producers Bulls

1. Calculation of Herd Bull Needs and Costs
2. Selecting Herd "Best Cows" as Owned Recipients to AI Breed*
3. Sexed Semen AI Breeding Cost
4. Natural Service Clean-Up Bull Breeding Costs*
5. Weaning to Breeding Ages AI Herd Bulls*

*These are the same spreadsheets across the breeding alternatives.

2. Conventional Artificial Insemination (AI) Producers Bulls

1. Calculation of Herd Bull Needs and Costs
2. Selecting Herd “Best Cows” as Owned Recipients to AI Breed*
3. Conventional AI Breeding Cost
4. Natural Service Clean-Up Bull Breeding Costs*
5. Weaning to Breeding Ages AI Herd Bulls*

3. Sexed Embryo Transfer (ET) Using Owned Recipient Females

1. Calculation of Herd Bull Needs and Costs
2. Owned Recipient Female Costs*
3. ET Breeding Cost – Purchased Embryos
4. Natural Service Clean-Up Bull Breeding Costs*
5. Weaning to Breeding Ages ET Herd Bulls Costs*

4. Non- Sexed Embryo Transfer (ET) Using Owned Recipient Females

1. Calculation of Herd Bull Needs and Costs
2. Owned Recipient Female Costs*
3. ET Breeding Cost – Purchased Embryos
4. Natural Service Clean-Up Bull Breeding Costs*
5. Weaning to Breeding Ages ET Herd Bulls Costs*

*These are the same spreadsheets across the breeding alternatives.

Quantity of Replacement Bulls Required Annually

The **first sheet** in the spreadsheet calculating the cost of alternatives is used to calculate the number of bulls required and the numbers of recipients of exposed females required to produce the needed bulls. Key data and costs facilitate “what if analysis” of changing values as they are linked to other sheets.

Note the calculation of the exposed females or recipients is a two-step process. Enter all the production data. This will calculate exposed numbers required. Then record the calculated number in the C column in D cell. This number will calculate the correct exposed number.

Exposed Female or Recipient Female Costs of Weaned Bull Calves

This spreadsheet facilitates the organization of production and cost data to determine the cost of producing AI or ET bulls using recipient females. Full cost is recorded including cow depreciation costs. This allows for use of current owned females or purchased recipients. See Appendix B for definitions and terminology. The full cost is calculated for the cows involved to give a fair cost that recognizes that full cost must include the cows used to produce herd bulls.

The third and fourth sheets have the reproduction rates and costs for each breeding system alternative. The decision aids provide for evaluation AI and ET reproduction and associated costs and expected pregnancy rate followed by natural service for open exposed females.

The sexed embryo is used as this offers the opportunity to produce the highest portion of the desired replacement sires from the recipient females.

A market value is placed on the AI or ET produced heifers and natural service calves from cows that produce bulls. This is a credit offsetting the costs to calculate the net cost of the weaned AI or ET bull calves.

Weaning to Breeding Ages Herd Bull Production Costs

The final spreadsheet puts all together including feeding, health, labor and other production costs and testing bulls before the beginning of the breeding season. The spreadsheet facilitates “what if” evaluation by changes in reproduction measures and costs.

The cost of using AI or ET technology to produce bulls can be compared to the **market cost** of herd bulls with the same genetics. Using the AI or ET option may be cost effective when compared to the bull market for genetics in high demand.

Use of AI or ET technology requires special skills and management. The herd veterinarian and AI or ET technicians that do the transfer must be involved for successful planning and implementation success.

For commercial herds using artificial insemination (AI) for replacement heifers use of AI or ET to produce herd bulls is feasible option. As similar support and skills are required.

Comparing Economics of Alternatives for Bull Replacement

The final decision aid helps organize data to calculate the annual cost for the following purchased bull options to compare to the raised alternatives including:

- Private Treaty or Direct Purchase from Seedstock Producers
- Production Sale Auction Purchase
- Bull Test Sale Auction Purchase

This decision aid calculates the annual cost of herd bulls. This helps put the “bull investment” into proper cost and production perspectives. The key is finding the “**most cost effective**” way to acquire the desired genetic. Annual cost is calculated in terms of the number of cows serviced or exposed females and what change would be required in weaning weight to pay for the higher priced bull. This provides insight into what the market would have to pay to justify paying more for a herd bull that could produce a more market acceptable calf.

Raised or purchased herd bulls are an investment is expected to pay out over a 4 to 5-year productive life. That is 100 to 125 exposed females with an average of 25 exposed females serviced per year. The ownership costs (depreciation, death loss and interest cost) are expressed as an annual cost spread over females serviced and calves produced during the bull’s productive life.

Depreciation is the purchased cost minus salvage value allocated over years of use. Salvage value or cull bull net sales value when the bull is culled is a substantial part of bull purchase cost. It reduces the bull depreciation cost.

The investment in a higher priced bull that can contribute to improved production of more market acceptable calves and better weaning weight for the cow-calf producer is not that costly when numbers are put into perspective for calf value sired.

The impact on the replacement heifer's production and bull selection uncertainty is not addressed in this decision aid. This has to be part of the selection criteria. Selection involves more than bull cost.

Input Data to Compare Purchased and Raised Alternatives

The key data for this decision aid is the bull investment or total purchase cost, estimated salvage value and economic life. When combined with an interest cost on capital these are the "ownership costs" of the bull investment. Once the bull is purchased these are fixed costs and only vary with the salvage value of the bull and the productive life. Annual operating costs include the grazing, feed, and health costs including annual breeding soundness exam (BSE).

To calculate cost per cow the number of cows serviced per year needs to be input. In order to evaluate the impact of number of cows and cost per exposed female a sensitivity table is included in the **second sheet**. Cost level is quite sensitive to the number of cows serviced and reinforces the importance of the breeding soundness exam, good bull nutrition, and management.

Sheet 1, provides for data input for the bull investment costs for a bull selected evaluated in detail. The spreadsheet calculates the number of calves to pay the bull investment based on weaned calf crop and weaning weight. The final data item is the projected average market price of the weaned calves.

To quickly evaluate different variables, change the values in the **blue cells**.

The key message "buying the right genetics" is the most important goal of purchasing the right herd bull. It's a long-term investment. As observed in the second sheet the bull cost is not a major cost of production for the cow-calf herd when viewed as a part of the total production cost per cow. Paying \$500 or \$1,000 more to get the right genetics can be a very cost-effective decision.

Appendix A: Herd Bull Decision Aids

Replacement Bull Economics Decision Aids:

1. Sexed Semen AI Raised
2. Conventional AI Raised
3. Sexed Embryo Transfer (ET) Raised
4. Embryo Transfer (ET) Raised
5. Herd Bull Purchased or Raised Summary of Costs: A Planning Decision Aid

Other decision aids that assist in evaluation of herd bull economics are the following: *

1. Bull Investment and Cost Analysis
 2. Breeding Service Exam (BSE)
 3. Bull Ownership or Lease Bull
-

See Department of Agricultural Economics – Agri-Life Extension – Beef Cattle Decision Aids <http://agecoext.tamu.edu/resources/decisionaids/beef/> See sections Cow-Calf Budgeting and Herd Bull Investment and Herd Bull Replacement Alternatives Economics.

For information on **sexed semen** see www.STgen.com

Appendix B. Definition of Herd Bull Production Economics Terms

Total Production and Breeding Cost Producers must add to direct costs full cost of the bull and the business general and administrative (G & A) and finance costs. They must have **total unit cost** to have a true measure of profitability. Having G&A and actual interest cost will mean the replacement bull profitability and TUC are consistent with the total business income statement or profit and loss (P&L) statement.

Depreciation is the value that accounts for the use of a capital asset over time. Depreciation of a bred replacement bull divided by productive cost is what the depreciation would be for breeding cows. This is a major cost of production.

Direct Expenses are expense items that are directly related to production activity such as grazing, feed, yardage, health, breeding and bull cost.

Economic Cost is, in addition to the financial or accounting cost, an opportunity cost that is charged for owned land (what it could be leased for) and owner equity capital (what it would earn in an alternative investment or by how much it would reduce interest if used to repay debt). Opportunity cost represents the return that could be received for a resource in its next best use. Economic cost represents the cost “if all resources” earned their opportunity cost or a use forgone.

Financial Analysis focuses on determining the accounting cost (cash and non-cash), profitability or change in equity, and repayment capacity of the enterprise or business being evaluated.

Financial Costs include cash costs, depreciation, and non-cash adjustments, such as accounts payable, accrued interest, etc. These costs are recorded and reported in the business accounting system. The financial cost does not include opportunity cost of resources like lease equivalent or owned land and interest on equity capital.

Indirect Costs include asset ownership and operating costs. Depreciation and repair and maintenance of improvements vehicles, machinery and equipment, labor and management, and property tax are examples of indirect costs. Indirect costs continue as the number of cattle increase or decrease. **General and Administrative Costs (G&A)** are included in indirect costs to run the business such as bookkeeping, professional fees for accounting and legal services, dues, utilities, general insurance, office supplies and administrative personnel salary and payroll and benefits. There is management time spent on planning, implementation and marketing issues for the cattle custom feeding retained ownership activity. Indirect cost is also referred to as overhead cost or fixed cost.

Owner Operator Labor and Management compensation should be included in the production cost calculation at a level equivalent to the salary required to hire a non-family member to provide an equivalent service. Compensation in excess of this amount must be considered capital distributions in order to reconcile the retained earnings and statement of cash flows. Owner manager costs need to be included in production costs. Leaving it out implies the owner works for nothing.

Profit (Loss) Great care must be exercised in reading reports in the cattle sector labeling the value profit or loss. Most frequently in feedyard and other cattle reporting, these numbers are gross margins (gross revenue minus direct costs) and do not include overhead and owner labor and management costs, which are required to calculate a true profit or return to business equity.