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## **An Extension Approach to Forage-Based Heifer Development: Outcomes from the Geaux Beef Program**

### **Abstract**

The Geaux Beef Heifer Development Program is a forage-based program designed to help beef producers develop sound replacement females. Since 2021, heifers have arrived at the Hill Farm Research Station in early October and remained through April, receiving a backgrounding ration and hay before transitioning to cool-season forage grazing. Participants received consultations on reproduction, health, and nutrition, with artificial insemination, bull exposure, or both offered. Program participation expanded from 50 to 75 heifers annually, with cooperating producers increasing from 8 to 15 and representing a diverse mix of British and Bos indicus–influenced genetics. Growth, temperament, and performance data were collected. Overall average daily gain ranged from 1.6 to 2.0 lbs./day, temperament scores improved, average hip height increased from 45.5 to 50.5 inches, and mean pelvic areas ranged from 174 to 213 cm<sup>2</sup> across years.

**Abbreviations:** Louisiana State University Agricultural Center – LSU AgCenter

**Keywords:** beef cattle, cool season forage, heifer development, temperament

## Introduction

Developing sound, productive replacement females requires proper nutrition, genetics, and herd health to reach sexual maturity. Unfortunately, producers often face challenges such as the inability to house and feed replacement heifers separately from the herd and an inability to feed or graze heifers in a cost-effective manner.

Furthermore, needs assessments regularly conducted through Louisiana State University Agricultural Center's (LSU AgCenter) Extension programs, in collaboration with producers and stakeholders, consistently identified a demand for structured programs focused on heifer development. This led to the development of the LSU AgCenter's Geaux Beef Heifer Development Program. This forage-based heifer development program allows producers to bring heifers to the LSU AgCenter's Hill Farm Research Station (Homer, LA) for development from October through April. During this time, growth, temperament, and performance data are collected and shared with participants through monthly reports. Additionally, participating producers receive consultation on reproduction, health, and nutrition of their heifers. Artificial insemination, breeding via natural service, or a combination of both, along with brucellosis vaccinations are also offered. This support not only improves herd productivity but also reduces the financial risks associated with developing replacement females.

Extension professionals across the United States can utilize key aspects of the Geaux Beef Heifer Development Program, as well as similar heifer development programs run by other state Extension services, by leveraging core principles, such as structured management protocols, consistent data collection, and producer-centered consultation, while simultaneously tailoring implementation to local production environments. By collaborating with local producers, research stations, or grazing cooperatives, Extension personnel can establish centralized development sites that provide uniform management and economically feasible heifer development opportunities. Pilot programs may begin with smaller cohorts while maintaining the program's emphasis on standardized health protocols, baseline performance measurements, and ongoing educational engagement.

## Methods

All practices utilized were approved by the LSU AgCenter Animal Care and Use Committee (Protocol Number: A2021-11).

### Enrollment guidelines and requirements

Registration forms and information were released by August each year. Management and vaccination requirements are presented in Table 1. All participants must adhere to the program's management and health protocols; failure to comply may result in dismissal without refund. Heifers should weigh between 550 and 800 pounds upon arrival, and participants were strongly encouraged to provide additional information, such as birth date, birth weight, and weaning weight. Upon arrival at the station during the first week of October, heifers received program-specific ear tags, and breed composition and initial weights were collected. Heifers were then tested for both persistently infected Bovine Viral Diarrhea Virus (PI-BVDV) and pregnancy.

Table 1. Management and vaccination requirements for heifers enrolled in the program.

<b>Management Practice</b>	<b>Additional Instruction(s)</b>
Clostridial (Blackleg) Vaccination	Required. Initial and booster vaccinations must be given based on label instructions.
Viral Respiratory Complex Vaccination	Required. Initial and booster vaccinations must be given based on label instructions.
Shipping Fever Complex Vaccination	Required.
Dewormer and Fly Control	Recommended as needed based on veterinary guidance.
Individual Ear Tag	Required. At least one producer tag must be in place upon arrival.
Dehorn	Required. All heifers must be polled or completely healed from dehorning upon arrival.

PI-BVDV status was determined chute-side using the IDEXX SNAP® BVD Antigen Test (IDEXX Laboratories, Inc., Westbrook, ME), while pregnancy status was assessed using the Alertys OnFarm Pregnancy Test (IDEXX Laboratories, Inc., Westbrook, ME). If a heifer tested positive for pregnancy, the research station's consulting veterinarian was contacted to confirm pregnancy status and provided guidance to the producer. All animals must be negative for PI-BVDV and open to be permitted into the program.

Following arrival, heifers were co-mingled in a holding pen for 3 to 5 days. Day 0 of the program was defined as the first day following this co-mingled adjustment period.

### **Heifer nutrition and management**

The backgrounding period was defined as the period from day 0 until heifers were turned out to graze cool-season annual forages. During the backgrounding period, heifers were offered bermudagrass hay *ad libitum* and supplemented at 1.0% of their body weight (BW) daily with the ration presented in Table 2 (Livestock Nutrition Center, LLC., Tenaha, TX). Additionally, a complete free choice mineral mix was provided throughout the program (14.8% Ca, 7.5% P, 18.8% NaCl, 1% Mg, 1% K, 3,600 ppm Zn, 3,600 ppm Mn, 1,200 ppm Cu, 12 ppm Co, 60 ppm I, 27 ppm Se, 662 IU/g vitamin A, 66/g IU vitamin D and 0.66 IU/g vitamin E; Purina Wind & Rain Storm All-Season 7.5 Complete).

The grazing period began mid- to late-December each year, depending on forage mass availability. Annual ryegrass (*Lolium multiflorum*) was combined with cereal rye (*Secale cereale*). Wax Marshall (The Wax Company LLC, Amory, MS 38821) variety of annual ryegrass was planted at a rate of 30 lbs. per acre, while Elbon cereal rye (Apache Seed and Supply, Apache, OK 73006) was planted at a rate of 70 lbs. per acre. Planting was achieved using a 10 ft. no till drill during mid- to late-September, depending on weather and moisture conditions. Commercial poultry litter was applied annually as needed (average 8,000 lbs./acre) based on soil test results. Heifers were managed at a continuous stocking rate of approximately 700 lbs. per acre until the conclusion of the program in late-April or early-May.

**Table 2.** Ration formulated for Geaux Beef Heifer Development Program.

<b>Ingredient</b>	<b>% as-fed</b>
Soyhull pellets	25.5
Corn Gluten Feed	23.5
Cracked Corn	15
Dried distillers' grains	15
Peanut Hulls pellets	12
Cottonseed Hull	4
Fortipel Calf <sup>1</sup>	2
Liquid conditioner	1.5
Calcium carbonate	0.8
Rumensin 5 <sup>2</sup>	0.4
Salt	0.3

<sup>1</sup>FortiPel® Calf – LNC (Livestock Nutrition Center/Auto-Max); custom vitamin-mineral premix carrier.

<sup>2</sup>Rumensin® 5 – Elanco Animal Health; monensin sodium ionophore for feed efficiency and coccidiosis control.

### **Performance Data**

Following arrival, heifers were co-mingled in a holding pen for 3 to 5 days. An initial weight, pen score (PS), exit velocity (EV), and hip height were then recorded after this holding period. This was defined as day 0 of the program. Receiving weights were determined immediately after heifers were unloaded at the research station. Initial weight was recorded the Monday morning following drop-off (day 0), with drop-off ranging from the previous Wednesday to Friday, thus giving a 3-to-5-day acclimation period in holding pens. Individual weights were collected monthly, and average daily gains (ADG) were calculated separately for the backgrounding period, grazing period, and for the overall program. Hip height measurements were collected at the beginning (day 0) and end (day 210-215) of the program to further assess heifer growth. A Rice

pelvimeter was utilized to determine pelvic area each March. Pelvic area was calculated by multiplying the pelvic height by pelvic width. A ratio (determined by heifer age and weight) was then utilized to calculate an acceptable maximum calf birth weight for a heifer’s offspring. Pelvic area and heifer weight were then used to calculate an estimated maximum deliverable calf size (Patterson and Herring 2022).

Temperament was assessed using pen score (PS), exit velocity (EV), and an overall temperament score (TS). Individual pen scores were assigned at the beginning (day 0) and end (day 210-215) of the program by a trained evaluator, as described by the Beef Improvement Federation (BIF 2021a). Pen scores range from 1 (docile) to 5 (very aggressive) based on a heifer’s willingness to be approached by the evaluator.

Descriptions of each PS are provided in Table 3. Exit velocity is the time (seconds) it takes a calf to traverse 1.83 meters after leaving a squeeze chute (Schmidt et al. 2014). Velocity is calculated as  $velocity = distance (m)/time (s)$  with EV presented in meters per second. An overall TS was then calculated using the formula  $(PS + EV)/2$  as described by Schmidt et al. (2014), where 1 (calm), 2 (intermediate), and 3 (temperamental).

Table 3. Pen score descriptions.

<b>Pen Score<sup>1</sup></b>	<b>Animal’s Response to Human Approach</b>
1	Non-aggressive or Docile. Walks slowly and can be approached closely by humans, not excited by humans or facilities.
2	Slightly Aggressive. Runs along fences, will stand in corner if humans stay away, may pace fence.
3	Moderately Aggressive. Runs along fences, head up and will run if humans move closer, stops before hitting gates and fences, avoids humans.
4	Aggressive. Runs, stays in back of group, head high and very aware of humans, may run into fences and gates even with some distance, will likely run into fences if alone in pen.
5	Very Aggressive. Excited, runs into fences, runs over humans and anything else in path, “crazy”.

<sup>1</sup>(BIF 2021a)

### **Fixed-time artificial insemination and natural service**

Producers were given the options of breeding their heifers via fixed-time artificial insemination (FTAI) with a bull of their choice or natural service (NS) with an Angus bull designated to the Geaux Beef Heifer Development Program. Breeding via FTAI or NS was performed February through April each year. The 7-day CO-Synch with CIDR<sup>®</sup> protocol was used for FTAI (BRTF 2025). Heifers must have reached a minimum of 700 lbs. and have a pelvic area that allows for a calf birth weight of 65 lbs. or larger to be bred by FTAI or NS. If not bred by FTAI or NS, the heifers continued to graze pastures separately from those in the breeding program until the program concluded.

### **Program costs for producers**

The annual cost to register a heifer into the program was \$100.00. In addition to the registration fee, a per diem was charged for each heifer throughout the duration of the program. Fees were also charged if producers elect to have their heifers bred and/or vaccinated for brucellosis. All fees are presented in Table 4.

**Table 4.** Fees associated with the Geaux Beef Heifer Development Program.

<b>Activity</b>	<b>Cost/Head</b>
Registration Fee	\$100.00
Per Diem	
2021-2022	\$0.85
2022-2023	\$1.00
2023-2024	\$1.00
2024-2025	\$1.10
Brucellosis Vaccination	\$8.00
Breeding Fees	
FTAI – LSU AgCenter Purchased Straws	\$100.00
FTAI – Producer Provided Straw	\$75.00
Natural Service with Angus Bull	\$50.00

## Results

### Enrollment data

Producers were initially limited to enrolling 5 heifers per year. However, if the program does not fill, participating producers were offered the opportunity to enroll additional heifers. The inaugural year (2021-2022) was limited to a total of 50 heifers, with subsequent years being expanded to a maximum of 75 heifers. Total enrollment and number of participating producers are shown in Table 5. Breed of sire was utilized to determine heifer breed composition shown in Table 5. Those listed as single breeds may be either commercial or registered.

Table 5. Breed composition and number of producers enrolled.

Breeds	Program Year			
	2021-2022	2022-2023	2023-2024	2024-2025
Akaushi	0%	0%	0	4.2%
Akaushi-Cross	0%	6.7%	6.7%	2.8%
Angus	0%	8.0%	6.7%	0%
Angus-Cross	10%	1.3%	2.7%	22.2%
Beefmaster	0%	5.3%	0%	0%
Beefmaster-Cross	0%	0%	0%	6.9%
Brahman-Cross	10%	6.7%	36.0%	20.8%
Brangus	24%	9.3%	8.0%	5.6%
Brangus-Cross	30%	33.3%	6.7%	13.9%
Charolais	10%	12%	6.7%	13.9%
Charolais-Cross	0%	4%	13.3%	0%
Hereford	16%	4%	0%	0%
Hereford-Cross	0%	6.7%	13.3%	9.7%
Simmental-Cross	0%	2.7%	0%	0%
<b>Total Number of Heifers</b>	50	75	75	72
<b>Number of Producers</b>	8	15	14	15

## Weights and average daily gains

Weight ranges and averages at receiving, day 0 (initial weight), and conclusion of the program (final weight) are reported in Table 6. Despite the required 550 to 800 lbs. range at enrollment, heifers weighing outside of this range were brought to the research station annually due to a lack of scales at many producer operations. Average daily gains during the backgrounding period, grazing period, and entire program are reported in Table 7.

Table 6. Heifer weights at the beginning and end of the program.

<b>Year</b>	<b>Weight (lb)</b>	<b>Mean <math>\pm</math> SD</b>	<b>Range</b>
2021–2022	Receiving BW <sup>1</sup>	572 $\pm$ 102.8	353–780
	Initial BW <sup>2</sup>	570 $\pm$ 102.9	355–769
	Final BW <sup>3</sup>	980 $\pm$ 104.5	795–1199
2022–2023	Receiving BW <sup>1</sup>	571 $\pm$ 118.2	313–935
	Initial BW <sup>2</sup>	576 $\pm$ 120.1	330–935
	Final BW <sup>3</sup>	918 $\pm$ 123.2	584–1333
2023–2024	Receiving BW <sup>1</sup>	575 $\pm$ 118.9	326–971
	Initial BW <sup>2</sup>	585 $\pm$ 126.7	311–981
	Final BW <sup>3</sup>	969 $\pm$ 128.7	712–1332
2024–2025	Receiving BW <sup>1</sup>	592 $\pm$ 100.5	406–865
	Initial BW <sup>2</sup>	590 $\pm$ 100.9	381–855
	Final BW <sup>3</sup>	945 $\pm$ 119.3	720–1217

<sup>1</sup>Receiving weight: Recorded when heifers are delivered to the research station by producers. <sup>2</sup>Initial weight: Day 0; 3 to 5 days after arrival at the research station. <sup>3</sup>Final weight: Recorded at the end of the entire program. BW: Body weight, SD: Standard deviation.

Table 7. Heifer average daily gains during different phases of the program.

<b>Year</b>	<b>Average daily gain (lb/d)</b>	<b>Mean <math>\pm</math> SD</b>	<b>Range</b>
2021–2022	Backgrounding Period <sup>1</sup>	1.51 $\pm$ 0.52	0.27 – 2.55
	Grazing Period <sup>2</sup>	2.01 $\pm$ 0.34	1.31 – 2.84
	Entire Program <sup>3</sup>	1.84 $\pm$ 0.34	0.98 – 2.52
2022–2023	Backgrounding Period <sup>1</sup>	1.04 $\pm$ 0.47	-0.08 – 2.19
	Grazing Period <sup>2</sup>	1.93 $\pm$ 0.37	0.99 – 2.94
	Entire Program <sup>3</sup>	1.61 $\pm$ 0.27	0.94 – 2.24
2023–2024	Backgrounding Period <sup>1</sup>	1.16 $\pm$ 0.52	0.07 – 2.62
	Grazing Period <sup>2</sup>	2.01 $\pm$ 0.31	1.21 – 2.69
	Entire Program <sup>3</sup>	2.03 $\pm$ 0.47	1.14 – 3.46
2024–2025	Backgrounding Period <sup>1</sup>	1.51 $\pm$ 0.38	0.55 – 2.38
	Grazing Period <sup>2</sup>	1.79 $\pm$ 0.40	0.72 – 2.77
	Entire Program <sup>3</sup>	1.67 $\pm$ 0.27	1.04 – 2.30

<sup>1</sup>Backgrounding period: Day 0 until turnout to cool-season forages; heifers receive bermudagrass hay ad libitum and a supplement at 1% of body weight. <sup>2</sup>The grazing period comprehends the period when heifers are turned out to cool-season pastures (mix of ryegrass and cereal rye) to the end of the program. SD: Standard deviation.

### **Temperament**

Subjective and objective measurements of temperament were evaluated through PS and EV, respectively. Temperament data at the beginning and conclusion of the program are presented in Table 8.

Table 8. Evaluation of heifer temperament.

Year	Item	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range
		Initial <sup>1</sup>		Final <sup>2</sup>	
2021–2022	Pen Scores <sup>3</sup>	3 $\pm$ 1.0	1 – 5	2 $\pm$ 0.54	1 – 4
	Exit Velocity <sup>4</sup>	1.9 $\pm$ 0.72	0.52 – 2.80	1.5 $\pm$ 0.55	0.65 – 2.37
	Temperament Score <sup>5</sup>	2.2 $\pm$ 0.70	0.9 – 2.8	2 $\pm$ 0.47	1.4 – 3.4
2022–2023	Pen Scores <sup>3</sup>	3 $\pm$ 0.91	1 – 4	2 $\pm$ 0.75	1 – 4
	Exit Velocity <sup>4</sup>	1.7 $\pm$ 0.79	0.75 – 7.73	1.3 $\pm$ 0.64	0.54 – 7.81
	Temperament Score <sup>5</sup>	2.2 $\pm$ 0.74	0.8 – 3.9	1.7 $\pm$ 0.62	0.6 – 3.2
2023–2024	Pen Scores <sup>3</sup>	2 $\pm$ 0.75	1 – 4	3 $\pm$ 0.78	1 – 4
	Exit Velocity <sup>4</sup>	2.1 $\pm$ 0.96	0.36 – 4.41	1.7 $\pm$ 0.74	0.51 – 2.90
	Temperament Score <sup>5</sup>	2.3 $\pm$ 0.74	0.9 – 3.9	2.1 $\pm$ 0.68	0.9 – 3.7
2024–2025	Pen Scores <sup>3</sup>	3 $\pm$ 0.96	1 – 4	3 $\pm$ 0.67	1 – 4
	Exit Velocity <sup>4</sup>	2.0 $\pm$ 1.05	0.38 – 4.42	1.34 $\pm$ 0.67	0.50 – 3.13
	Temperament Score <sup>5</sup>	2.3 $\pm$ 0.89	0.7 – 3.9	2 $\pm$ 0.57	0.8 – 3.6

<sup>1</sup>Initial evaluations: Recorded on day 0; 3 to 5 days after arrival at the research station. <sup>2</sup>Final evaluations: Recorded at the end of the entire program (day 210-215). <sup>3</sup>Pen Scores assessed on a scale of 1 to 5. <sup>4</sup>Exit Velocity measured as m/s. <sup>5</sup>Temperament Scores assessed on a scale of 1 to 5. SD: Standard deviation.

## Hip Height

Hip height ranges and averages are presented in Table 9.

Table 9. Heifer hip height.

Year	Hip Height (in)	Mean $\pm$ SD	Range
2021–2022	Initial HH <sup>1</sup>	45.4 $\pm$ 2.33	40.50 – 49.25
	Final HH <sup>2</sup>	50.1 $\pm$ 2.21	45.75 – 54.75
2022–2023	Initial HH <sup>1</sup>	45.7 $\pm$ 2.76	37.50 – 54.25
	Final HH <sup>2</sup>	50.5 $\pm$ 2.28	43.00 – 56.00
2023–2024	Initial HH <sup>1</sup>	44.69 $\pm$ 2.61	38.25 – 50.50
	Final HH <sup>2</sup>	51.28 $\pm$ 1.89	46.50 – 55.75
2024–2025	Initial HH <sup>1</sup>	46.25 $\pm$ 2.24	41.25 – 51.50
	Final HH <sup>2</sup>	50.25 $\pm$ 1.86	44.75 – 54.00

<sup>1</sup>Initial hip height: Recorded on Day 0; 3 to 5 days after arrival at the research station. <sup>2</sup>Final hip height: Recorded at the end of the entire program. HH: Hip Height, SD: Standard deviation.

## Pelvic Area

Pelvic area data is presented in Table 10.

Table 10. Pelvic area measurements.

Year	Item <sup>1</sup>	Mean ± SD	Range
2021– 2022	Pelvic Height, cm	14.3 ± 1.26	11.5 – 17.0
	Pelvic Width, cm	12.5 ± 1.17	10.0 – 16.0
	Pelvic Area, cm <sup>2</sup>	179.2 ± 24.83	138.0 – 240.0
	Acceptable Maximum Calf Weight, lb	74.2 ± 9.45	57.5 – 96.0
2022– 2023	Pelvic Height, cm	14.3 ± 0.97	12.0 – 18.0
	Pelvic Width, cm	12.1 ± 0.93	10.0 – 15.0
	Pelvic Area, cm <sup>2</sup>	174 ± 21.4	126.0 – 247.5
	Acceptable Maximum Calf Weight, lb	80.4 ± 7.04	67.5 – 103.1
2023– 2024	Pelvic Height, cm	14.6 ± 2.28	11.0 – 20.0
	Pelvic Width, cm	14.6 ± 1.21	11.00 – 18.0
	Pelvic Area, cm <sup>2</sup>	213.1 ± 34.8	148.5 – 310.0
	Acceptable Maximum Calf Weight, lb	88.63 ± 13.8	64.6 – 124.0
2024– 2025	Pelvic Height, cm	15.4 ± 1.43	11.5 – 19.5
	Pelvic Width, cm	12.6 ± 1.38	10.0 – 16.5
	Pelvic Area, cm <sup>2</sup>	195.5 ± 36.37	130.0 – 321.8
	Acceptable Maximum Calf Weight, lb	87.5 ± 13.1	62.0 – 128.7

<sup>1</sup>Pelvic height and width were recorded each March. SD: Standard deviation.

## Breeding and Brucellosis Vaccinations

Number of producers that opted into breeding heifers either by FTAI or NS, as well as those requesting brucellosis vaccinations, are presented in Table 11.

Table 11. Number of Producers Opting to Breed Heifers and Vaccinate for Brucellosis.

<b>Program Year</b>	<b>Fixed-Time AI<sup>1</sup></b>	<b>Fixed-Time AI + Bull<sup>2</sup></b>	<b>Natural Service<sup>3</sup></b>	<b>Brucellosis Vaccination</b>	<b>Total Producers Enrolled</b>
<b>2021-2022</b>	0	4	0	4	8
<b>2022-2023</b>	1	5	0	8	15
<b>2023-2024</b>	1	4	1	9	14
<b>2024-2025</b>	1	2	4	9	15

<sup>1</sup>Number of producers that opted for heifers to be bred by FTAI only. No exposure to a clean-up bull. <sup>2</sup>Number of producers that opted for heifers to be bred by FTAI and then exposed to a clean-up bull beginning 2 weeks post-FTAI. <sup>3</sup>Number of producers that opted for heifers to be bred by NS only.

### **Discussion**

The outcomes of the Geaux Beef Heifer Development Program demonstrate the substantial value that structured, forage-based heifer development models can provide to Extension systems, producers, and regional beef industries. In addition to improvement in heifer performance, this program highlights how coordinated management, standardized data collection, and producer education can address long-standing barriers faced by beef cattle producers. Many enrolled producers have noted that prior to program participation, they lacked access to scales, separate heifer-development facilities, and/or the technical expertise needed to implement proper heifer development and assisted reproductive technologies. The program’s monthly reporting system and hands-on consultations help bridge these gaps by providing timely, actionable feedback that producers can use to make informed decisions for their replacement females and subsequently their entire herd.

Participants noted a lack of consideration placed towards selection or culling based on temperament and frame score prior to enrolling in the program. Temperamental cattle have been reported to have lower average daily gain (ADG), a greater incidence of dark

cutters, lower dressing percentages, lower body condition scores, a decrease in immunity, and lower conception rates (Burdick et al. 2011; Burrow and Dillon 1997; Del Campo et al. 2010; King et al. 2006; Petherick et al. 2002). Hip height on beef cattle can be utilized to assess frame score, which is helpful to improve consistency in animal size throughout the herd. As stated by the Beef Improvement Federation, there is not a single ideal frame score for marketing, breeding, etc. (BIF 2021b). Instead, producers are encouraged to use these scores for monitoring single animal performance and selecting for consistency within the herd.

Importantly, the diversity of enrolled heifers, spanning numerous breeds, frame sizes, and initial temperament scores, demonstrates the adaptability of the program's protocols and the feasibility of applying this approach across varied production environments. Performance data across the first four program years show consistent weight gain patterns despite fluctuations in weather, forage conditions, and breed composition, underscoring the reliability of the forage-based model when combined with structured supplementation and targeted health protocols. Similarly, improvements in temperament scores for many heifers support existing research indicating that low-stress handling and consistent exposure to facilities can positively influence animal behavior and long-term productivity.

From an Extension programming standpoint, these results emphasize the importance of integrated, multi-disciplinary approaches that combine nutrition, reproduction, health, forage management, and genetics into a single educational framework. Producer satisfaction and demand for the program indicates an opportunity for Extension systems nationwide to replicate or adapt similar development models. Whether implemented at research stations, cooperating farms, or regional grazing cooperatives, the foundational elements of the Geaux Beef framework provide a scalable, research-based template for improving replacement heifer quality, strengthening producer confidence in data-driven management, and supporting the long-term sustainability of beef cattle operations.

## Conclusion

These strategies demonstrate how Extension professionals nationwide can tailor the Geaux Beef Heifer Development framework to strengthen producer support, enhance heifer development outcomes, and expand educational reach. By integrating standardized management, regional forage systems, and collaborative expertise, Extension programs can significantly improve replacement heifer quality, producer confidence, and long-term herd sustainability across diverse production environments. Integrating local veterinarians, nutritionists, and AI technicians can enhance producer confidence and strengthen the educational impact. Ultimately, implementing this model in new counties, states, or regions can create sustainable, data-driven development pipelines for replacement females while improving marketing opportunities and strengthening long-term herd productivity.

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