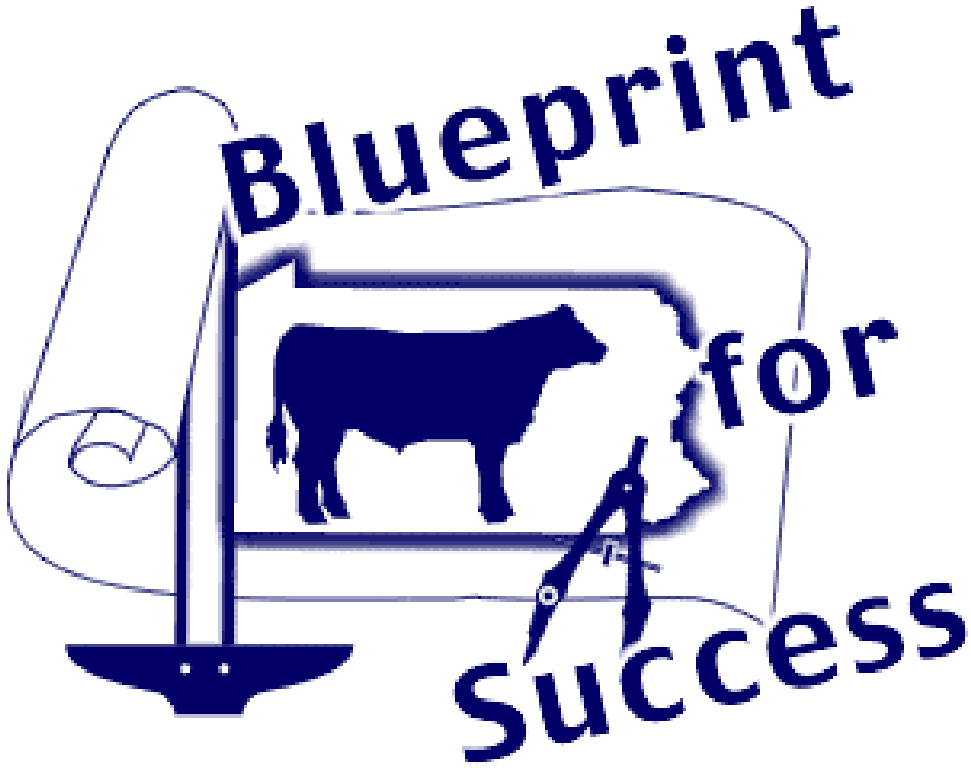

Blueprint for Success

A Guide for Feeding Quality Assured Beef Cattle in Pennsylvania

A joint initiative of:
Penn State College of Agricultural Sciences
The Pennsylvania Beef Council

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Blueprint for Success

For Feeding Quality Assured Beef Cattle

Forward

Pennsylvania is uniquely positioned to produce high quality, finished beef cattle for the nation's and the world's consumers because of the availability of meat packing facilities, a nearby concentration of population, and from an established agricultural infrastructure. Consumers demand consistent, flavorful, nutritious, and safe muscle foods. Beef can maintain its competitiveness in the food marketplace by meeting these demands. These safety and palatability traits can be enhanced in many ways, including farm-level production practices. The advantages for feeding cattle in this region are twofold:

1.There is a number and diversity of markets available for beef cattle. These markets include major beef packers; available markets for restaurant, export, and "labeled" retail beef products; smaller, local butchers and retailers of beef; and active terminal auction markets.

2. The availability of inputs to a cattle feeding enterprise. Extensive feeder cattle production is found in the surrounding states of Virginia and West Virginia, cattle are available in the southern Atlantic states, and there are 100,000 feeder cattle produced in Pennsylvania. Feed commodities of many types are readily available. Extensive corn and small grain production currently exists with 1.4 million acres of corn and 500,000 acres of small grains. An extensive food processing industry exists that produces waste products which find an alternative use as cattle feed. Finally, poultry production is one of the largest and emerging animal enterprises in the region, and the byproducts from this industry are also excellent sources of cattle feed.

On March 12, 1999, representatives from the College of Agricultural Sciences at Penn State, Moyer Packing Co. and the Pennsylvania Beef Council met in Souderton, PA to discuss the opportunities for feeding cattle in Pennsylvania and the Northeast, determine an educational process that is necessary to improve fed cattle production in the region, and organize an effort among the participants to institute an educational program to improve fed cattle production.

The first step in this process was to determine the management factors that are necessary to improve the competitiveness and consumer value of a finished animal. An effort was initiated between Penn State University Cooperative Extension and Moyer Packing Co. to jointly determine production and educational needs to address this issue. Named the "Blueprint for Success," a working committee was formed that determined the specific factors necessary to produce a valuable beef carcass. That committee was co-chaired by Steve Bryce, Director of Cattle Procurement at Moyer Packing Co. and by Dr. John Comerford, Beef Extension Specialist at Penn State. The other members were Darwin Nissley, a cattle feeder from Lancaster County; John McFadden, Regional Sales Manager for Hoechst-Roussel Animal Health; John Moose, Fulton Bank; Jim Hogue, Territory Manager for Agric-Basics, Inc.; Bill McCoy, McCoy Cattle Co.; Chester Hughes, Lancaster County Extension Agent; and Micheal Firestine, Agricultural Representative of Fulton Bank. The charge for this group was to list the specific management and animal factors that would improve the value of fed cattle for producers, packers, and consumers in Pennsylvania. This document, "Blueprint for Success for Feeding Cattle in Pennsylvania" is the result of that discussion.

Purpose

The purpose of this manual is to provide a summary of the management and animal factors that can increase the competitiveness, predictability, quality, and value to consumers of fed cattle in Pennsylvania. Recognizing that quality beef cattle may come in many forms and that market forces may not allow even the "best" animal to be profitable, the practices outlined here are intended to help reduce the cost of production, increase the value of the product to consumers, and reduce carcass discounts affecting meat quality.

Objectives

1. To increase the long-term competitiveness and consumer value of cattle fed for slaughter using prescribed management practices.
2. To increase the number of cattle fed in Pennsylvania that meet consumer demands for consistency, quality, and value.

Overview

What does the perfect finished steer look like? Obviously there is no single answer to this question. The integration of variation in animals, feed resources, land resources, management skills, markets, and consumer demands will result in competitive cattle that take many forms. However, there are three factors that are universal to increased value: capturing premium carcass prices through additional consumer value when they are available, eliminating carcass discounts, blemishes, and other factors that affect consumer acceptability for beef, and reducing production costs to insure a consistent supply. The following values represent the "Ten-Point Benchmark" for fed cattle that have the highest potential to reach these goals:

Ten-Point Benchmark for Quality Cattle in Pennsylvania

1. Carcasses with an USDA quality grade of Choice or better to reach and exceed consumer's "window of acceptability."
2. A carcass weight of 700-900 lbs. to help insure tenderness, quality factors, and portion sizes acceptable to consumers.
3. A yield grade of 1, 2, or 3 to reduce fat, make beef more visually attractive, and influence tenderness and consistency.
4. No distinguishing Dairy or Brahman characteristics. Identify breed and feeding systems for premium programs that address eating quality, value, safety, and nutrition.
5. Fed high energy feed for at least 120 days to meet consumer demands for uniformity and flavor.
6. Healthy cattle that produce safe and desirable beef.
7. Free of carcass blemishes that may detract from consumer value and insure appropriate animal husbandry practices.
8. Less than 20-24 months of age at slaughter to positively influence tenderness and high consumer demand.
9. High growth rate with desirable feed conversion to make more efficient use of feed, water, land resources, and reduce production of animal wastes.
10. Produced in environmentally friendly conditions that target excellent animal welfare and positive community relations.

Cattle, both fed steers and heifers, that match these criteria form the "mainstream" of desirable cattle for both producers and consumers. Likewise, here are some of the factors that may detract from the value in fed cattle (**the Ten-Point Discounts**):

1. **Lower than USDA Choice Quality Grade.**
2. **Yield grades greater than 3.5.**
3. **Carcass weights greater than 950 lbs or less than 600 lbs.**
4. **Distinguishing dairy- or Brahman - influenced characteristics.**
5. **Carcass blemishes such as bruising and injection sites.**
6. **Recurrent and chronic health problems.**
7. **"B" maturity carcasses.**
8. **Low or moderate energy diets fed for extended periods.**
9. **Poor growth and feed conversion.**
10. **Rejected by consumers for poor product wholesomeness, or when produced in unfriendly environmental conditions.**

Achieving Added Value

Quality grade of USDA Choice or Prime

Background: Quality grades of beef cattle are intended to categorize beef into segments that will have similar eating quality. The two major factors that are used to determine quality grade in carcasses are a subjective intramuscular fat - marbling - between the 12th and 13th ribs and maturity of the carcass. The latter is determined by lean color, calcification of the spinous procemes, and calcification and flatness of the ribs. Beef cattle less than 24 months of age will generally have "A" maturity.

Keys to Success:
Understanding Marbling

Within an age category, marbling will be the most important factor determining quality grade. The specific factors, which allow marbling to be experienced in a carcass, are not well understood. It is generally believed to be some combination of genetics of the animal, animal age, and animal feed intake relative to the energy density of the daily ration.

Genetics: Genetic influences on marbling come in two forms. First, there is an "average breed effect" for marbling. Most scientific reports have shown that breeds such as Angus, Shorthorn, and Jersey will generally have the highest positive average breed effect on marbling, while breeds with a high proportion of muscling in the carcass, such as Limousine, will have a lower average breed effect for marbling. There is very little influence of heterosis (hybrid vigor) on marbling. The second factor is variation in the genetics of marbling within a breed that is measured with Expected Progeny Differences (EPDs). This is a fairly recent technology, but it has been shown:

(1) There is a wide variation in the genetics of marbling within all breeds.

(2) Selection of parents with high EPD for marbling will result in a larger percentage of Choice carcasses compared to those from parents with a low EPD for marbling.

(3) Marbling is genetically independent of most other production and carcass traits. This is particularly true of fat thickness in the carcass. While marbling is in fact

fat, it has a different composition that subcutaneous fat, so it is possible to select for more marbling and for less fat thickness and achieve this result.

Age: It is known that yearlings will usually have a higher proportion of Choice carcasses than calf-feds. This is probably due to the influence of age and maturity in converting feed to fat in the carcass. Even within heavy selection pressure for EPD for marbling, older cattle will usually have more marbling in the carcass.

Feed Intake: It has been suggested that cattle of the same genetic potential for marbling and of the same age will have a "threshold" of feed energy intake that must be reached to express marbling in the carcass. This factor will, of course, vary from animal to animal, but documentation of this threshold will have important economic benefit. This is the basis for the ultrasound sorting program written by Dr. Brethour at Kansas State University described later in this manual.

Managing for Success:
Feeding and Feed Management

Specifications for Feedlot Rations:

(1) For cattle 600-850 lbs., feed 12.5% crude protein diet and minimum of .55 mcal/kg net energy of gain.

(2) For cattle 850 lbs. And up, feed 13% crude protein diet and minimum of .60 mcal/kg net energy of gain.

(3) Diets should be 70% corn (or equivalent) of the dry matter.

(4) Diets should be less than 8% fat.

(5) Diets should be a minimum of 40% dry matter.

(6) Diets should be a minimum of 8% roughage.

(7) Protein ratio should be 65-75% undegradable intake protein.

(8) No more than 1/3 of the total protein requirement should be met with non-protein nitrogen.

(9) At least sixty percent of the total protein requirement of receiving diets should be high quality ruminal escape protein

Examples of Feedlot Rations:

Ingredients and Prices Used:

Dry, shelled corn	**$2.50/bu**	**Yardage = $.40/head/day**
Corn silage	**$35/ton**	
36% natural protein	**$200/ton**	**Fed at 3 lbs/hd/d**
Mineral mix	**$350/ton**	**Fed at .5 lbs/hd/d**

Animal Wt.	Sex	Ration NEg	Corn (as fed) lbs	Corn Silage (as fed) lbs	ADG (lbs/day)	Feed Conversion (feed/gain)	Non-feed cost $/cwt gain	Feed cost $/cwt gain	Total cost $/cwt gain
650 (850)	S	60	12 (14)	11 (16)	3.6	4.9 (5.9)	11.05 (11.02)	34.15 (38.91)	45.20 (49.93)
	S	55	7 (8)	22 (30)	3.3	5.4 (6.3)	12.66 (12.25)	36.62 (42.56)	48.78 (54.81)
	S	50	4 (5)	28 (37)	3.0	6.0 (7.2)	13.48 (12.97)	39.62 (44.70)	53.10 (57.67)
	H	60	12	11	3.5 (3.4)	5.1 (6.3)	11.41 (11.72)	35.24 (41.37)	46.65 (53.08)
	H	55	7	22	3.1 (3.1)	5.8 (7.1)	12.92 (13.01)	38.91 (45.21)	51.83 (58.22)
	H	50	4	28	2.8 (2.9)	6.4 (7.6)	14.31 (13.07)	42.07 (47.46)	56.38 (61.23)

Key to Success:
Determining feed cost

Farmer - feeders in Pennsylvania typically market crops through cattle. An important component of cost - and subsequent determination of profitability - is how home-grown feeds are valued in the feedlot enterprise. There are several methods available:

(1) Never consider home-grown feeds of any kind as "free." They all have a cost.

(2) The cost of production is added to the cost of production of cattle. The fallacy of this method is that it is economically important to separate the value of crop production from cattle feeding to determine which enterprise is more profitable.

(3) Charge the cattle enterprise for the feed at the value the crop could be sold for on an open market or the price you would have to pay to buy the commodities on an open market. This will allow the operator to determine the true profit centers on the farm-crop farming or feeding cattle.

Another perspective is equivalent pricing of nutrients, particularly energy. Consider the following example:

Corn Silage Production Budget (1997 PSU Agronomy Guide)
(Per acre basis)

Yield	TDN	Variable cost	Fixed cost	Total cost
21 tons	68%	238.77	99.56	338.36

Adjustments: (1995 NRAES Dairy Reference Manual)
Harvest and Storage loss (11.3%) = $385.81
Feeding loss (4%) = $401.89

Corn silage production cost per ton = $19.31
TDN cost per lb. of silage = $.04
TDN cost per lbs. of corn @$2.50/bu = $.04

Under this scenario it is shown that actual feed energy costs for corn silages at the cost of production is equivalent to purchasing corn at $2.50 per bushel.

Managing for Success:
Feeding Management

Specific recommended strategies:

(1) Feed twice daily.

(2) Offer enough feed so the bunk is clean not more than 1 hour before the next feeding.

(3) Allow 12 inches per head of bunk space for outside lots and high forage diets, and allow 6-9 inches per head for high concentrate diets fed in confinement.

(4) Use a total mixed ration.

(5) Use equipment with scales that allows feed weights to be available and recorded daily.

(6) Use a laboratory analysis of all forages and non-traditional feeds for diet formulation.

Key to Success:
Variations in feed quality can be costly.

Situation: Feeding a 55 Neg diet to 850 lb. steers changes in production cost are shown for variations in values for silage.

Source of Variation	Value	Change in cost of gain 46	47	48
Net energy-gain	.47 ± .05	-$.51	0	$.51
Moisture	40% ± 5%	35%	40%	45%
		-$.56	0	$.56

Moisture and energy value for silage are shown to be important sources of value in production costs. These values are also additive. All feed components that have the potential on variability in nutrient or moisture content, particularly wet forages, high moisture grains, and food processing byproducts, should be subjected to laboratory analysis.

(7) Competent feedlot nutritional consultation to provide ration balancing and least-cost formulations.

(8) Provide sufficient quantity and quality of water.

Key to Success:
Providing Sufficient Quantities of Water

Estimated Water Requirements for Feedlot Cattle (gals/day)

	Temperature (°F)					
Weight	40	50	60	70	80	90
600	6.0	6.5	7.4	8.7	10.0	14.3
800	7.3	7.9	9.1	10.7	12.3	17.4
1000	8.7	9.4	10.8	12.6	14.5	20.6

National Research Council, 1996

Managing For Success:
Use of Growth-Promoting Implants

Background: Growth-Promoting implants are natural or hormone-like compounds that partition animal growth. In general growth and weight gain is shifted away from fat accretion toward protein production. This results in added weight gain and better feed efficiency since the efficiency of protein production is greater than that for fat production. Animal health, growth potential, and the plane of nutrition will influence the response of a feedlot animal to implants. Additionally, since implants extend the animal's growth period, it should be expected that implanted animals will be heavier at the same compositional endpoint (i.e., fat thickness) than non-implanted cattle. It is estimated growth-promoting implants are responsible for $700 million in revenue to the beef industry. All implants have a specific mode of action; therefore, the response level and the length of response will be different. It has been shown certain combination of implants used too close to slaughter date will reduce marbling and the percentage of cattle

grading Choice. Generally, most implants should not be used within 140 days of slaughter. Aggressive implant strategies that maximize the response to the implant in growth and feed efficiency can compromise carcass grade. However, in situations where the Choice/Select spread is narrow and few premiums exist for high quality grades, the advantage of the implant strategy for Select cattle may be enough to offset the discount.

Key to Success:
Using Implants Correctly

Implanting Mistakes and Solutions
(Compudose Technical Manual, 1982)

Problem	Cause	Solution
Abscess at implant site	Lack of sanitation	Disinfect equipment, dry ears, Improve restraint
Bunched pellets	Needle moved, poor restraint	Improve cattle restraint
Retrograde abscess	Infection after implanting	Pinch site after implanting Improve sanitation
In cartilage	Poor needle, too fast, Improper placement	New needle, slow down, place properly
Crushed pellet	Needle not fully inserted	Fully insert needle
Missing implant	not advancing cartridge, through ear, abscess in skin	Check implant position, pinch site shut
Separated pellet	Rapid withdraw of needle Processing too fast	Slow down, withdraw needle slowly
Partial implant	Needle too short, too fast Poor restraint	Use needle provided, slow down, improve restraint
Pellet too close to the head	Inexperience	Implant only in middle one-third of ear
Walled-off implant	Abscess	Improve sanitation

The following summarizes the steps to use in determining an implant strategy.

1. **Make sure the target market will accept implanted cattle.**
2. **Choose an implant that fits the feeding period, ration, and cattle type.**
3. **Seek professional advice on the appropriate implant to use.**
4. **Use implants properly by using appropriate implanting technique and abiding by label directions for their use.**

Managing for Success: Feeder Cattle Selection

The highest valued input into the cattle feeding enterprise is the purchase of feeder cattle. Three factors related to the cattle that will significantly influence profitability are:

1. **Potential for growth**
2. **Health**
3. **Potential to qualify for premium market values.**

Standards for Feeder Cattle Selection

1. **No more than 10% weight variation on a load.**
2. **Flesh condition $\leq$ 5.0.**
3. **Feeder grade M-1 with range of S^{+}-1 to L-1.**
4. **Known vaccination, deworming, and implant history.**

5. **Males castrated with a knife at less than four months of age, females open.**
6. **Known farm of origin and housing facilities.**
7. **Black hide with predominately Angus breeding for premium programs.**
8. **Known transportation conditions.**
9. **Calves thoroughly weaned.**
10. **Known weight conditions (i.e., distance to scales, mud, time of weighup).**
11. **Absence of horns, external parasites, active pinkeye infections.**
12. **Previous history on fescue pastures.**

Contributions to high growth potential:

1. **Prevaccination and booster for pasturella, IBR, BVD, PI_3, BRSV, and H. somnus 10-14 days prior to transport.**
2. **Weaned for at least 14 days.**
3. **Eating small amounts of dry feed and grain.**
4. **Drinking water from a tank or fountain.**
5. **Vaccinated with modified-live vaccines after weaning.**

6. **Treated for internal and external parasites August-January and for internal parasites February-July.**

7. **Confidence and credibility of market or order buyer.**

8. **Known commingling history**.

Keys to Success:
Why Feeder Cattle Get Sick

Extensive research has shown the factors that are involved in marketing feeder cattle-weaning, commingling, transportation, handling, novel environments - provide additive sources of stress on the animal. This stress can contribute to the inability of the animal to defend itself against disease, particularly respiratory disease. The factors (from highest priority) that contribute to stress are:

1. Weaning
2. Transportation
3. Commingling
4. Novel feeds and water sources
5. Handling

Sick cattle are costly. The following data show the cost of sick cattle in the Texas "Ranch to Rail" program (McNeil, 1997, 1998):

	1996-97		1997-1998	
Source	Sick	Healthy	Sick	Healthy
November	298	1774	507	1394
Death loss	7.7%	0.6%	4.0%	0.6%
Ave. daily gain	2.40	2.96	2.54	2.84
Cost of gain	$76.95	$59.52	$71.15	$59.93
Medicine cost	$23.36	$ 0.00	$22.73	$ 0.00
Net return	(5.23)	112.19	(101.57)	(36.18)
% Choice	26	40	23	42
% Select	60	55	60	51
% Standard	14	5	17	7

Managing for Success:
Calves versus Yearlings

Cash flow and turnover: Will favor the use of yearlings since more total output can be realized. This is particularly needed in startup phase for new facilities. Cash flow maintained at a greater level in higher-leveraged operations.

Example: Compare output in 500-head facility for 550-lb. calves and 900 lb. yearlings.

Projected gain =3.6 lbs/day

Final weight =1300 lbs (yearling); 1200 lbs (calves);

	Yearlings	Calves
Days on feed	111	180
Turnover	3.3	2.0
Lbs. per year	2,145,000	1,200,000

Health management: Many factors contribute to the potential of cattle to get sick. For calves, weaning and vaccination history will significantly influence the outcome. In general morbidity rates on calves are 10% to 35%, and mortality rate is 3% to 5%. For yearlings, the morbidity rate will be 0 to 5% and mortality rate of 0- to 1%. The economic compromise for the purchase of

calves is usually a lower initial cost, greater value being added in the feedlot, and flexibility of feeding and marketing.

Availability: More calves are usually available in conventional marketing channels. Yearlings can be found in more restricted time periods and production is usually more localized geographically (such as Virginia, West Virginia, and the Carolinas). Intense market pressure for yearling cattle can be seen in the Northeast because of competition from western markets that usually depend on cattle from wheat pasture and grazing on the high plains. Highly organized backgrounding programs for calves generally do not exist in the Northeast, so the risk of availability of yearlings for northeastern feedlots is relatively high.

Feed management: The rations for feeding yearlings would generally be more energy-dense. The total amount of feed required in the enterprise would be greater with yearlings because the turnover is greater and the total weight of animals being maintained is also greater.

Example: Corn requirements of 500-head feeding facility with corn at 80% of diet dry matter.

Item	Yearlings	Calves
Average daily weight	525,000	437,500
Average daily corn intake (lbs.)	8,400	7,000
Annual corn needs (bu)	54,750	45,625

Facilities and manure management: Floor space in a confinement building for yearlings (800-1300 lbs.) would generally be 10% greater than for calves (550-800 lbs.). Since the average animal weight maintained in a facility with yearlings is greater, manure production will also be greater:

Item	Yearlings	Calves
Daily manure/animal (lbs.)	60	45
6-month capacity (500 head)	2,700 tons	2,025 tons

Keys to Success:
Treatment Protocol

The following procedures are recommended practice for the treatment of sick cattle in the lot.

1. Animal identification. All incoming cattle should be individually identified as a means of inventory control and health management.
2. Isolation/treatment pens: Drug treatment protocol for respiratory disease usually requires multiple days of treatment. A compromise exists whether to daily remove an animal from the home pen for treatment, or leave it in isolation until treatment is complete and reintroduce to the home pen.
3. Animal body temperature: Treat any animal with a temperature of 104°F or greater.
4. Drug protocol: A veterinarian/client/patient relationship should be established. Specific drug use should be determined based on health records. Extra-label drug use should always be in consultation with the veterinarian.
5. Treatment records: Accurate records should be maintained for all activities. This record should include animal ID, diagnosis, drug use, drug delivery method and site, and the date of all activities.
6. Quality assurance techniques: Quality assurance is a comprehensive procedure for animal handling and health management that seeks to reduce carcass blemishes and illegal drug use. Correct procedures are prescribed through a program adopted by the National Cattlemen's Beef Association and is administered and provided by the Pennsylvania Beef Council. Training and certification is provided by the Council at various sites and times during the year (1-717-939-7000).
7. Postmortem services: Identification of organisms that cause death or sickness to cattle in a feedlot is the first step in instituting control and therapy. These services are available through Penn State University Animal Diagnostic Laboratory (814-863-0837).

Keys to Success:
Using Ultrasound to Pre-Sort Outcome Groups of Feeder Cattle

A program developed by Dr. John Brethour at Kansas State University uses ultrasound technology to categorize outcome groups of feedlot cattle at the time they are placed in the lot. Under this procedure, the cattle are weighed, scanned for backfat, and scanned for marbling. A computer program is then employed to develop a feeding strategy for the cattle, and reports as many as three outcome groups per load. The information used in the program includes:

*Ration analysis
*Feeding conditions and facilities
*Weather
*Projected market price
*Breed
*Projected discounts
*Projected premiums available
*Feeder calf cost
*Overhead costs

The output categorizes the cattle into groups based on a best estimate of profitability. The following is a sample output from a load of steers:

Item	Group 1	Group 2	Group 3
No. in group	42	25	32
Initial backfat (mm)	8.7	5.6	3.4
Initial weight (lbs.)	908	876	815
Initial marbling score	4.2	4.0	4.0
Optimal days on feed	57	98	138
Final backfat (est.)	15.4	14.9	13.6
Final carcass wt (est.)	651	727	781
Final marbling score (est.)	4.9	5.1	5.6
Final wt. (est.)	1060	1164	1238
% Choice (est.)	42.5	52.3	67.9
% CAB (est.)	8.4	10.8	22.6
% Yield grade 4 (est.)	14.7	11.6	10.6
% 950+ carcass wt (est.)	0	0	1.4

This output is particularly useful in identifying cattle in a load, which have a low probability of attaining premium values in the carcass, producing overweight carcasses, producing fat carcasses, or some combination of these traits. The feeder can then feed these cattle to their highest reasonable value (i.e., Group 1), then market them prior to the onset of discount values.

The results are only as accurate as the information provided in the program. It is currently probably not cost effective to scan all cattle, but the procedure could be useful for sorting cattle with little information available or with a high degree of variation.

The Cost of Rough Handling

(Livestock Conservation Institute, 1988)

* **Bruises cost $57 per 100 head of cattle processed in large packing plants.**
* **Two-thirds of all bruises occur during loading and unloading of animals.**
* **A common cause of bruises in cattle is by collision with protruding objects or horns when handled.**
* **More than 50% of all bruises are caused by people handling the cattle inappropriately.**

Contributions to Premium Carcass Values:

1. **Black hide color and preponderance of Angus breeding for Certified Angus Beef specifications, as well as for other labeled beef products.**
2. **Frame size used as predictor of final weight. Feeder grades of L, L+, and LL will often result in cattle that exceed maximum carcass weight with accompanying price discounts.**
3. **Breed will influence carcass values if known with some certainty. However, the breed of any individual animal will not be representative of all like animals because there is as much variation in carcass traits within a breed as there is of carcasses across breeds.**
4. **Yearlings of similar breed, frame, and condition will generally have slightly higher quality grades than calves.**
5. **Cattle from parents selected for high genetic potential for desirable carcass traits will result in higher average carcass values for those traits than unselected cattle.**

Managing For Success:
Facilities

Suggested facility requirements:

1. **Animal handling system. Functional handling systems can be very elaborate or of homemade design. However, the basic design components of a handling system cannot be overlooked. These include proper chute wall construction, chute width, crowding and slide gate construction, headgate and squeeze design, radius of the curved chute, sturdiness of construction, lighting, and site planning. Specifications and designs are provided as an attachment.**
2. **Perimeter fencing. Fencing is needed on the perimeter of the facility to contain animals that have escaped, reduce liability for damage from escaped animals, and prevent entry by unwanted visitors.**
3. **Loading and unloading facilities. Functional loading and unloading facilities will reduce stress on incoming cattle, prevent bruising of finished cattle, and make transportation accessible for several forms of transport. Specific design recommendations are shown as an attachment.**
4. **Sorting Area. A designated sorting area should be available that is accessible to all the holding pens, well lighted, have excellent footing, be free of corners and obstructions, and be easily accessible to sick pens, handling facilities and loading chutes.**
5. **Bunk space. Conventional concrete "J" bunks should provide an average of one linear foot per head. Variations on this requirement include the type of ration (energy-dense, total mixed rations would require less space than high-silage diets) and the number of feedings per day (twice-per-day feeding in a confinement barn would require 6-9 inches of bunk per head).**
6. **Lot space (sq. feet per animal):**
   - **Slatted floor, confinement = 17-22 sq. ft.**
   - **Bedded barn = 30-35 sq. ft.**
   - **Barn with outside lot = 20 sq. ft. inside the barn and 30 sq. ft. in the lot.**

- **Counterslope confinement barn = 30-35 sq. ft.**
- **Outside lot = 300-500 sq. ft.**

7. **Scales. Animal scales are available to weigh inputs and outputs, record animal performance, and measure animal shrink in and out of the lot. They should be placed within the handling facility. Certification will allow sale of animals from the lot.**
8. **Ventilation. Rates per 1000 lb. animal (cubic feet per minute):**
   --Cold weather = 36 cfm
   --Mild weather = 120 cfm
   --Hot weather = 700 cfm
9. **Manure and Pest Management. Steps to insure functional and appropriate manure and pest management:**

- **Calculate appropriate storage requirements and use correct storage design for confinement buildings.**
- **Develop a nutrient management plan with the local Natural Resource Conservation Service representative.**
- **Be aware of local ordinances prior to any new construction.**
- **Dispose of dead animals in legal and appropriate ways.**
- **Use a conservation practice standard (PA393-1) for a grass filter area around open lots.**

Keys to Success:
Animal Performance and Economics (T. M. Peters, 1996)

Item	$ Breakeven/cwt	$ Profit/loss per head
Normal	61.22	0.00
$1.00 higher calf cost	61.88	-7.92
1% lower interest rate	61.00	2.64
3% more in-shrink	61.93	-8.52
1% more out-shrink	61.88	-7.92
1% more death loss	61.65	-5.16
5% feed waste	62.17	-11.40
$.25/bu higher corn price	62.05	-9.84
5% lower feed intake	61.85	-7.56
5% greater feed intake	59.77	17.40
10% greater feed efficiency	58.36	34.42

Managing for Success: Financial Management

Cost discovery. Profit cannot be measured until the cost of production is known. No inputs to the enterprise are free. Home-raised feeds are a cost to the cattle feeding enterprise. Cost can be determined using the farm's checkbook, a Schedule F tax form, and an annual asset inventory. Penn State extension farm management specialists and commercial financial advisors are available to develop a system to determine costs of production on a farm.

Breakeven projections. When costs are known with some accuracy, breakeven projections can be calculated that can forecast profitability under various conditions. Personal software is available for this purpose.

Managing for Success: Risk Management

1. **Custom feeding: The risk of cattle ownership is removed. There is a legal document detailing the feeders' responsibilities. Feeders are paid for their labor, the use of their facilities, and usually for a marked-up value of feed. It is necessary to have scales, feeding equipment, veterinary care, market access, and management expertise that will provide appropriate records and service.**
2. **Homegrown feeds. In the absence of disastrous health problems, cattle will have value added as they gain weight. When the amount and quality of feed is known and on hand, the "cash" risk is reduced in the enterprise.**
3. **Futures and options. Price risk for cattle and commodities can be managed using futures and options when:**

A. There is a thorough knowledge by the feeder of how futures and options markets work.

B. The banker or lender has a thorough knowledge of how futures and options markets work.

C. A broker can be engaged who understands risk management in addition to speculation in futures and options markets.

D. A base price can be established that accurately reflects the difference between futures and live market prices at the location where the cattle are fed.

E. The cost of production is known with a high degree of accuracy.

Live cattle are traded on the Chicago Mercantile Exchange for the months of February, April, June, August, October, and December in 40,000-lb. contracts. Price risk is also managed by hedging feed costs through trading corn futures on the Chicago Board of Trade, and by trading feeder cattle futures on the Mercantile Exchange.

4. Forward contracting. Both a marketing tool and a form of risk management, forward contracting with a market or packer is an agreement to provide specified cattle at some date at some price or range of prices. In order to take full advantage of a forward contract, the price received should include some incentives for exceeding the specified limits of the contract (i.e., number of cattle grading Choice, number of cattle qualifying for CAB, etc.). Inexperienced

cattle feeders should not forward contract the sale of cattle. It is essential to have command of the following factors in order to make forward contracting useful.

A. There are incentives for exceeding the specifications of the cattle for the contract.

B. There is a thorough understanding of the discounts that are imbedded in the contract.

C. There are realistic expectations of the performance of the cattle in reaching the contract specifications.

D. The cost of production is known with a high degree of accuracy.

E. The time and method of animal delivery and payment is clearly understood.

Managing for Success: Marketing

In addition to the risk management tools previously described, there are management factors that can be employed to contribute to higher returns in the market. These factors can generally be categorized as 1) capturing available premiums and 2) eliminating the source of discounts. Premiums may come in several forms, but are generally related to breeds and carcass grades that qualify for labeled beef products and (or) export markets. Communication with markets and packers can help identify potential premium prices. A thorough knowledge of the cost of production is necessary to assess the cost of producing

cattle for some specifications in relation to the premium that may be paid.

Keys to Success:
Elimination of Discounts

Discount	Value	Methods to Control
Select and no-roll - Grades	$2 to $20/cwt	Feeder cattle selection rations Feeding system Animal health Facilities
Heavy carcasses/ Light carcasses	-$10 to $20/cwt	Feeder cattle selection rations
Bruises	-$2 to $4/cwt	Proper handling methods Proper handling equipment Proper truck size and capacity Removal of horns
Dark cutters	-$10 to -$20/cwt	Proper handling methods Complete castration Weather changes
Yellow fat	-$10 to -$15/cwt	Rations Feeding period
Yield grades 4-5	$0 to -$15/cwt	Feeder cattle selection Feeding system Rations Time on feed
Shrink/dressing	approx. $.60/1% shrink Approx. $12/1% change In dressing percentage	Length of transportation Mud Fill Accurate weigh-ups

Marketing on a price grid. Fed beef cattle have usually been marketed based on some "average" value for grade, yield, and weight. Grid pricing is now often employed to place more value on cattle that are better than "average." The following is an example of a pricing grid for finished steers ($1/cwt carcass):

		Quality grade		
		Select and no-rolls	Choice	High Choice and Prime
			Base Values	
Discounts: (additive)		95	106	107
Carcass wt. 500-600 lbs.	(-10)	85	96	97
Carcass wt. 601-949 lbs.	(0)	95	106	107
Carcass wt. 950-up lbs.	(-20)	75	86	87
Yield grade 4-5	(-12)	83	94	95
Dark cutter	(-19)	76	87	88
Yellow	(-15)	80	91	92
Bruise	(-2)	93	104	105

- **Grid pricing implies marketing carcasses on the rail to a packer.**
- **Transportation and marketing costs to the packer must be accounted for.**
- **A reasonable expectation of the performance of the cattle on the rail should be known based on experience, feeding history, and elimination of discounts.**

❖ **A thorough knowledge of the USDA beef grading system is necessary to understand the source of premium and discounts.**

[1]Marketing direct to packers. Direct marketing to packers will usually be based on a carcass price that will employ discounts and premiums found on a pricing grid. Some flexibility in delivery can be negotiated.

Marketing at Auctions. Auctions can provide immediate liquidity through competitive bidding. Buyers of "non-traditional" beef - small butchers and ethnic markets - can be included with major packers. The risk of some carcass discounts passes to the buyer. Pricing may be volatile due to local conditions of supply and demand, and pricing will usually be based on some "average" value with few premiums available.

Keys to Success:
Effective Marketing

1. Plan purchases of cattle and commodities based on a market that is targeted.
2. Fully understand the USDA beef grading system.
3. Know your costs of production.
4. Avoid the "people discounts" of carcass bruises, yellow fat, and heavy or light carcasses.
5. Communicate with several potential markets while the cattle are being fed.
6. Make profitability dictate marketing procedures and not animal weight, grade, or time on feed.
7. Control price risk when costs and animal performance are known with some accuracy.
8. Use feeder cattle selection, rations, and feeding systems to realize available premiums in the market.

Maintain a historical record of cattle source, performance, and carcass values so appropriate markets may be addressed.

Quality Assurance

Producers, packers, meat purveyors, and meat retailers have the responsibility to maintain the safety and wholesomeness of beef provided to consumers. The influence of poor husbandry practices at the farm level can have far-reaching negative consequences to everyone involved in the beef industry. It is of utmost importance that consumers have confidence in selecting beef as a protein food and be assured it will be safe for their families. Beef producers must maintain vigilant standards of husbandry to meet their responsibility. These standards include:

1. **Clean water, adequate and high quality feeds provided, appropriate facility ventilation, and disposal of wastes.**
2. **The use of drugs specifically approved for use in beef cattle.**
3. **Proper methods of drug delivery including injection sites in the neck region, proper needle size, and subcutaneous delivery whenever possible.**
4. **Adhering completely to drug withdrawal standards.**
5. **Using label recommendations on the specific amount of drugs and animal classes when delivered through the feed.**
6. **Proper handling, storage, and disposal of animal drugs.**
7. **Using label recommendations for proper implant use and implanting technique.**
8. **Having adequate and properly maintained animal handling facilities.**
9. **Maintaining and using proper records of drug use and animal handling.**

Reductions in per capita consumption of beef compared to poultry, pork, and fish have diminished because consumers recognize the nutritional value and satisfaction from eating high-quality beef products. It is essential the beef industry continually improve the consistency, value, eating quality, and safety of beef in order to remain competitive in the muscle foods marketplace. Much of the responsibility for that improvement falls on the producer at the farm. High standards of production, management, and husbandry are needed to assure consumers beef will be a satisfying and safe eating experience.