

Organic, Natural and Grass-Fed Beef: Profitability and constraints to Production in the Midwestern U.S.

Nicolas Acevedo¹

John D. Lawrence

Margaret Smith

August, 2006

¹ Acevedo is a graduate student and Lawrence is a professor (jdlaw@iastate.edu) in the Department of Economics and Margaret Smith is member of the Value-added Agriculture Program, Iowa State University.

I. Introduction

Organic and grassfed beef marketers across the U.S. are searching for more supply to fill their potential markets. Iowa State Value-Added Agriculture Extension staff has had an increase in requests from organic beef marketers across the US. These individuals and groups indicate they are unable to source adequate supplies of organically raised cattle to supply their markets. Apparently, there are constraints to entering this market that need to be addressed if these specialty beef markets are to be filled by Midwestern farmers.

There is an assumption that organic beef production is more complex and expensive than the production of conventional beef and, therefore, the cost of converting to organic production would affect the producers' decision. In addition, producers may face problems with the availability of inputs (i.e. organic corn, organic hay and organic soybean meal) for organic production. Finally, some producers may not produce organic beef because they are not prepared to meet USDA requirements for certification. It is possible, though, that some producers find it more attractive to sell natural beef instead of organic beef because production standards are less regulated.

This document is organized as follows: The next section reviews the definitions for natural, organic and grass-fed beef. The third section explores the consumer's willingness to pay for non conventional beef, organic corn and organic hay. The fourth section is an internet exploration of some representative organic, natural and grass-fed producers in the US. In the fifth section, we discuss the costs and challenges that a producer faces when he or she decides to convert from conventional to organic beef production. The last section is a cash flow analysis for the different methods of producing organic beef.

II. Production of beef

Beef producers in the US have increasingly marketed a wide variety of beef products, giving consumers the opportunity of selecting from several kinds of beef products. However, there are essentially four types of beef marketed by US beef producers: conventional, natural, certified organic and grass-fed beef.²

Conventional beef

Conventional beef comes from cattle raised in pastures for the majority of their lives, typically 12 to 18 months, and then fed a grain-based diet for 120 to 200 days prior to harvest. The grain-based "finishing period" is meant to increase the marbling, tenderness and consistency of the final beef product. Producers are allowed to use a wide variety of technologies including fertilizer for pastures and grains, man-made herbicides and parasite control. Also animals may be treated with or fed growth promotants and subtherapeutic antibiotics.

Natural beef

The official USDA definition of natural refers only to meat products and does not refer to the method of raising the beef animals. The definition describes beef products that have been minimally processed and contain no additives, which means no artificial flavors, colors or preservatives. This definition applies to all meat that does not have an ingredient label (a label is

² This section follows the National Cattlemen's Beef Association (<http://www.beefusa.org/theieconomics.aspx>) and the USDA definitions.

added if the product includes a marinade or solution). If there is no ingredient label, it can be assumed as natural.

The USDA definition doesn't mention the production techniques for the natural beef which can be misleading for consumers. Some producers are aware of this and try to explain to consumers the problem that comes from the lack of an official definition on the growing side for the natural beef. For example, the Dakota Beef Company stresses the idea of "no restrictions [for natural beef production] on feed, veterinary care, or growth stimulants. If a natural producer decides to promote the fact that his or her cattle were raised without antibiotics or growth hormones, an additional label is added to the package.³ For the Maverick Ranch, "the natural beef definition allows almost any pure protein to be labeled as 'natural.' While it precludes the addition of chemicals or additives after the animal has been harvested, it does not make reference to raising practices during the life of the animal, such as what the animal was fed or whether antibiotics or pesticides were ever administered."⁴

In general, and through the efforts of ranchers and natural beef marketers, natural beef has come to be defined as raised without antibiotics or growth hormones⁵ and ionophores and implants⁶ are not used in the production process.

Certified organic beef

Certified organic beef must meet USDA National Organic Program standards. The USDA standards were set for all food labeled organic by the Organic Foods Production Act in October 2002,. For beef, this means:

- Organic meat comes from animals that are given no antibiotics or growth hormones. However, if an animal is sick, the animal cannot be denied treatment to ensure its health; any animal that is treated with antibiotics is taken out of the National Organic Program.
- Organic food is produced without using most conventional pesticides; fertilizers made with synthetic ingredients or sewage sludge; bioengineering; or ionizing radiation.
- Cattle must be fed 100 percent organic feed, but may be provided certain vitamin and mineral supplements.
- Organic food is produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations.
- Cattle that meet the national organic standard require ruminants to have access to pasture.
- Before a product can be labeled "organic," a Government-approved certifier inspects the farm where the animal is grown to make sure the farmer is following all the rules necessary to meet USDA organic standards. Companies that handle or process organic food before it gets to your local supermarket or restaurant must also be inspected and certified. Organic beef must be certified through USDA's Agricultural Marketing Service (AMS).

³ <http://www.dakotabeefcompany.com>

⁴ http://www.maverickranch.com/natural_vs_organic.cfm

⁵ Iowa Farmer Today (NW Edition). Natural Beef Sales Grow Faster than Other Beef. October 22, 2005. Page 36.

⁶ For the purpose of this research and to find the cost of production of this brand of beef we will use this definition for natural beef.

Grass-fed beef

The USDA Agricultural Marketing Service (AMS) proposed a definition for grass-fed cattle, for the purpose of meat marketing claims in December, 2002⁷. This proposed standard stated that for producers to make claims that their animals were “grass-fed”, the definition of grass fed would be: “Grass, green or range pasture, or forage shall be 80% or more of the primary energy source throughout the animal’s life cycle.”

This statement suggests that a producer of grass-fed cattle is allowed to use 20% from other sources of energy in any stage of production of meat. Therefore, a producer could feed animals on a daily basis with no more than 20% from other sources of energy or can wait until the finishing period and give the animal a high concentration of grains that will not exceed 20% of the total of energy source of the animal through the animal’s life cycle. So, the decision of how to start feeding the animals will have an impact in the cost and weight gain of the livestock. This proposal was met with generally negative feedback from respondents to the proposal.

As a result of feedback on the 2002 proposed definition, in May, 2006, the USDA AMS solicited comments on a revised standard for a grass (forage) fed marketing claim⁸. The revised proposed Claim and Standard is:

“*Grass (Forage) Fed*----Grass (annual and perennial), forbs (legumes, brassicas), browse, forage, or stockpiled forages, and post-harvest crop residue without separated grain shall be at least 99 percent of the energy source for the lifetime of the ruminant species, with the exception of milk consumed prior to weaning.”

Mineral and vitamin supplementation would also be allowed. Comments were received until August 10, 2006 and a ruling is pending.

The American Grass-fed Association has a different definition for the grass-fed cattle: a) Animals having been, from birth to harvest, fed on grass, legumes and forages and, b) Animals having not been: creep fed as calves, fed for extended periods in confinement, or finished on grains (as grain feeding is what destroys the nutritional benefits of grass-fed products).⁹ For the same reason, any silage fed may not contain grain. Similarly, the National Cattlemen’s Beef Association has defined grass-finished beef as that produced from cattle that grazed in pastures their entire lives.

To date, as a result of the forage-based diet grass-finished animals receive throughout their lives, grass-finished beef grow more slowly than grain-finished and are often marketed before much intramuscular fat or marbling has been deposited. Grass-finished beef typically a leaner product and tends to grade “Select”. However, conventional beef graded “Select” has the same level of leanness as grass-finished beef. Some producers claim that

“Grass-fed animal products have been shown to be higher in beta carotene (Vitamin A), conjugated linoleic acid (CLA), and Omega-3 fatty acids, which some producers claim are important in reducing cholesterol, diabetes, cancer, high blood pressure and other life

⁷ Federal Register Vol. 67, No. 250, December 30th, 2002. Online at: <http://www.csuchico.edu/agr/grassfedbeef/pdf/Product%20Claims.pdf>

⁸ Federal Register Vol. 71, No. 92, May 12, 2006. Online at: <http://www.ams.usda.gov/LSG/stand/ls0509.pdf>

⁹ For the complete letter visit: <http://www.ams.usda.gov/lsg/stand/comments/mc106.htm>

threatening diseases. These products are lower in fat, cholesterol and calories. In addition, the risk of infection by E. coli in these products is virtually eliminated”¹⁰.

A disadvantage for grass-fed meat producers is that animals raised entirely on grass mature more slowly, lengthening the production time for grass-fed products, and the carcass weight is often lower at slaughter.

Grass-fed cattle can be raised organically or naturally. Consumers can recognize organic products by looking for the “USDA Certified Organic” label. They may also find organic beef imported from other countries. “Grateful Harvest Organic” is marketing their product as:

“beef is 91% lean and comes from Uruguay. Getting lots of rain and lots of undeveloped land, grass grows year-round. Cost is lower because it's easier to maintain grass-fed cattle and land is less expensive. Uruguay has some of the most advanced techniques for beef production. They export into 60 countries including Europe and Japan. They have had no case of mad cow disease and the cattle are treated properly.”¹¹

Table 1. Differences among conventional, natural, organic, and grass-fed beef.

	Conventional Beef	Natural Beef	Organic Beef	Grass-fed Beef
Antibiotics (therapeutic) ¹²	Yes	No	No ^{a/}	Optional
Antibiotics (sub therapeutics) ¹³	Optional	No	No	No
Hormones	Yes	No	No	No
Ionophores ¹⁴	Yes	No	No	No
Pesticides	Yes	Optional	No	Optional
Vaccinations	Yes	Yes	Yes	Yes
Feedlots (grain)	Yes	Yes	Optional ^{b/}	No
Certified Organic ¹⁵	No	No	Yes	Optional

¹⁰ <http://www.americangrassfed.org/AGA%20FAQs.htm>. On the other hand, The University of California has a website specialized in the benefits of grass-fed cattle on human health. The information can be found at: <http://www.csuchico.edu/agr/grassfedbeef/health-benefits/index.html>

¹¹ <http://www.albertsorganics.com/NewsDetail.asp?NewsID=22>

¹² When no therapeutic antibiotics are used there would be expected to be an increase in the death loss and in the animal morbidity (animals that are sick but not dead).

¹³ Sub therapeutics are routinely fed to reduce the threat of a disease outbreak and to enhance growth rate and feed efficiency. Therapeutics treat, control and prevent disease. The use of sub-therapeutic antibiotics and growth hormones increases the average daily weight gain in cattle. When no growth hormones are used a producers will have to use more feed to ensure that the ideal weight is reached. This means less efficiency because it is needed more feed per pound gain on the cattle. At the same time there is slower animal growth, which leads to fewer number of animals per field per production period or more days on feed for the animal to reach the desired weight.

¹⁴ With high-grain diets, ionophores generally decrease feed intake, improve feed conversion, maintain or increase daily gain, and do not affect carcass characteristics. When cattle in confinement (feedlot) are fed diets containing large proportions of roughage, ionophores improve daily gain and feed conversion. Feed intakes of animals fed high-roughage diets do not change if the proper level of ionophore is fed. (Source: <http://www.ansci.cornell.edu/beef/bcc/bcc0303.html>)

¹⁵ The Organic Food Production Act (OFPA) requires anyone that produce or handle agricultural products that are intended to be sold, labeled, or represented as "100 percent organic," "organic," or "made with organic ingredients"

^{a/} It is possible that an organic beef producer use antibiotics in a therapeutic way. If so, that animal will be marketed as conventional.

^{b/} Some organic producers don't confine animals in feedlots, they, instead, provide organic grain to their cattle on the field. In contrast, Organic grass-fed beef must be fed with pastures and hay and no grains.

III. Consumer's willingness to pay

Consumers of organic beef are willing to pay a premium for non-conventional meat.¹⁶ At the same time, organic producers will have to pay more for some production inputs used in the cattle business (i.e. organic corn and hay) and the production process takes more time and more total feed inputs per pound of carcass beef. This section explores these topics.

Final consumers

Because of the wide variety of beef products available and their definitions, finding the consumer's willingness to pay for organic and natural beef had become an important goal for researchers in recent years. This is important because the premium that consumers are willing to pay for organic or natural beef has a significant impact on the profit of organic and natural beef operations. However, it is difficult to examine the price premium consumers are willing to pay when there is uncertainty among consumers about the differences between organic and natural beef.

It is likely that consumer confusion about natural and organic beef has been influenced by the way that producers market their beef. Boland (2002) and Lautaro (2003) have found that "the way in which companies align their marketing program to the 'natural definition' varies in the United States" and therefore consumers could be confused when buying natural and/or organic beef.

The department of Agricultural Economics of the Kansas State University conducted a survey in 2002 with the objective to "learn more about how managers view Nature's Premium All Natural beef products". The results indicated that consumers are somewhat informed about how meat is raised and processed. The results of the survey were encouraging, because consumer's overall impression of All Natural Beef franks was positive (taste and texture). Unfortunately, no prices for the All Natural Beef were provided in that research¹⁷.

Surveys have been conducted in recent years to find the willingness to pay a premium for natural beef. Grannis and Thilmay (2000) found that of the 1,400 survey respondents, 38 percent were willing to pay \$5.49/lb (10% price premium) for natural steak and 14 percent were willing to pay \$5.99/lb (20 percent price premium). At \$1.89/lb (12% price premium), 67 percent would buy natural ground round, and 29 percent were still willing to buy natural ground round at \$2.09/lb (23% price premium),

or food group(s) to be certified. According to Fundamentals of Organic Agriculture (Iowa State University, May 2003, Page 13), the certification fee per acre in 1999 was \$15.

¹⁶ An interesting paper called "Economic Issues with Natural and Organic Beef" was published by the Agricultural Research Marketing Center (Department of Agricultural Economics of Kansas State University) in August, 2002. To download this paper visit: <http://www.agmrc.org/NR/rdonlyres/3AF0E192-32EC-41B6-8384-B0588B795475/0/ksueconbeef.pdf>.

¹⁷ For all the studies on natural beef of the Agricultural Marketing Resource Center of the Kansas State University visit <http://www.agmrc.org/agmrc/commodity/livestock/beef/beef+natural.htm>.

Organic corn and soybean meal

The organic beef production requires feed raised according to organic standards. Organic markets demand that organically-grown corn and soybeans be seeded, grown, harvested, and handled without synthetic fertilizers or synthetic pesticides. For weed management, farmers must rely on crop rotation, tillage, cultivation and, in some cases, hand weeding. In organic grain production systems, these practices tend to increase machinery and labor costs, whereas fertilizer and pesticide costs are less than for conventional production.

Organic corn and soybean markets are not well developed in the US. For this reason, organic markets are volatile, with periods of high demand and short supply for some crops and periods of high supply and slow demand for others. This implies that the price of this input exhibits a high standard deviation throughout time. These wide swings in prices and product availability creates a disadvantage for cost budgeting and is a source of risk in organic beef production.

Corn

Based on information from organic corn producers in Iowa, we found that buyers were paying 1.6 times more for organic corn than conventional corn in late 2005, about \$5.46/bushel. Prices have moderated somewhat since that time, with prices about \$5.00/bu in fall, 2006.

Soybean meal

The organic soybean meal market has similar behaviors to the organic corn market. Price fluctuates considerably and its availability can vary from year to year. For our calculations we have assumed a price of \$604.5/ton for soybean meal (48% protein), a premium of 2.1 times the regular soybean meal price.¹⁸

Organic grass and hay

Forage grass, legume and forb species provide pasture and hay for livestock during most of the year. Pasture costs can vary greatly across regions and farms within regions due to land costs, productivity, and management practices. In this research, we estimate the cost of organic production of orchardgrass – legume pastures. Annual cost per acre of organic grass-legume pasture is \$113.69 (Table 2.) and, assuming a productivity of 3 tons/A of dry matter, 19 cents/lb of harvested forage. As budgeted, the organic cost per acre and ton is less than conventional pasture in which fertilizer and pesticides are used. This assumes that the organic producer must be able to maintain productivity without commercial chemicals or fertilizers. We do not model the entire farming system to determine if that is feasible. It is important to note that organic feed is grown and processed without the use of synthetic chemicals, fertilizers or pesticides for at least three years prior to the harvest of the crop. Also, the land must be certificated organic.

Producers can replace chemicals, fertilizers, and pesticides with some organic fertilizers and organic pesticides. When a producer stops using fertilizers and does not rotate crops, he/she observes a decrease in the amount of grass and corn produced and an increase in the cost of managing weeds. Organic producers can select from available weed management strategies, including mowing, managed grazing, the use of other ruminant species, and hand weeding. Adapting a variety of grazing strategies can reduce the cost of meat production and allow producers to have enough pastures to produce hay for winter seasons. At the same time, when

¹⁸ These premiums come from interviews with cattle producers during fall of 2005.

animals harvest their own feed in a well-managed rotational grazing system of management intensive grazing (MIG) feed costs decline and animal health tends to improve. For the purpose of our budget scenarios (Table 2) we have assumed well-managed pastures for fall, spring, and summer.¹⁹ We also assumed that the grass yields for the organic and conventional method are the same, after including legumes in the organic pastures.²⁰

The use of cool season grasses requires cattle producers to have winter feed options for a pasture-based organic system (i.e. organic hay, haylage, or silage). Organic hay can be produced on the farm but requires good drying conditions to produce high quality hay. Alternatively, high quality organic hay can be bought at market with prices fluctuating from \$80 to \$125 per ton. These prices mean that some organic hay growers are getting 10-30% premium over the conventional hay price. The supply of organic hay varies from season to season and can be another source of risk for organic beef producers. Some organic hay suppliers can be found in Table 3.

Table 2. Annual cost per acre of maintaining improved grass pastures

	Conventional method (chemicals used)				Organic method (chemicals free)				
	Units	Cost/unit	Fixed	Variable	Units	Cost/unit	Fixed	Variable	
1. Machinery									
Spreading Fertilizer			\$1.52	\$0.98			\$1.52	\$0.98	
Clipping weeds			\$2.74	\$2.29			\$3.56	\$2.98	
Total machinery Costs			\$4.26	\$3.27			\$5.08	\$3.96	
2. Soil Fertility									
One third of legume seeds cost	3 lb	\$1.80		\$5.40	3 lb	\$1.80		\$5.40	
Phosphate	30 lb	\$0.33		\$9.90				\$0.00	
Nitrate		\$0.00		\$0.00		\$0.00		\$0.00	
Potash	40 lb	\$0.18		\$7.20				\$0.00	
Lime (yearly cost)			\$6.00				\$0.00		
Total Fertilizer and Herbicide			\$6.00	\$22.50			\$0.00	\$5.40	
3. Labor									
Growing practices	0.5 hr	\$9.50	\$4.75		0.5 hr	\$9.50	\$4.75		
Fence Maintenance	1 hr	\$9.50	\$9.50		1 hr	\$9.50	\$9.50		
Total Labor			\$14.25				\$14.25		
4. Land Charge									
Cash rent equivalent			\$70.00				\$70.00		
Organic certification cost			\$0.00				\$15.00		
Total Annual Cost per Acre			\$94.51	\$25.77			\$104.33	\$9.36	
Total annual cost per acre				\$120.28	Total annual cost per acre				\$113.69
Productivity per year DM (lb/acre)				6,000	Productivity per year DM (lb/acre)				6,000
Grass price DM (\$/lb)				\$ 0.020	Grass price DM (\$/lb)				\$ 0.019

¹⁹ The National Sustainable Agriculture Information Center has an interesting website with information about this topic at: <http://www.attra.org/attra-pub/rotategr.html>.

²⁰ This might not be the case for some producers. However, and based on some interviews with experts and ranchers, it seems to be an improvement on productivity in those pastures used in the organic beef enterprise.

Table 3. World Wide Web pages for organic hay buyers and sellers.

Internet Address	Description
http://www.haybarn.com/	The Hay Barn is a classified ad site for hay, hay equipment, and haying services. Using the links to your left, you can locate buyers and sellers in your area or across the globe.
http://www.farmclassifieds.com/	FarmClassifieds.com is a division of MOVIA Media of Alberta, Canada and is part of a large Farm related web community. They strive to provide the most farm related information presented in a highly professional and accessible way.
http://www.hayexchange.com/	This webpage contains a list of hay sellers and buyers by state.
http://www.newfarm.org/	The Institute works with people worldwide to achieve a regenerative food system that renews and improves environmental and human health, working with the philosophy that "Healthy Soil = Healthy Food = Healthy People ®."

IV. Webpage exploration

To analyze how beef producers sell their products, we have taken information from the web pages of several organic and natural beef producers in the US. These producers are listed in Table 4, with a description of their meat production and their web page address.

Table 4. Natural, organic and grass-fed beef producers and marketers.

Natural beef		
Producer's name	Type of beef sold	Internet address
Coleman	They produce natural beef, bison, chicken, pork, lamb and sausage. The cattle are never fed or administered antibiotics, are always 100% vegetarian fed, with no animal by-products or animal fats and they are raised with no added hormones.	http://www.colemannatural.com/
Laura's	Their cattle are raised on family farms, on all natural grains and grasses with no animal by-products, without the use of antibiotics or growth hormones.	http://www.lauraslcanbeef.com/
Painted Hills	They produce natural beef. They use no added growth hormones and no antibiotics. They never feed their cattle any animal by-products.	http://www.natural-beef.com/
Harris Ranch	Harris Ranch Natural Beef is minimally processed and contains no artificial ingredients.	http://www.harrisranchbeef.com/
Niman Ranch	They produce natural beef pork and lamb. They never use growth-promoting antibiotics or hormones and they never feed their cattle meat.	http://www.nimanranch.com/
Meyer Natural Angus	They produce natural Angus. Their cattle are raised on a strict all-vegetarian diet and are never administered antibiotics or growth hormones commonly used to promote faster weight gain.	http://www.meyerbeef.com/
Creekstone Farms	Their Natural Black Angus Beef is USDA Certified, raised without supplemental hormones and without antibiotics, raised on a 100% vegetarian diet, minimally processed with no artificial ingredients, source of cattle verified, random residue testing for antibiotics, and guaranteed tender.	http://www.creekstonefarmspremiumbeef.com/
Oregon Country Natural Beef	Country Natural Beef / Oregon Country Beef has chosen to raise their cattle the "old fashioned way" - without the use of hormones, antibiotics, or any animal by-products.	http://www.oregoncountrybeef.com/
Montana Range Beef	They produce natural beef using Piedmontese cattle, which are naturally lower in fat and cholesterol, and have been an important part of Italy's gourmet beef industry for over a century.	http://www.montanarange.com/
Van Wie Natural Food	Their natural meat includes: pork, beef, free range chicken and turkey, lamb, seafood, pheasant, duck, rabbit, goat, and buffalo.	http://www.vanwiennaturalmeats.com
North Star Neighbors	They produce naturally raised beef, pork, lamb, chicken, goat, turkey, and eggs.	http://www.northstarneighbors.com/
Wolfe's Neck Farm	Natural raised beef, USDA inspected and graded 100% choice and higher, fed a purely vegetarian diet, raised with the highest attention to taste, texture and marbling, produced by family farms that are committed to sustainable agriculture.	http://www.wolfesneckfarm.org/

Organic beef		
Producer's name	Type of beef sold	Internet address
Dakota Beef Company	They only sell certified organic beef products. Their cattle are never administered antibiotics or growth-promoting hormones, and are fed a strict vegetarian diet that never contains any animal by-products.	http://www.dakotabeefcompany.com/
Organic Valley	They are an independent cooperative of family farms that produce organic soy, milk and cream, milk powders, butter, cottage cheese, sour cream, cheese, juice, eggs, and meat (beef and pork).	http://www.organicvalley.coop/
Natural and Organic beef		
Producer's name	Type of beef sold	Internet address
Maverick	They produce organic and natural beef, and natural pork, buffalo and lamb. Their meat that is free of antibiotics, growth hormones, and pesticides.	http://www.maverickranch.com/
Organic Grass-Fed beef		
Producer's name	Type of beef sold	Internet address
Genesee Valley Organic Beef	All of their land and animals follow strict guidelines developed by the USDA National Organic Program. Cattle graze on USDA Certified Organic pastures in the Sierras while drinking crystal clear mountain stream water.	http://www.geneseevalleyorganicbeef.com/
Mesquite Organic Foods	Their cattle are raised in open pastures and are never fattened in feed lots. They eat 100% grass, not GMO (Genetically Modified Organisms) feed, and are never contaminated with hormones, antibiotics, pesticides or chemicals of any kind.	http://www.mesquiteorganicbeef.com/
Natural Grass-Fed beef		
Producer's name	Type of beef sold	Internet address
Thousand Hills Cattle Company	Their cattle are locally raised on small family farms in Minnesota and northeast Iowa, and processed at a state-of-the-art USDA inspected facility in Cannon Falls, MN. They are committed to making healthy, 100% grass-fed beef convenient for busy families.	http://www.thousandhillscattleco.com
Tallgrass Beef	Tallgrass is raising cattle that roam freely in open pastures and eat lush, hearty, natural grasses. Their animals eat no grains, and are fed no unnatural supplements, growth hormones, or antibiotics. Because animals spend their lives in open pastures, they are never confined to stressful feedlots or unnatural environments.	http://www.tallgrassbeef.com/
Western Grasslands Beef	Their cattle are raised by family ranchers on pasture through virtually their entire lives. They never feed animal byproducts or any artificial feeds including grain-based supplements and feeds. The cattle are grown without the use of synthetic chemicals, including artificial growth-enhancing hormones or sub-therapeutic antibiotics.	http://www.westerngrasslands.com/

Twin Creek Ranch	Twin Creek Ranch cattle roam free on ecologically sound rangeland and are never in a feedlot. They have a Grass-finished double-aged beef production.	http://www.twincreekranch.com/
James Ranch	Their beef is 100% grass fed and finished - no grain or feedlots. The beef marketed to consumers are grown naturally and receive no hormones or antibiotics.	http://www.jamesranch.net/

Two observations from this set of beef marketers: a) most of the natural and organic beef producers have a diversified operation that include another kind of meat production and b) some are cooperatives of farming/ranching operations with the objective of marketing their products.

In addition, we have constructed Table 5 to show some of the main characteristics of selected producer's. One interesting conclusion from this analysis is that producers focus their market strategy on characteristics of their products that are not stated in the USDA definitions for either organic or natural beef. In general there are two trends among producers:

1. **Natural beef producers often exceed USDA guidelines for natural of beef.** These producers often claim that they sell a kind of beef that is not completely organic but exceeds the natural category. Also, producers distinguish their product through numerous characteristics, the two that were the most recurrent a) letting the consumers know that they take care of animals on humane farms²¹, b) communicating that they follow a strict protocol for producing the beef that they market.²² It is important to note that all of the producers analyzed claim that they grow animals without the use of hormones and antibiotics, and they don't feed animal byproducts.
2. **Organic beef producers often surpass the USDA standards for the production of organic beef.** These producers know the importance of letting the public know that there is a significant difference between organic food and natural food, so, they focus their marketing strategy on educating consumers on the real meaning of organic food and encouraging new consumers to start buying their products.

Finally, two of the producers studied (Meyer Beef and Oregon Country Beef) have information on how the grass is produced and how the animals are fed over the winter season. This aspect becomes one of the most important issues when conventional producers are planning to switch from conventional beef production to organic. In addition, Maverick Ranch Natural Meats is the only producer from the sample that produces organic and natural beef on their farms; its web page makes the difference between these two kinds of beef production clear to visitors.

²¹ A good example of this type of producer the "Certified Humane Raised and Handled" label that now appears on Meyer Natural Angus.

²² Laura's Lean Beef's webpage contains a great deal of information regarding the protocols that they follow to offer their consumers an excellent product.

Table 5. Beef production characteristics for selected producers.

Criteria	Coleman	Laura's	Maverick	Organic Valley	Painted Hills	Harris Ranch	Niman Ranch	Meyer Natural Angus	Oregon Country Beef	Montana Range Beef	Wolfe's Neck Farm	North Star Neighbors	Van Wie Natural Food
1.1. and 1.2. for Natural production (Appropriate policy for the approval or denial of labeling for meat products and poultry products bearing the term "natural." (Labeling Natural Directive 7220-1, Policy Memo 055).)													
1.1. The product does not contain any artificial flavor or flavoring, coloring ingredient, or chemical preservative (as defined in 21 CFR 101.22), or any other artificial or synthetic ingredient.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.2. The product and its ingredients are not more than minimally processed.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.1. - 2.3. Describe Organic production (This national program will facilitate domestic and international marketing of fresh and processed food that is organically produced and assure consumers that such products meet consistent, uniform standards.)													
2.1. Organic food is produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations.	No Stated	Yes	Yes	Yes	No Stated	No Stated	Yes	No Stated	Yes *	Yes	Yes *	Yes	No Stated
2.2. Organic meat comes from animals that are given no antibiotics or growth hormones.	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes *	Yes	Yes	Yes
2.3. Organic food is produced without using most conventional pesticides; fertilizers made with synthetic ingredients or sewage sludge; bioengineering; or ionizing radiation.	No Stated	Yes *	Yes	Yes	No Stated	No Stated	Yes	Yes	Yes	No Stated	Yes	Yes	No Stated
3.1. - 3.5. Describe additional characteristics founded in the web page of those meat producers studied.													
3.1. Raising animals from birth in a humane manner, following good animal husbandry practices.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.2. Laboratory Testing	No Stated	Yes	Yes	Yes	Yes	No Stated	No Stated	No Stated	No Stated	No Stated	No Stated	No Stated	No Stated
3.3. Protocol	No Stated	Yes *	No Stated	Yes	Yes	No Stated	Yes*	No	Yes	No	Yes	Yes	No
3.4. Humane Farm Animal Care's seal	No	No	No	No	No	No	Yes	Yes *	No	No	No	No	No
3.5. Educational Program	No	No	No	Yes	No	No	No	No	No	No	Yes *	Yes *	No

* Indicates the best example of specific characteristic on webpage.

V. Cost of beef production

In this analysis we define five production systems: Conventional, Natural Grain-fed, Natural Grass-fed, Organic Grain-fed, and Organic Grass-fed. The two grass-fed systems assume small frame cattle that are recommended for grass-finishing and, thus, have smaller cows to feed, a smaller calf weaned, and a smaller animal sold for slaughter. The three grain fed systems assume medium frame cattle with similar sized cows and calves weaned. In addition the Conventional system uses growth promotants and have a higher slaughter weights to reach the same degree of marbling as in the Natural and Organic grain-fed systems.

Estimated calf costs assume a spring born calf with a November 1 weaning date (Table 6.). The small framed calves are estimated to have lower cost per head than their grain-finished counterparts due to the smaller cow to maintain, but the cost per pound of calf are similar. The Conventional system has the lowest per pound calf cost. This result should not be surprising as the objective of the Conventional commodity system is to use products to lower the cost of production.

To predict the daily gain of growing animals, the Cornell Net Carbohydrate and Protein System model (CNCPS) and seasonal availability of grass were used²³. This model allowed us to simulate the growth pattern of cattle when they have and have not been implanted or fed ionophores. It is a consistent methodology for predicting animal performance across systems. The method of cost analysis is as follows:

Table 6. Estimated Cost of Calf Production for Organic, Natural, and Conventional Systems

	Organic		Natural		Conventional
	Grass-fed	Grain	Grass-fed	Grain	Grain
Feed cost	\$333	\$392	\$294	\$354	\$323
Non-feed Variable	\$126	\$126	\$126	\$126	\$143
Fixed cost	\$148	\$148	\$148	\$148	\$148
Total cost	\$606	\$665	\$567	\$627	\$614
Calf weight, lbs	425	475	425	475	475
Calf cost \$/lb	\$1.43	\$1.40	\$1.33	\$1.32	\$1.29

Input and output prices are based on the Food and Agricultural Policy Research Institute (FAPRI) long-run projections for grain and livestock prices. These forecast prices are the average for 2005-2011 and are modeled to incorporate current U.S. farm policy and historic price cycles and reflect the price relationship between commodities. The prices used in this analysis are shown in Table 7 and reflect the opportunity cost of production, as the input prices are based on market prices.

Table 7. Long-term Feed and Cattle Prices and Organic Premiums used in Analysis

²³ “The Cornell Net Carbohydrate and Protein System model (CNCPS) was developed to predict requirements, feed utilization and nutrient excretion for dairy and beef cattle in unique production settings. This model integrates our knowledge of cattle requirements as influenced by breed type and body size, production level and environment with our knowledge about feed composition, digestion and metabolism in supplying nutrients to meet requirements.” The complete manual for Version 5.0 can be download at: <http://www.cncps.cornell.edu/downloads.htm>.

Production Inputs	Conventional	Organic premium	Organic
Corn grain (\$/bu)	\$2.25	160%	\$5.85
Corn silage -- 50% grain (\$/Ton)	\$20.25	160%	\$52.65
Soybean meal -- 48% protein (\$/Ton)	\$195.00	210%	\$604.50
Orchardgrass & Alfalfa Hay (\$/Ton)	\$100.00	20%	\$120.00
Choice Steers and Heifers (\$/cwt)	\$79.32	54%	\$122.15
Choice Natural Steers and Heifers (\$/cwt)	\$85.62		
Natural Grass-fed Steers and Heifers (\$/cwt)	\$122.00	73%	\$137.25

We assumed that the calves are weaned November 1. Temperatures for Ames, Iowa for 1951-2005 provided by Iowa Environmental Mesonet²⁴ were used in the model simulation. The three grain-fed systems put the calves in the drylot and began a growing program using corn, corn silage, corn gluten feed, hay and supplement. The two grass-fed systems wean the calves on winter grazing with supplemental hay as needed plus a vitamin-mineral supplement. A summary of the estimated feed intake for the five systems indicates that feed intake per head is similar across the three grain-fed systems (Table 8). The organic grain-fed system uses more silage, hay and supplement, but less corn and no corn gluten feed compared with the natural and conventional systems. Because corn gluten feed is relatively high in protein, less supplement is needed in systems feeding it. The grass-fed systems use only pasture and hay and a salt and trace mineral supplement, but no corn or corn silage in this analysis.

Table 8. Estimated Feed Intake for Growing and Finishing Cattle per Head by Production System.

	Organic		Natural		Conventional
	Grass-fed	Grain-fed	Grass-fed	Grain-fed	Grain-fed
Winter grazing days	166		166		
Summer grazing days	200		200		
Hay, lbs	1,525	945	1,540	746	739
Corn silage, lbs		1,905		1,675	1,780
Corn grain, bu		73.3		74.8	79.1
Corn gluten feed, lbs				1,565	1,555
Supplement, lbs*	27	645	27	160	160

* Grass-fed supplement is salt and vitamins and mineral. Grain-fed supplement includes protein.

The production systems were simulated using CNCPS, predicting feed intake and animal performance (Table 9). Animal in the three grain-fed systems are assumed to have the same genetic potential and frame size and weaning weight. The Natural and Organic Grain-fed systems also had identical performance, final weight and dressing percentage as neither used growth promotants or ionophors. The difference is that Organic must use organic feed, whereas Natural can use conventional feeds including corn gluten feed. The Organic and Natural Grass-fed systems are also identical except that the pasture and hay must be certified organic in the organic system.

²⁴ For more information please visit: <http://mesonet.agron.iastate.edu/COOP/>.

The difference across the systems is revealed in Table 9 when comparing days on feed (wean to slaughter), average daily gain, feed:gain, final weight and carcass weight. The grass-fed system does not have as high a percentage of animals grading Choice as the grain-fed systems. In addition, because they have leaner carcasses with less external fat, the grass-fed cattle have a lower dressing percentage than those that are grain-fed. The three grain-fed systems are modeled to reach the same degree of marbling (i.e., same percent Choice) and the same dressing percentage. The higher weight for the Conventional system is due to the growth promotants that result in a heavier final weight to reach the same degree of marbling as non-implanted cattle. The Conventional system cattle also gain faster and more efficiently than the Natural and Organic system cattle because of the use of implants and ionophores.

Table 9. Estimated Production Performance by System for Spring Born Calves Weaned November 1.

	Organic		Natural		Conventional
	Grass-fed	Grain-fed	Grass-fed	Grain-fed	Grain-fed
Starting weight, lbs	425	475	425	475	475
Days on feed	366	329	366	329	303
Post weaning ADG	1.65	2.36	1.65	2.36	3.06
Feed:Gain, dry matter	10.99	7.06	10.99	7.12	6.22
Marketing date	2-Nov	26-Aug	2-Nov	26-Aug	31-Jul
Final weight, lbs	1,029	1,252	1,029	1,251	1,401
Dressing percent	61%	63%	61%	63%	63%
Carcass weight, lbs	623	783	623	782	876

The results of our budget analysis are divided into variable costs, fixed costs and income for each system (Table 10). All five systems assume retained ownership, with calves finished on the same farm as the cow herd. In addition, the cost of production for feeder cattle was transferred to this finishing budget. Fixed costs are a combination of the results of our feed cost simulation and other variable costs. The selling prices are the long-run forecast from FAPRI. Finally, we based our expected carcass premiums for natural, organic, and grass fed on interviews with producers in November of 2005. In summary, the budget results illustrate:

- Grass-fed costs are similar for Organic and Natural production systems, but the selling price and profits are higher for Organic over Natural. The Natural Grass-fed has less weight to sell, but only a modest premium.
- Grass-fed Organic has lower cost than Grain-fed Organic in part due to smaller calf and lower feed bill. However, the Grain-fed Organic was more profitable than Grass-fed Organic because it sold more carcass pounds, albeit, at a lower price.
- Natural grain-fed had much lower cost per head than Natural grass-fed, sold more pounds at a lower price, but was still more profitable than Natural Grass-fed.
- The Conventional system had lower cost per head than all systems except the Natural Grain-fed, but had the heaviest carcass resulting in the lowest cost per pound sold, making it the most profitable system considered on a dollars per head basis.

The carcass selling prices needed for the systems to breakeven ranged from \$1.18/lb for the Conventional system to \$2.22/lb for the Natural grass-fed system (Table 10). For this budget analysis, we used a forecast of long-run market prices for inputs and outputs to reflect the opportunity cost of the resources used to produce beef in the systems analyzed. We did hold some inputs constant across the systems. For example, land and labor are valued at the same price per unit. One of the reasons for the Organic grain-fed system being less profitable than the Conventional or Natural systems is that the corn, corn silage, and hay are valued at the organic market value the producer would receive for these inputs if they were sold. Thus, the organic farm may be more profitable than the conventional farm, but the organic beef enterprise was not as profitable as the conventional enterprise. The grass-fed systems had relatively high opportunity cost of hay for winter feeding because FAPRI forecast hay prices at \$100 per ton.

Sensitivity Analysis

The budget analysis (Table 10.) reflects a specific set of price and production assumptions. The production process is modeled and has a level of risk associated with animal performance. The production risk associated with feed efficiencies and market weights is important and should be considered by producers when comparing these systems. Price risk often has a larger profit impact than production risk and is largely beyond the producer's control. Table 11. illustrates the impact of 10% increase and decrease in the price of pasture, corn and carcass beef on the per head life-time profits for each of the five systems. The price premiums for organic feeds and cattle and natural cattle prices are calculated on a percentage basis in this exercise rather than a fixed amount. Thus, a 10% change in the commodity price has a larger than 10% change in the organic price by how it is modeled.

Table 10. Estimated cost of producing organic, natural and conventional steers

	Organic		Natural		Conventional
	Grass-fed	Grain-fed	Grass-fed	Grain-fed	Grain-fed
1. Variable cost					
Feeder weight (lb)	425	475	425	475	475
Feeder cattle cost of production (lb)	1.43	1.40	1.33	1.32	1.29
Total feeder cost	\$606	\$665	\$567	\$627	\$614
Days post weaning	366	329	366	329	303
Total Feed costs	610	697	664	269	294
Interest on feeder	49.32	48.62	46.13	45.86	41.32
Interest on feed	24.81	25.50	27.01	9.83	9.90
Veterinary and health	3.00	3.00	3.00	3.00	15.00
Machinery and equipment	10.50	7.00	10.50	7.00	7.00
Marketing and miscellaneous	16.00	16.00	16.00	16.00	16.00
Other costs	3.89	2.59	2.59	2.59	2.59
Labor	<u>20.59</u>	<u>18.51</u>	<u>20.59</u>	<u>18.51</u>	<u>17.04</u>
Total Other Variable Costs	103.29	95.72	98.81	92.95	98.95
Total Variable Costs	\$1,345	\$1,484	\$1,357	\$999	\$1,017

2. Fixed cost					
Machinery, equipment, housing	22.88	20.56	22.88	20.56	18.94
Total all Costs	\$1,367	\$1,504	\$1,380	\$1,019	\$1,036
3. Income					
Expected slaughter weight (lb)	1029	1252	1029	1251	1401
Minus death loss	0.75%	0.75%	0.75%	0.75%	0.75%
Steers dressing percentage	61%	63%	61%	63%	63%
Carcass weight	623	783	623	782	876
Expected carcass price (\$/lb)	\$2.18	\$1.94	\$1.94	\$1.36	\$1.26
Gross Income	\$1,358	\$1,516	\$1,207	\$1,063	\$1,103
Lifetime profit per head	-\$10	\$12	-\$173	\$44	\$67
Price needed to cover total costs	\$2.20	\$1.92	\$2.22	\$1.30	\$1.18

1/ From cow-calf budget for production system

2/ Prices are an average of 2005 and FAPRI forecast for 2006-2011

Note that corn silage price is tied directly to the price of corn. Likewise, organic corn, corn silage, and hay prices are tied directly to the price of the conventional commodity in this example. Thus, a 10% increase in the price of conventional corn has a larger per bushel impact on the organic system because it is assumed that the percentage organic premium is maintained. Not surprising, the grass-fed systems are more susceptible to changes in pasture cost than grain-fed systems; although pasture cost do impact the cost of calf production. The grain-fed systems are at greater risk to changes in corn prices. There was little differential impact due to changes in hay prices. However, the largest profit risk comes from changes in cattle prices. The magnitude of the impact is due to the base price and the pounds sold. Organic grain-fed has a larger impact than Organic grass-fed because it is selling more pounds. Organic grass-fed has a larger impact than Natural grass-fed because it is higher priced and a 10% change in price is larger.

Table 11. Changes in per head life-time profit due to 10% changes in prices of pasture, corn, and beef.

	Organic		Natural		Conventional
	Grass-fed	Grain-fed	Grass-fed	Grain-fed	Grain-fed
Base Profit	-10	12	-173	44	67
Pasture Costs					
-10%	\$64	\$8	\$68	\$8	\$8
10%	-\$64	-\$8	-\$68	-\$8	-\$8
Corn Price					
-10%	\$0	\$55	\$0	\$25	\$22
10%	\$0	-\$55	\$0	-\$25	-\$22
Cattle Price					
-10%	-\$258	-\$288	-\$229	-\$108	-\$110
10%	\$285	\$318	\$253	\$104	\$110
Hay Price					
-10%	\$28	\$27	\$31	\$26	\$26
10%	-\$28	-\$27	-\$31	-\$26	-\$26

In general, a 10% increase and decrease have similar results, but in opposite directions. An important question to consider when evaluating risk is: what is the probability of such a price change? Conventional corn and beef markets are well established and quite volatile. For the 15 years, 1990-2004, the standard deviation of annual corn price and Choice carcass price was 22.8% and 9.8%, respectively. The organic and natural markets for beef are relatively new and not well tested. Several packers and/or retailers are establishing “natural” programs whose prices are relatively fixed premium to the conventional market. Although it is evolving, much of the organic and grass-fed market prices are either constant or change only occasionally. Thus, niche markets that are able to offer more stable selling prices reduce a significant risk for producers. This is important because grass-fed beef producers may not have the flexibility to change marketing dates as grain-fed beef producers do to help manage risk.

Becoming an organic beef producer - Cash flow methodology

The budget methodology discussed above uses opportunity costs to address the question of profitability, but it has two short-comings that producers must address before changing production systems. First, using market prices may not reflect the actual short-term cash position of the farmer who may produce the inputs on the farm rather than buying them at market prices. Second, it doesn't account for extra costs and the timing of costs and returns derived from the conversion process to organic, which becomes an important production restriction for producers.

To address these questions, we analyze the cash flow for a producer who converts from the conventional system to the organic system. Figure 1 depicts the decision tree of a conventional beef producer considering a change from conventional to organic. This conversion requires the producer to use land that is certified organic, that is to say that land must be free of manufactured fertilizers and pesticides for at least three years. It is also important to note the importance of managing grass, especially for the organic grass-fed production process.

Five different cash flows were constructed to illustrate the return to management. One is the conventional method, two organic systems (grass-fed and grain-fed) are the result of a producer converting slowly from conventional to organic beef production, and the two remaining (grass-fed and grain-fed) convert to organic using Conservation Reserve Program (CRP)²⁵ acres that can be certified organic more quickly if has not had manufactured chemicals used on the land. Cattle prices for the five different cash flows are depicted in Figure 2. Figure 3 reflects the annual cash flow for the five systems over seven years. In addition to the annual cash flow, the net present value (NPV)²⁶ for each scenario was calculated using a discount rate of 4.5% per annum. A positive NPV means that the enterprise will pay the stated rate for resources used, the discount rate on equity, and return the stated amount expressed in current dollars. The larger the NPV, the better the return.

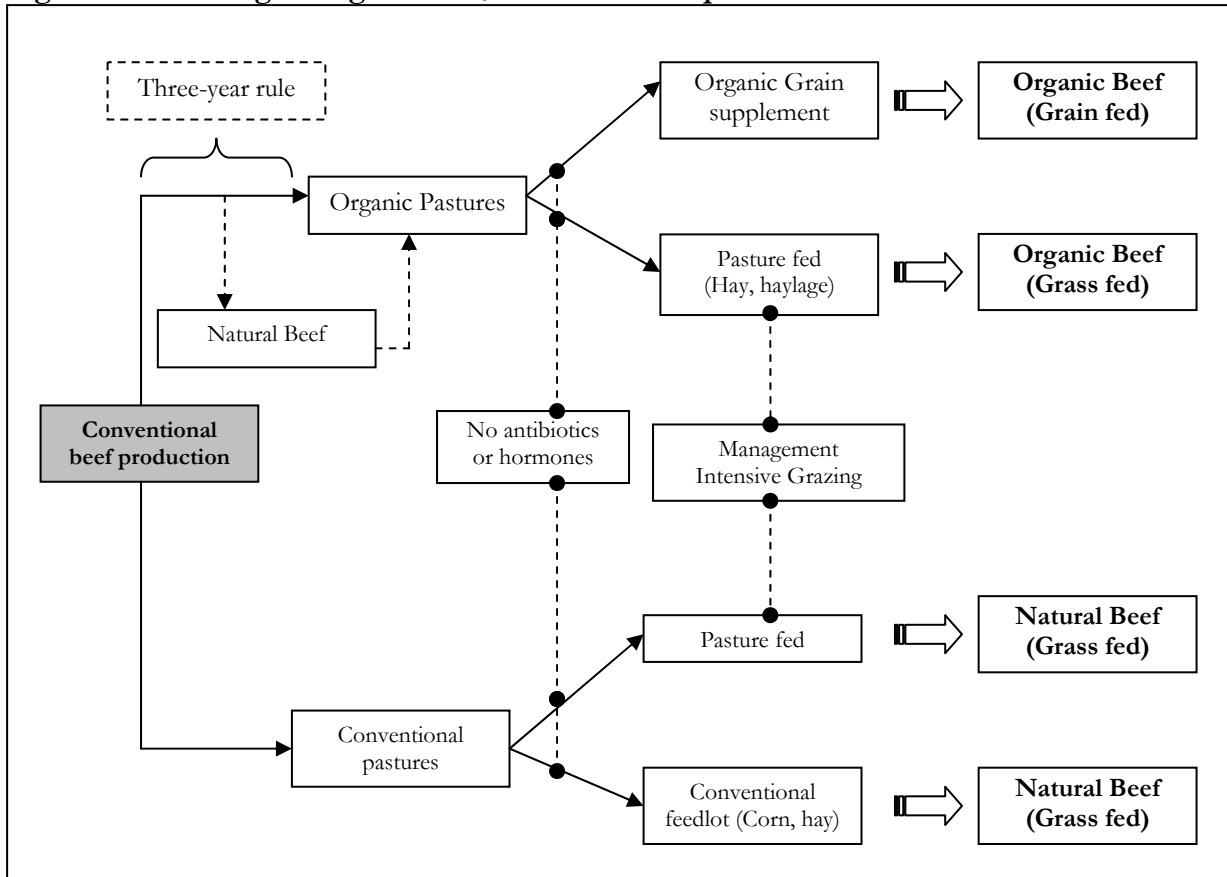
For our cash flow budget, we assumed a conventional herd with 100 bred cows and heifers. We assume a calf pre-weaning death loss of 3 percent and that 20 replacement heifers are retained annually. As a result, the herd sells 77 feeder animals (48 steers and 29 heifers) at the end of the process. The forecast is for cattle prices to decline over the next seven years (Figure 2) as the U.S. beef breeding herd expands. Corn and hay prices are forecast to increase over the same period, reflecting increased demand for corn (and land to grow corn) for ethanol, exports, and livestock production. Figure 2 reflects the premium paid for organic and grass-fed beef. Also, notice that the two systems that convert to organic start out selling at natural prices for three years, but once they are certified organic, they sell at the higher organic price. Likewise, the systems that convert immediately to organic by using CRP ground receive the organic premium in the second year. This approach to modeling the organic premium is greatly simplified as farmers must grow through the organic certification process and it can take longer than reflected here. However, this analysis depicts the range of potential cash flow from the conventional system to the first year organic certification using CRP land for conversion.

²⁵ The CRP is a voluntary program for agricultural landowners. Through CRP, landowners can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. More info at: <http://www.fsa.usda.gov/dafp/cepd/crp.htm>.

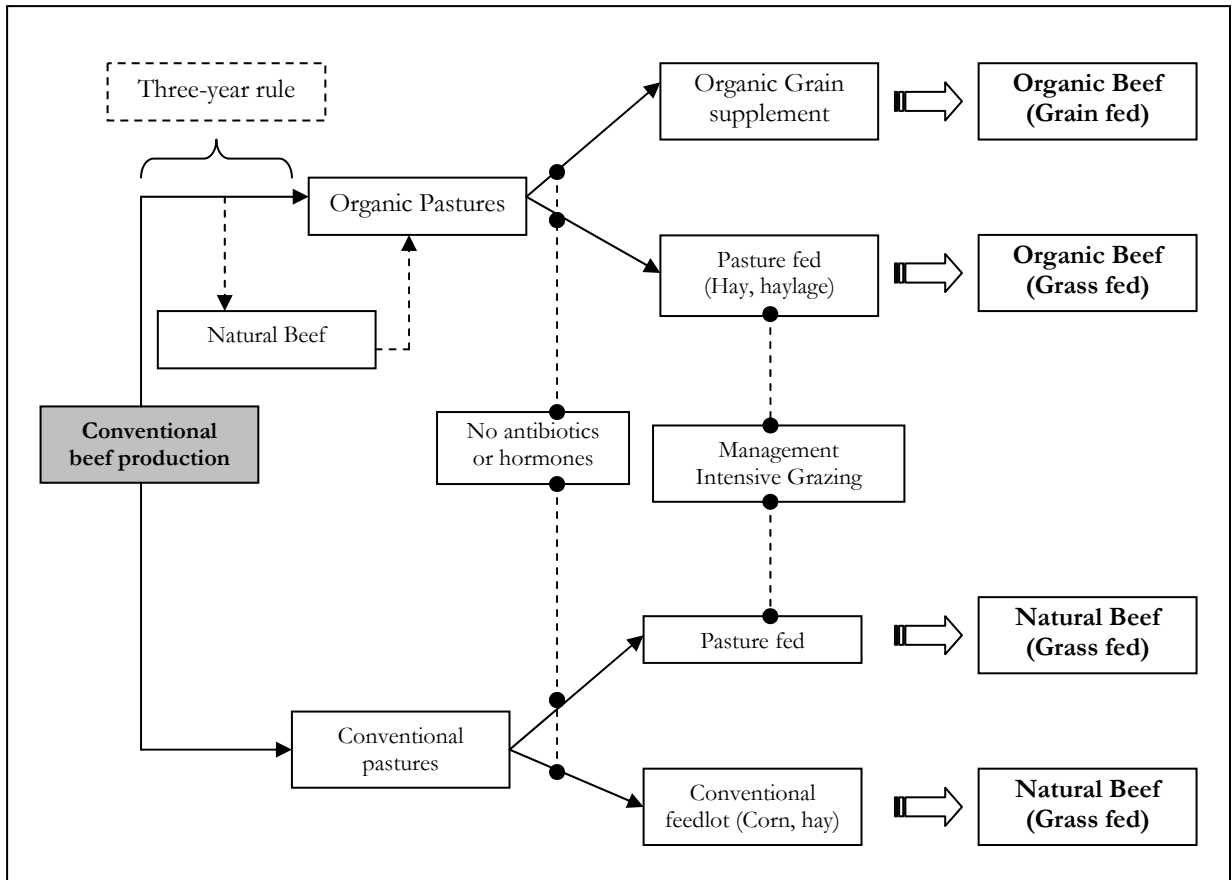
²⁶ The net present value (NPV) is the present value of a series of future net cash flows that will result from an investment, minus the amount of the original investment. The NPV is a method used in discounted cash flow analysis to find the sum of money representing the difference between the present value of all inflows and outflows of cash associated with the project by discounting each at a target yield.

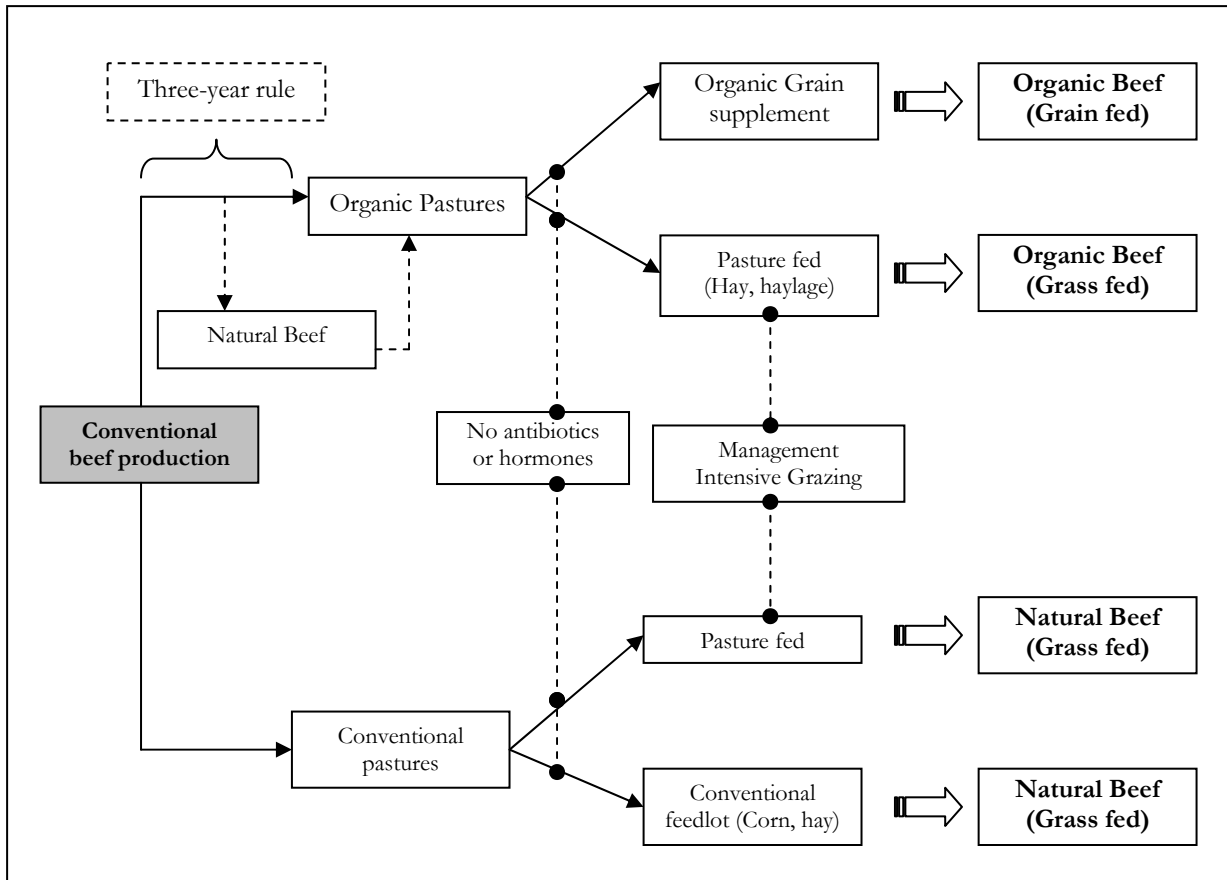
A key assumption in this analysis is that corn, pasture, and hay prices are entered at the cost of production based on Iowa State University Budgets²⁷. Thus, instead of paying the opportunity cost for these inputs, the cattle enterprise paid the cost of production. This includes a reduced land charge of \$15 per acre to reflect an annual out-of-pocket charge for owned land rather than the cash rental price. In addition to those costs, we included the costs of establishing new paddocks (i.e. new fencing and pasture costs). For fencing, we assumed a cost for exterior permanent fence of \$1.20/ft and for interior, subdivision fence of \$0.18/ft (electric fence).

Figure 1. Becoming an organic and/or natural beef producer.



²⁷Iowa Crop Production Cost Budgets, PM 1712; Organic Crop Production Enterprise Budgets, FM 1876





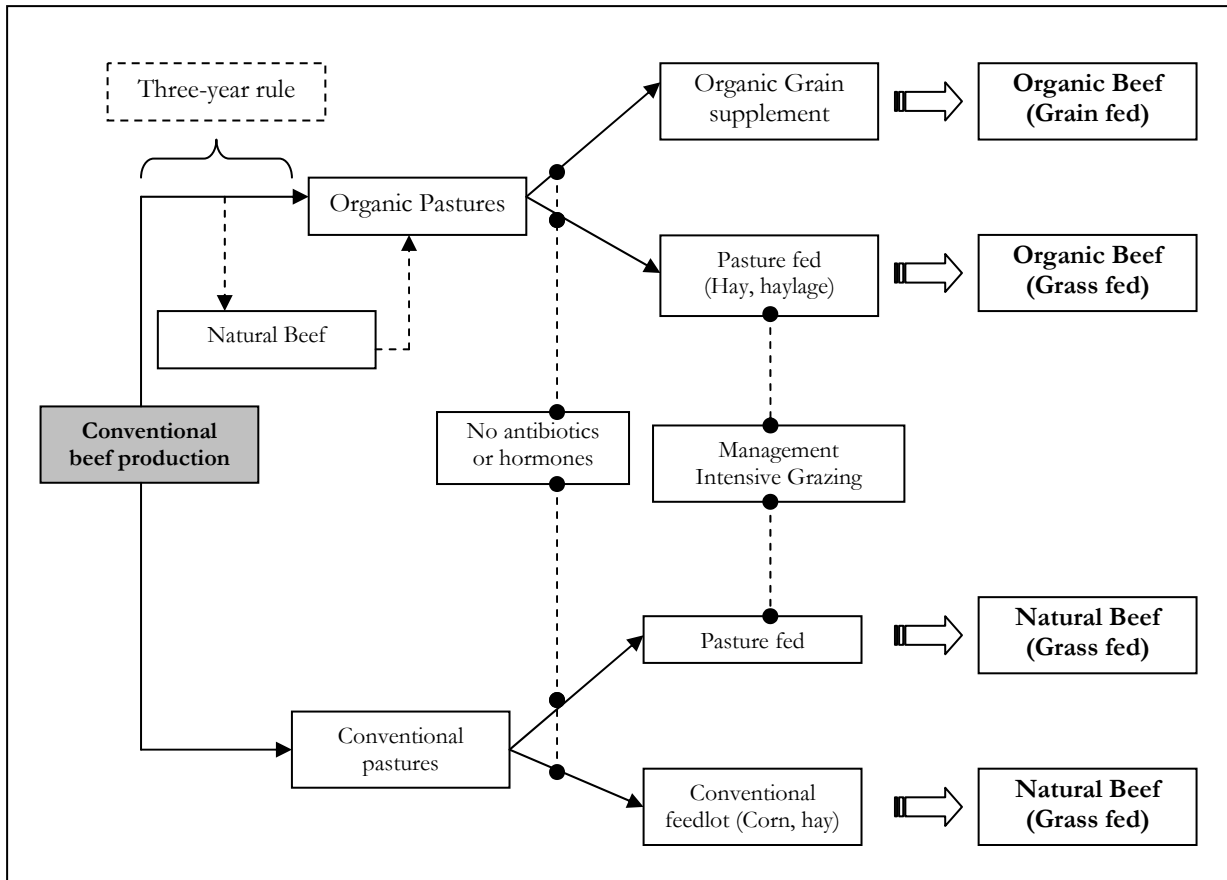
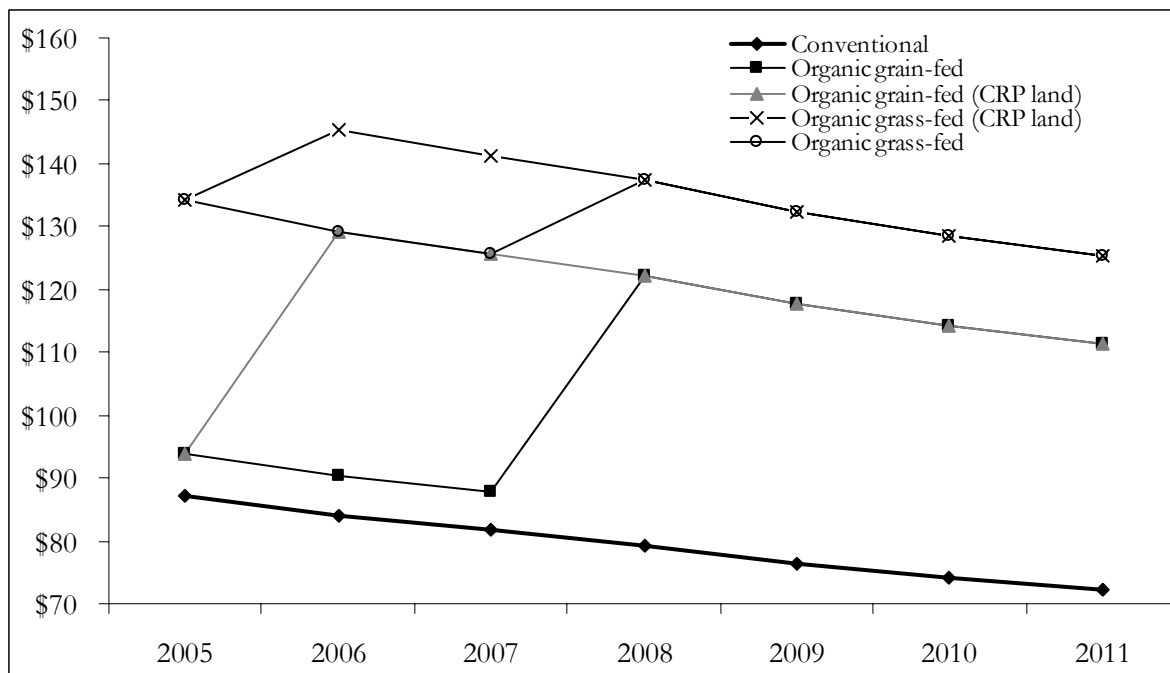


Figure 2. Price forecast for conventional and organic grass and grain fed cattle



The additional pasture needed varies upon the diet method, i.e. grass-fed animals need additional pasture and, therefore, the costs of establishing new paddocks is larger for this system of beef production. We assumed that the herds converting to grass finishing can trade conventional moderate frame-size breeding stock for small-frame breeding stock for even money in the initial year. Depending on the availability of small-frame cattle and resulting prices, a producer may have a net gain from selling the larger cattle and buying smaller ones. Five cash flow scenarios were constructed and characterized as:

- **Conventional.** A base cash flow was built for comparative purposes. We assumed that producers keep producing beef under the conventional method. Calves are weaned in November and fed 303 days to slaughter weight as described earlier. For this type of cattle, growth promotants were used and the grass pasture treated with fertilizers and herbicides. The 7-year NPV of this scenario was \$201,341.
- **Slow conversion to organic grain-fed beef.** Under this scenario, farmers grow organic grain and grass without the use of synthetic chemicals, fertilizers or pesticides. It is important to remember that to be certified organic, farms must be free of manufactured chemicals for at least three years before harvest. This implies that beef will be produced at organic pasture costs to obtain certification, but fed conventional corn and hay during this period and are sold at natural beef price for the first three years of operation. After three years, the beef is certified organic and receives the organic premium. Under the slow conversion method to organic, producers may face some transition costs. The most important are adding new paddocks to the farm and organic certification. The 7-year NPV of this scenario was \$232,382.
- **Slow conversion to organic grass-fed beef.** Producers grow organic grass without the use of synthetic chemicals, fertilizers, or pesticides. As in the organic grain-fed cattle method, farms producing organic grass-fed beef need to be certificated and land must be free of manufactured chemicals for at least three years. Therefore, beef will be produced at organic costs and sold as natural grass-fed beef for the first three years of operation. After three years the beef is sold as certified organic and grass-fed. Producers may face some transition costs, the most important being adding new paddocks to the farm and organic certification. The 7-year NPV for this scenario was \$217,845.
- **Organic grain-fed beef with converted CRP land.** We modeled the case of a producer that takes advantage of land that is currently in the CRP program. Under this scenario producers are able to sell organic cattle after the first year (as long as they are certified organic) because the land had not been used for commercial purposes, therefore, no chemicals (i.e. fertilizers) were applied. It is important to note that for this cash flow we were aware that establishing pastures on former CRP land can be an expensive process and expected grass yields cannot be reached the first year of operation. For that reason, we took in account the cost of pasture establishment in the first year based on a herd of 100 animals, and, according to our calculations, these costs approached \$27,200. The 7-year NPV of this scenario is \$287,351.
- **Organic grass-fed beef with converted CRP land.** For this cash flow we took in account that the price premium for the organic grass fed beef is higher than the price

premium for the organic grain feed beef. Also, animals that are grass-fed take more time to reach our target selling weight (1,029 lb), may need more pasture, and, therefore, more paddocks than the grain-fed method. The 7-year NPV of this scenario is \$237,166.

Figure 3 shows the estimated annual cash flow for the five systems during the 7-year transition from conventional to organic. As modeled, the conventional system has a positive cash flow over all years as do the two organic grain-fed systems when corn cost is calculated at the cost of production. The two grass-fed systems have a negative cash flow the first year while the additional pastures are being established. Their annual cash flows do not reach the level of the grain-fed cash flows during the seven years modeled. The length of the certification process is a key factor in annual cash flow and NPV.

It is also important to note that the annual cash flows represented in Figure 3 and NPVs stated above are a return to the land used in the enterprise as well as operator labor and management. Land was valued at its cash cost if it were owned and only needed to cover the cost of taxes each year, approximated at \$15/year. The three grain-fed systems used approximately the same acreage for the beef system, 365 acres of pasture, hay and corn for a 100 cow herd with retained ownership to slaughter on the same farm. The two grass-fed systems also have a 100 cow herd with grass finishing and used approximately 660 acres of pasture and hay.

Figure 3. Annual cash flow for conventional, organic grass-fed and organic grain-fed cattle.

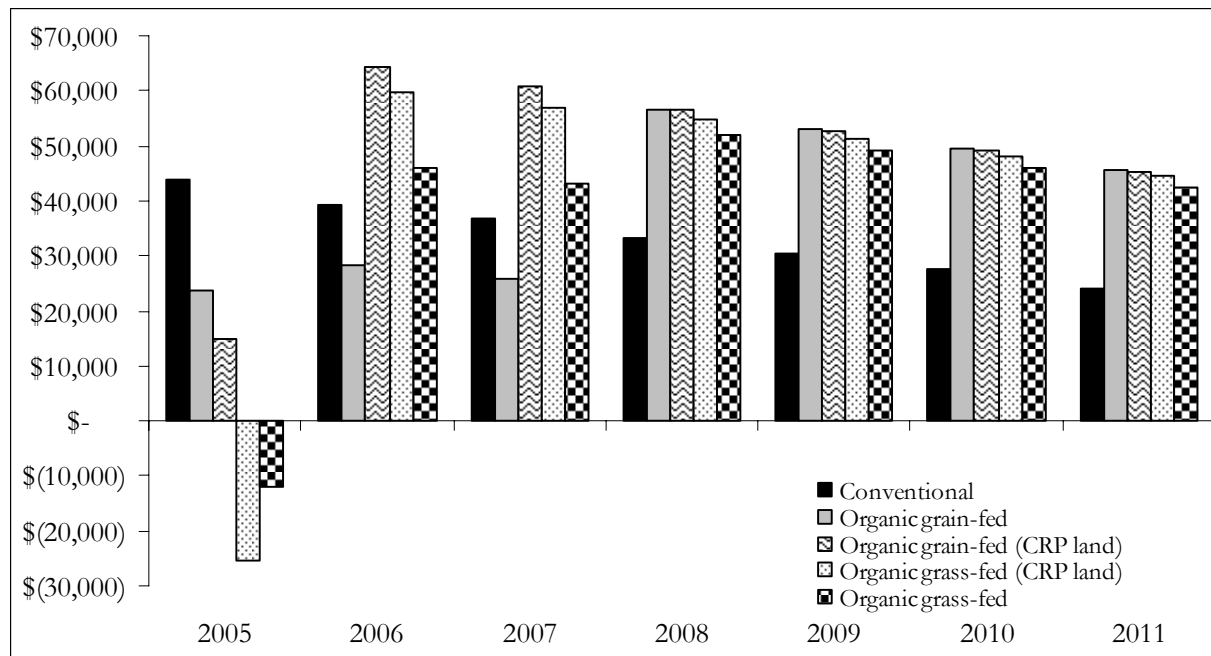


Figure 3 also reflects the strong relationship between selling price and NPV for the five production strategies. The price trend used to calculate the cash flows depicts the forecasted selling price assumed in the different cash flows for the following seven years, taking in account that once producers are certificated organic they capture the price premium associated with this product (Figure 2.). It is important to note that we assume a downward trend in the price of cattle over the period analyzed as the national herd expands. Organic beef produced on converted CRP land is sold at the natural price in year one, but at the full organic price in year two and beyond. In contrast, when the production of organic beef begins on conventional farms, the organic price premium was only applied after the third year of production. Therefore, producers that are converting from conventional to organic are not be able to capture the organic price premium immediately when they begin the cattle operation; instead we assume that they sell beef into the natural market during the first three years.

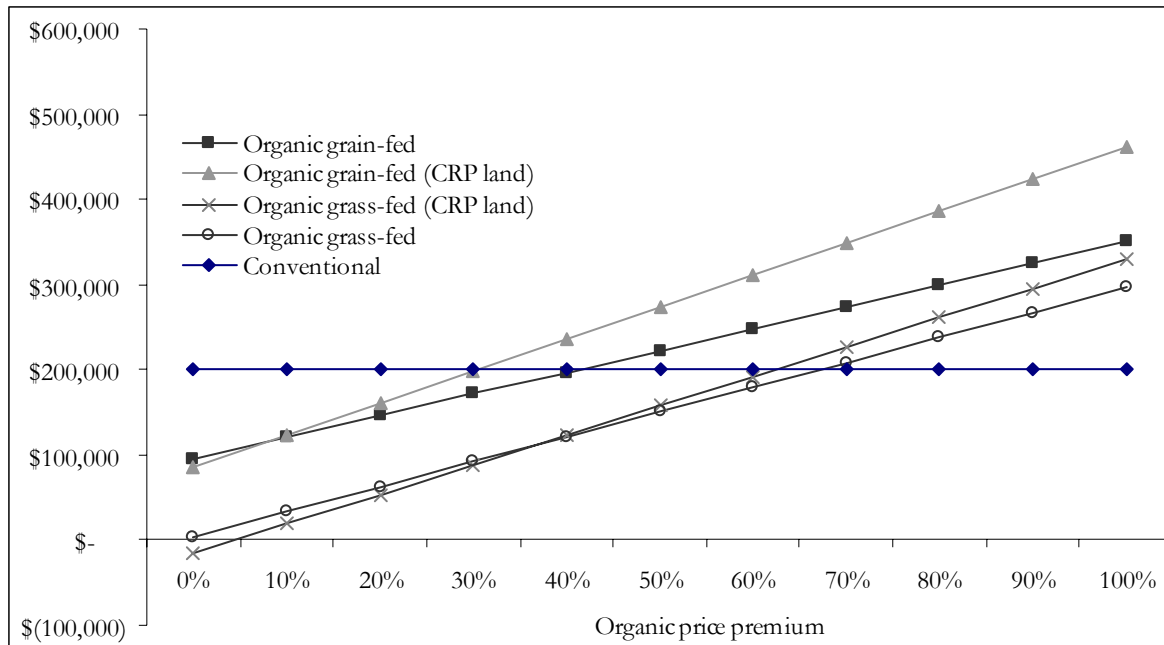
Price premium sensibility

Once the cash flows were constructed, we analyzed how sensitive the NPV was to changes in the organic beef price premium. To do this we assume that organic premiums and natural premium are proportionally correlated, when there is an increase (decrease) in the organic premium there is also a proportional increase (decrease) in the natural price premium. To make our calculations we assumed the following relationships:

- The premium for the natural grain-fed beef was 14% of the organic premium for that type. That percentage comes from an expected slaughter price for the organic grain-fed beef of \$2.00/cwt, a price of \$1.40/cwt for the natural, and a price of \$1.30/cwt for the conventional beef.
- The natural grass-fed premium was 74% of the organic grass fed cattle. That percentage comes from an expected slaughter price for the organic grass-fed beef of \$2.25/cwt, a price of \$2.00/cwt for the natural, and a price of \$1.30/cwt for the conventional beef.

Figure 4 depicts the changes in the NPV of the different strategies when the organic price premium ranges from 0% (organic beef is sold at the conventional beef market price) to 100% (organic beef is sold at twice the price of the conventional beef). As noted earlier, the NPVs are positive even with no premium. However, a more relevant comparison is between the Conventional NPV and the organic systems. Note that the Organic grain-fed on converted CRP ground crossed the Conventional line at a 30% premium. The Organic grain-fed crossed at a 40% premium and the two grass-fed systems needed approximately a 60% and 70% premium for CRP and traditional conversion to cross the Conventional NPV trend line, respectively.

Figure 4. NPV sensibility analysis to changes in the organic price premium.



Summary

Based on the analysis and prices modeled, the conventional beef production system is more profitable than natural, organic, or grass-fed beef. The profitability analysis assumes that the beef enterprise pays the market-based opportunity cost for inputs used including organic grain and hay. The organic and natural premiums are based on premiums available in late 2005. The results also indicate that selling prices and premiums are key determinates of profitability. The cash flow analysis showed that at organic premiums over 30 and 40% the grain-fed organic produced a higher net present value than the conventional system. Grass-fed systems needed premiums over conventional of 60 and 70% to produce a higher net present value.

As noted, beef price premiums relative to conventional are important for financial success of organic or grass-fed systems. Antidotal evidence indicates that there is a growing market with acceptable premiums for these products, but it may take extra effort on the farmer's part of find the buyers. In some of these niche programs the selling price is more stable than the commodity market; thus reducing risk to the farmer in the program.

The opportunity for individual farmers in these niche markets depends on many variables beyond selling price for the cattle. Cash flow and opportunity cost for pasture, hay, and corn are important considerations and differ greatly across farms. Organic standards are well defined, and dictate a lengthy process to convert from conventional to organic production and become certified organic. While the producer gives up some technologies, estimated cost of production for pasture, crops, and cattle do not indicate a significant change in cost of production per head or total input use. Grass-fed beef standards are less well defined and are currently being considered by the USDA. In addition, there is a significant increase in the amount of land converted from crops to pasture for the same size enterprise as farmers finish cattle on grass rather than grain.

Conclusions

- Most of natural beef programs analyzed in this paper exceed the USDA definition for this type of meat. Producers use that as a marketing tool with the objective to increase their product differentiation. Humane Farm Animal Care's seal is a good example of the differentiation effort.
- Producers considering becoming organic must be concerned about beginning a management intensive grazing (MIG) system. Good quality pastures and high yields showed to be indispensable for organic producers that don't confine animals in feedlots.
- Grass-fed cattle grow slower than grain-fed cattle and finish at lighter slaughter weights. Designed research and carefully monitored field research is needed to validate or improve the modeling approach used in this analysis.
- Conservation Reserve Program (CRP) land coming out of contract may allow producers to capture organic price premiums sooner than a conventional conversion to organic and therefore, they could have a higher beef selling price sooner. However, converting CRP land requires a large initial investment (i.e. investing in new fencing and renovating pastures), as was shown using the cash flow analysis.
- More work is needed to determine the behavior of the price premiums on organic and natural beef. Even though we assumed price premiums relatively constant, they are more likely to vary over time. This is true, also, for the prices of the organic commodities used in the production of organic beef.
- Conventional beef production is the most profitable system if market prices are paid for inputs. Natural beef was the second most profitable, given the premiums assumed. The natural niche is a rapidly growing beef market and there is greater market access than even two years ago.
- If producers value their land and feedstuffs at less than market value, or do not have access to a market that pays market premiums for inputs assumed in this analysis, the organic grain- or grass-fed beef can be a viable option.
- There appears to be a profit opportunity for organic grass and grain beef producers but relatively few producers are going this route. Perhaps the organic market is still immature and the price and price premium formation is not clear for producers. Successful examples of conversion and market demand will help producers determine if these niche markets are an appropriate enterprise for them.

References

Daley, C.A., Abbott A., and others. A Literature Review of the Value-Added Nutrients found in Grass-fed Beef Products.[Online],[revised 01-13-2006],[cited 06-20-2005]. Available from internet:

<<http://www.csuchico.edu/agr/grassfedbeef/health-benefits/index.html>>

Grannis Jennifer and Thilmany Dawn. Marketing Opportunities for Natural Beef Products in the Intermountain West. Agricultural Market Report. June 2000, Colorado State University.

Groves, Marlene. American Grassfed Association [Online],[revised 01-13-2006],[cited 08-25-2005]. Available from internet: <http://www.ams.usda.gov/lsg/stand/comments/mc106.htm>

Iowa Farmer Today (NW Edition). Natural Beef Sales Grow Faster than Other Beef. Iowa. October 22, 2005, p. 36.

Iowa State University Department of Agronomy. Iowa Environmental Mesonet. [Online],[revised 01-13-2006],[cited 08-05-2005]. University of Nebraska. Available from internet:
<http://mesonet.agron.iastate.edu/COOP/>

National Cattlemen's Beef Association. Economics [Online],[revised 01-13-2006],[cited 10-10-2005]. Available from internet: < <http://www.beefusa.org/theieconomics.aspx>>

Stock, Rick, and Mader, Terry. Feed additives for beef cattle.[Online],[revised 01-13-2006],[cited 09-10-2005]. University of Nebraska. Available from internet:
< <http://www.ansci.cornell.edu/beef/bcc/bcc0303.html> >