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**A PRELIMINARY FEASIBILITY FOR ESTABLISHING
A MULTI-SPECIES MEAT PROCESSING PLANT
IN SOUTHWESTERN NORTH DAKOTA**

Submitted by

THE INSTITUTE OF NATURAL RESOURCES AND ECONOMIC DEVELOPMENT (INRED)

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Executive Summary

This preliminary study reports on current efforts to define existing world markets and possible United States (US) markets for alternative livestock meat products as well as estimated production and producer interest in a slaughter incubator facility. As with most new livestock or crop enterprises, a large percentage of the information available is provided by fledgling producers or non-agriculturists. In addition, the fact that documented information is difficult to find and much of the information is on the World Wide Web means credibility becomes an issue, so there is a need for North Dakota to continue working with its agricultural counterparts to bring these potential alternative livestock into the agricultural research domain. Then it will be possible to properly conduct an accurate economic feasibility study.

- Although difficult to document for the US, there is specialty niche market demand developing for ratite, bison, elk, venison and other specialty meats. Venison, for example, has seen import values to the US increase from \$7.4 million in 1994 to \$11.7 million in 1996 (58 percent). Developing market segments include supermarkets, upscale restaurants and direct marketing outlets.
- The United Kingdom (UK) market for exotic and specialty meats will remain comparatively small (in comparison to traditional meats) but could be significant to US producers who are looking to increase their levels of sales and returns. US producers, who have access to cheaper feed stuffs, are likely to be at a competitive advantage in comparison to European Union (EU) producers. This competitive position will not be ended by high tariffs, as duty on venison and ostrich/emu meat is set to fall to zero by the year 2000.
- Traditional and specialty lambs were identified as the alternative livestock with the highest producer interest and potential to establish a demonstration slaughter incubator facility in southwest North Dakota. There are an estimated 30,000 lambs in southwest North Dakota. In a study conducted by INRED in 1997, western North Dakota accounted for 47 percent of all North Dakota lamb production (Nudell and Petry, 1997). Ratites, venison and other specialty meats could then be scheduled for alternative slaughter into this hub facility. This approach also provides a solution to the daily volume and seasonality problems identified in the 1997 study.
- Research results in this study indicated the need for a demonstration alternative livestock slaughter facility that would: 1) provide slaughtering services to producers of alternative livestock in the region, 2) contain an “incubator kitchen” where new edible products could be developed, and 3) contain a marketing service component that would develop existing and new markets for edible and non-edible products.
- **Recommendations.** Given the total number of interested producers, the wide variety of species, and the total number of animals already being produced in the area, research to determine organizational, building, equipment and operational costs for a state-of-the-art multi-species livestock slaughter plant is suggested using lambs as the baseline commodity. Due to the relatively low volume (by current industry standards) and the amount of

specialty processing equipment that will be necessary, the per unit investment and processing cost will be high. Any public assistance that may be available to construct and/or operate the plant would increase the chance for success. The jobs committee should pursue all potential rural economic development funds that may be available for a demonstration incubator venture of this type. This report includes a proposed three year budget for an Agricultural Experiment Station Project. The end products and services would be: 1) a complete economic feasibility study of a multi-species alternative livestock incubator facility using lambs as the baseline livestock, 2) assistance in market and product development, and 3) a plant establishment component. The plant establishment component would include assistance in the incubator kitchen development/HACCP/food safety requirements.

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Signature:

Date:

David G. Kraenzel

June 4, 1999

Abstract

The number of small commodity livestock slaughter plants in the Upper Northern Plains region continues to decline. Significant factors contributing to this decline include: 1) pressure to consolidate, thereby capturing economies of scale; 2) relatively stringent federal inspection specifications, along with; 3) HACCP (Hazardous Analysis Critical Control Points) requirements.

At the same time, consumer demand (markets) for specialty, selected, and exotic meats appears to be growing. For example, the recent market successes in Europe evidenced by the North American Bison Cooperative based in New Rockford, North Dakota.

Several alternative livestock producer groups have emerged which include lamb, ratite, elk, deer, goat, poultry, rabbit, specialty beef, and organic livestock. These groups have expressed a need for slaughter and processing facilities to meet market demand.

The economic question which then becomes foremost to developing a viable business enterprise is: “What is the critical threshold volume (CTV) of product required to succeed in terms of economic profit?” Specialty livestock is relatively new and production volume small in comparison to established commodity livestock such as cattle or hogs. This fact led researchers to consider the preliminary feasibility of a multi-species processing facility as a means of addressing the expressed need.

Key Words: multi-species, specialty meats, specialty livestock, alternative livestock, economies of scale, HACCP (Hazardous Analysis Critical Control Points), slaughter plants, processing plants

A PRELIMINARY FEASIBILITY FOR ESTABLISHING A MULTI-SPECIES MEAT PROCESSING PLANT IN SOUTHWESTERN NORTH DAKOTA

Introduction

In January of 1998, Dan Nudell of the Hettinger Research Extension Center and Tim Petry of the Department of Agricultural Economics at NDSU (North Dakota State University) submitted a proposal to the Jobs Committee of Bowman, Slope, and Adams Counties and the Roosevelt-Custer Regional Council suggesting a possible economic development opportunity for southwestern North Dakota (Appendix A). The opportunity they suggested was a new multi-species meat-processing incubator facility utilizing state-of-the-art technology, knowledge, and processes.

A project team consisting of: Dan Nudell, Hettinger Research Extension Center; David G. Kraenzel, Department of Agricultural Economics; Erin Brown, Research Intern, Department of Agricultural Economics; Harlan Hughes, Department of Agricultural Economics; Tim Petry, Department of Agricultural Economics; and Tim Faller, Hettinger Research Extension Center, was formed to study the feasibility of establishing such a facility.

Funding for this study was provided by the Alternative Economic Development Opportunities for Southwestern North Dakota Funding Plan of Work through the Institute of Natural Resources and Economic Development (INRED).

Goals and Objectives

The overall goal of this project was to conduct a preliminary information analysis for the economic feasibility and potential desirability of establishing a multi-species meat processing incubator facility in southwestern North Dakota. This facility would 1) provide slaughtering services to producers of alternative livestock in the region, 2) contain an “incubator kitchen” where new edible products could be developed, and 3) contain a marketing service component that would develop existing and new markets for edible and non-edible products.

The first objective was to determine if sufficient present markets and potential future markets exist for alternative livestock. The second objective was to determine if sufficient producer interest and production potential exist to meet such markets.

The study was completed in several sections. Those sections were markets, profitability, production, evolution of the multi-species concept, summary, recommendations, and a proposal.

The alternative livestock industry is still in its infancy. As a result, information is not as readily available nor as well documented as information for animals such as cattle and hogs. Due to the newness of the industry and lack of organized, currently available information, analyses remained preliminary and are based on various published trade sources, personal interviews, a producer survey, and the Internet.

StratSense™ was the procedure used to conduct the market study. This is a new way of analyzing market conditions and defining or detecting market opportunities for existing, new, and value-added products/commodities produced in North Dakota. This procedure was first introduced in an Agricultural Experiment Station (AES) project as a procedure under which existing and alternative crops may be analyzed for probable profitability and successful production in North Dakota and the region (Appendix B).

What is a multi-species meat processing plant?

There are several livestock producer groups today who are raising specialty animals on a small scale for sale in niche markets. These producer groups (lamb, ratite, deer, elk, goat, rabbit, poultry, game bird, bison, specialty beef, organic livestock, and others) would like to have access to a new, innovative state-of-the-art plant that can meet their unique requirements for slaughter, marketing, processing, and product development (Nudell and Petry, 1997). Large plants are reluctant to process these animals into the niche market meat products and co-products that draw the customers' interest. Niche market customers are generally looking for high quality products meeting stringent specifications and a high level of service rather than quantity. They also appear to be willing to pay premium prices.

Individually, most of these producer groups do not have enough volume to cover the costs of constructing and operating a federally inspected slaughtering and processing plant. Economies of scale and relatively demanding federal inspection specifications along with new Hazard Analysis Critical Control Points (HACCP) requirements make it very difficult for small livestock slaughter plants to enter or stay in the business.

A multi-species incubator type of slaughter facility, however, would allow the different groups of smaller volume livestock producers to share in the costs and scheduling of the plant. This incubator slaughter plant would be set up to process the different animals under their individual niche market specifications, giving each producer group a chance to develop its product and market. A multi-species meat processing plant would handle a smaller volume of meat than large single commodity plants, process for high-end niche markets, and serve as an incubator for new specialty meat products and co-products. If such a plant is viable in southwestern North Dakota, it could serve as a demonstration project for a possible economic development tool in other geographic areas. It is understood that quite probably one specialty livestock species may provide the necessary critical threshold volume (CTV) required to establish a profitable continuous baseline business. Other species would then be handled on a batch business to augment profitable operation.

The Multi-Species Alternative Livestock Market

Overview

Multi-species alternative livestock provide a multitude of marketing/sales opportunities for United States (US) producers. In the United Kingdom (UK), for example, the market for consumer friendly venison has become more developed as supermarkets have been able to source high quality farmed venison. Bison steaks and burgers have also made their appearance on two

supermarkets' shelves and ostrich steaks on one. The UK market for exotic and specialty meats will remain comparatively small (to established meats) but could be significant to US producers who are looking to increase their levels of sales and returns. US producers, who have access to cheaper feedstuffs, are likely to be at a competitive advantage in comparison to European Union (EU) producers. This competitive position will not be ended by high tariffs, as duty on venison and ostrich/emu meat is set to fall to zero by the year 2000 (URL: <http://www.stat-usa.gov/BEN/1998>). Opportunities such as this include both commodity type production and the more lucrative value-added (VA) options related to profit centers available along the food chain.

Information on specialty meat markets is limited (Kraenzel and Young, 1998) and closely guarded by the private firms and individuals operating in the business. Documentable pricing information was, for the most part, retail pricing obtained on the Internet. A necessary future research task is to study and separate bonafide processing plants from custom butcher shops, meat markets, and private individuals' operations. This is not to say that each is not a viable market outlet, but merely to classify them so that comparisons can be made with the proposed processing plant. For purposes of this study, we will focus on what appear to be bonafide meat processors who are able to process under federal inspection and thus can sell meat at retail.

For the purposes of this study, the list of species is open-ended but includes bison/buffalo, deer (red and other), duck, elk, game birds, fish, goat, lamb, poultry, sheep, organic meats, pheasant, quail, rabbits, ratite, specialty beef (Wagyu, Galloway), specialty/branded hogs and lambs, wild boar, and a group referred to as miscellaneous.

There are many different product groups/services which can be classified into the following general sub-markets (see Figure 1).

<u>Product Groups</u>	<u>Services</u>
• Agricultural Breeding Stock	Standard
• By-products*	Marketing
• Feathers	Product Development
• Fiber	Sensory Evaluation
• Food/Nutrition	Inventory Control
• Leather	Delivery
• Meat	Pricing
• Medicinal	
• Oil	Educational
• Pelts	Marketing
• Pets	Production
• Skins	Profitability

*By-products include: antlers, bone, ears, eggs, entrails, fat, feed meal, feet, hoofs, horns, tails, and others.

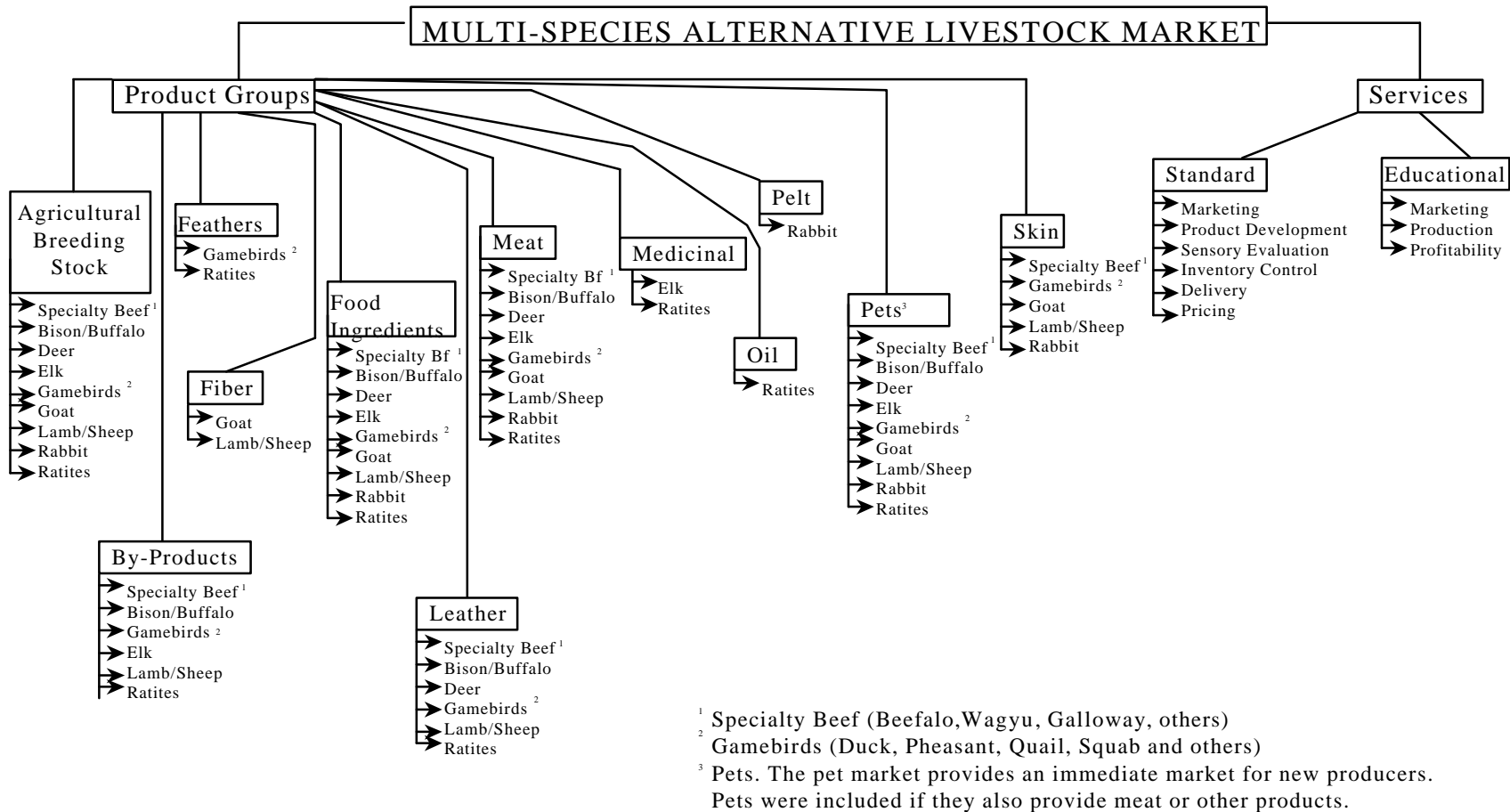


Figure 1. Multi-Species Alternative Livestock Market. Product Groups and Services. Jodi L. Young and Paulann Kautzman, Department of Agricultural Economics, North Dakota State University, 1998.

The service component presents another market opportunity. In addition to the normal product support options such as marketing, product development, sensory evaluation, inventory control, delivery, and pricing, there is the possibility of providing educational services that may be needed due to the relative newness, novelty, and uniqueness of many alternative species. Key areas where private educational market opportunities exist include management, marketing, production, handling, distribution, capital sourcing, information flow, new product development, and sensory evaluation. For example, raising animals for slaughter requires a knowledge of the entire value-added chain as shown in Figure 2. Each step along the chain presents the opportunity for additional profit if successful. There are inherent risks, and additional capital and management skills are often required to implement such ventures.

Although many exotic or alternative species are becoming established in the US, a great many are still developing. This means that in general some initial markets may be temporary in nature. For example, ostrich or emu breeding stock markets with high demand for birds and eggs in the initial stages of the industry have tapered off in recent years, and producers are now searching for a product market at a steady volume and price.

Another example is the elk industry, where producers are still able to sell breeding stock for relatively high prices. This market appears to be fueled by Asian demand for antlers and velvet. However, in our survey of producers, some elk breeders were looking for an alternative market. This may be hastened by an apparently weakening economic situation in the Asian rim at the current time. On the other hand, the North American Bison Cooperative, New Rockford, North Dakota stands as a shining example of forward marketing insight coupled with production savvy that has resulted in a steadily growing alternative livestock industry, in the US and abroad.

Another aspect of the market relates to small scale processors. There are a number of operators processing anywhere from one to a dozen or more animals per week to meet small niche or local markets. The Internet has become a significant marketing avenue for many of these firms. There is a gray area between butchering for home consumption and a commercial operation. In many cases, individuals may grow into a rising demand and growth market by chance or coincidence. This type of operation then becomes subject to food safety regulations that may not apply to the home use operation.

Alternative Livestock Meat Industry Value-Added Chain

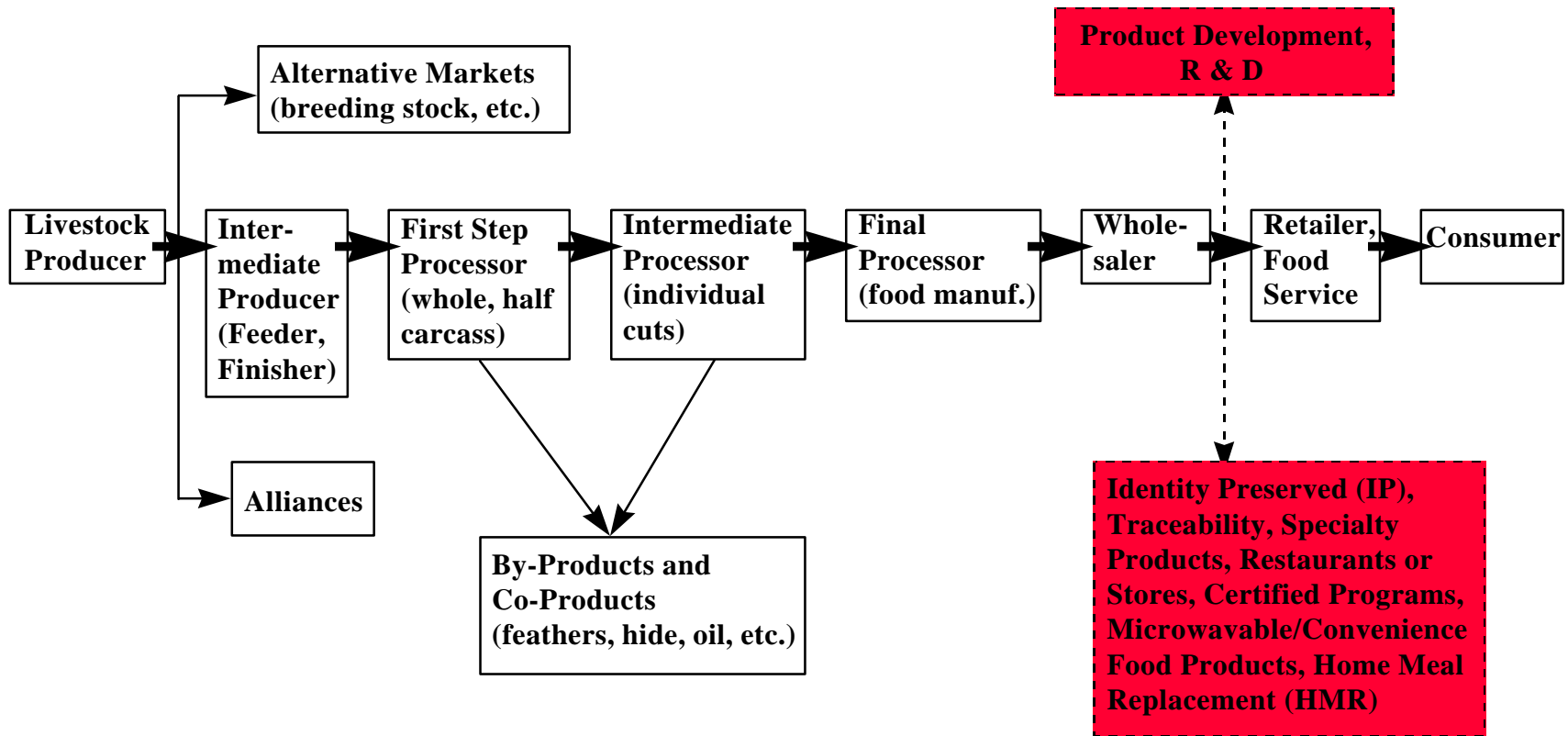


Figure 2. Alternative Livestock Meat Industry Value-Added Chain. Erin Brown and David G. Kraenzel. Department of Agricultural Economics, North Dakota State University, Fargo, North Dakota, September 1998.

Procedure Using StratSense™

StratSense™ was the market assessment method of choice and utilizes two specific methodologies to assess the market: strategic market management systems (SMMS) and scenario analysis. For the purposes of this preliminary study, SMMS was the sole methodology used. It is an information gathering/analysis method and is composed of the following components: 1) an external analysis focusing on those business elements exterior to the farm/firm to include a customer analysis, competitor analysis, market analysis, outside influence analysis, defining/detecting the opportunities, and defining strategies; and 2) the internal analysis, which includes focusing on interior farm business considerations such as profitability.

A general outline of this system, being customized especially for North Dakota, is presented in Figure 3. The concentration in this report is on the preliminary market (external) analysis (**The Market**) and the farm/firm (internal) analysis (**Profitability**) built upon a current review and summary of research done on the subject of multi-species alternative livestock marketing and production as of September 1998.

Customer Analysis

This customer analysis was done from a slaughtering plant processors' perspective. Producers of alternative livestock in the region then become the primary customers for such a facility. The production survey conducted by the Hettinger Research Extension Center serves a dual role in this study. It is a foundation document that identifies producers and specifies volume and interest while also identifying the initial customer base for a processing plant. Six hundred surveys were sent to producers in North Dakota, South Dakota, Minnesota, Montana, and Wyoming. A sample specialty meat animal producer survey is included in this report as Appendix C. As of September 2, 1998, 141 surveys were returned. Many more are expected, as 200 surveys were sent out only three weeks prior to this report, and another 100 were sent one week later.

Returned surveys indicate there are a wide variety of specialty animal producers in the five-state area. Thus far, the following surveys have been returned by meat animal producers:

specialty beef	emu
certified organic beef	ostrich
elk	rhea
buffalo/bison	pheasants
lambs	partridge
goats	turkeys
red deer	chickens and pastured chickens
whitetail deer	geese and ducks
hogs and free range hogs	goats
rabbits	other game birds
fish	

Strategic Market Management System (SMMS)

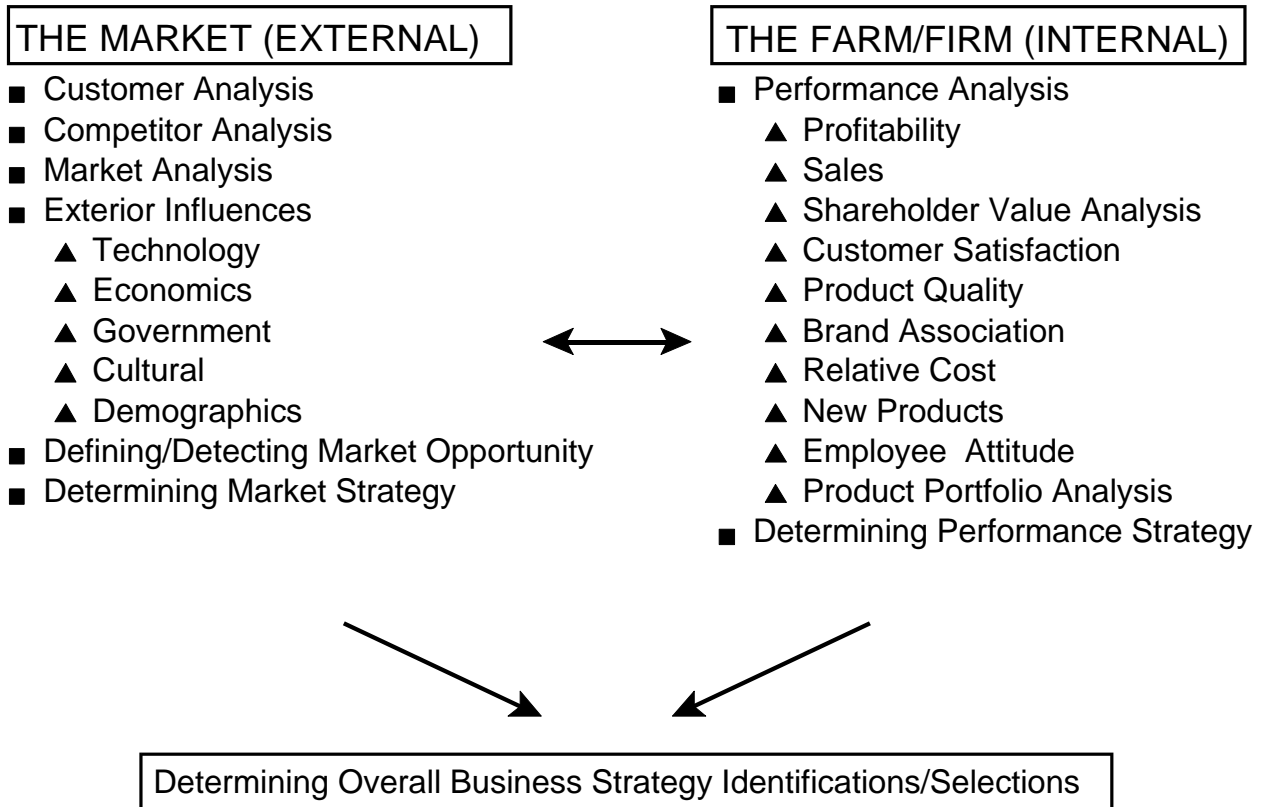


Figure 3. Prototype Strategic Market Management System (SMMS) framework customized to North Dakota. David G. Kraenzel, Associate Director, Institute for Natural Resource and Economic Development (INRED). Adapted from David A. Aaker, University of California, Berkeley, CA, 1995.

Producers were asked to indicate only the number of animals they are raising, not the pounds of meat or product (Table 1). The reader should keep in mind that just because there are more birds than elk being produced, elk are much larger so both may have similar potential for filling the capacity of a slaughter plant.

Turkeys were the most abundant of the animals being raised, at around 40,000 birds a year. However, almost all of this production was attributed to one firm in South Dakota that seems to have an established packer market for its product. The same firm raises 28,000 hogs a year, making them the second most abundant animal. This firm must be included in the production inventory and potential customer base because markets do change, and they may also be interested in new market access through the multi-species plant. There were two producers raising free range hogs, but neither divulged the numbers they are currently producing.

The third largest production number came from the chicken producers. The surveys showed 10,020 chickens and 300 pastured chickens being raised. Ten thousand of these chickens were raised by one firm for one company under contract, and all of the pastured chickens were being raised in North Dakota. Again, the large firm is included as a potential customer for the new plant.

Pheasants were next, with surveys showing about 10,000 being raised. However, about 49 percent of these were being hatched and then released to the wild, so only about 5,000 are being raised for slaughter. There is also one North Dakota firm raising 2,500 game birds mainly for hunting and feather crafts, and they stated that they have tried meat production in the past but transportation and USDA processing costs have been too high to make it economically feasible.

The number of other ratites being raised in the five-state area were not as abundant as first thought, according to this survey. Surveys were returned from nearly 60 producers who are raising almost 4,500 emu. Many of these producers belong to the Midwest Emu Grower's Alliance (MEGA), which has a cooperatively owned USDA slaughter plant for emu in Minnesota. It is unclear at this point whether this cooperative is also a marketing facility for emu products. These surveys and contacts with other producers, however, did make it clear that there are no USDA inspected facilities in North Dakota that will process emu, and many custom processors are not specialized enough to slaughter the birds to meet niche market specifications. There were approximately 1,200 ostrich and a small number of rhea being raised, with 900 of the ostrich being attributed to one ranch in Minnesota. It is unclear how many rhea are being produced, as the one producer reporting did not provide an exact number. Partridge and geese were also found in small numbers, at about 100 and 30 respectively, and there was one producer raising an unspecified number of ducks.

Rabbits, the last smaller animal being raised, are close to 1,500 per year according to the survey. Nearly 75 percent of these were being produced by one Montana rancher, who stated that the nearest market available for rabbits was in Portland, Oregon. There were also six meat goat producers found, who are raising over 1,000 animals combined.

Table 1. Tabulated Producer Survey Results as of September 22, 1998

Specialty Meat Category	Number of Producers	Number of Animals
Turkeys	2	40,020
Lambs/Sheep	5	30,000
Hogs	1	28,000
Chickens	2	10,500
Other Game Birds	2	10,000
Emu	60	4,500
Pheasants	10	3,800
Rabbits	5	2,000
Ostrich	5	1,300
Goats	6	1,034
Buffalo/Bison	3	922
Elk	21	911
Certified Organic Beef	2	360
Pastured Chickens	1	300
Whitetail Deer	4	105
Partridge	1	100
Red Deer	1	60
Geese	1	30
Wild Sheep	1	4
Ducks	1	-
Fish	1	-
Free Range Hogs	2	-
Rhea	1	-
Specialty Beef	3	-
Total	141	133,946

Bison and elk were the most numerous large animals found in this survey. Buffalo/Bison producers were not actively pursued, as most in this area belong to the North American Bison

Cooperative, which is growing quite rapidly and has been successful in marketing the animals. Only three bison producers have responded, raising 922 animals total. Twenty-one elk producers raising over 900 elk returned surveys. Many of these producers started out with only breeding stock or with raising bulls for their antlers, but they have expressed a high level of interest in entering the developing meat market. Red deer, which are similar to elk in many respects, are being raised in the area, although this survey identified only about 60. About 100 white tail deer were identified, although about 80 of these are currently being raised only for breeding or on hunting farms. It is felt that this number does not truly represent the number of deer being raised in the survey region.

Lambs were the next largest survey number found at 318, but this number does not reflect available lamb supplies, since lamb producers were not really targeted as specialty producers and nearly all those who returned surveys were producing some other type of specialty animal. It is known from previous NDSU studies that lamb producers in North Dakota and surrounding states have an interest in starting a slaughter plant. A recent NDSU study of lamb slaughter indicated that there would be sufficient lambs available to supply a 20,000 head per year plant. Lamb numbers in the immediate six county area are estimated to be at least 30,000 head in 1998 (USDA/NASS, 1998). There is considerable producer interest in traditional and specialty lamb production in the area. This alternative livestock is therefore identified as the potential livestock to initiate the baseline slaughter facility.

The specialty beef category returned a small number of responses, though there are some producers of certified organic and drug-free beef, as well as at least one producer each of Galloway (similar to the Highland breed) and Blonde d'Aquitaine (a heavily muscled exotic breed). The producer raising Blonde d'Aquitaine stated that they do have an organization of breeders in Wyoming and one in North Dakota, and that currently their product is not being successfully marketed. Only a small percentage of the cattle are being sold for a premium, while the remaining head are bringing below-market prices at auctions due to their large size and unfamiliarity.

The survey indicated one producer raising four wild sheep, and one producer raising an unidentified number of fish.

Competitor Analysis

Competitors of a North Dakota processing plant would include individual producers who process their own animals and US processors identified in this study. A current list of US rattle processors is displayed in Appendix D. There are approximately 95 rattle processors in approximately 30 states and the numbers appear to be increasing. Competitors outside the US include: New Zealand, which currently has 5,000 deer farmers and 1,000,000 deer under fence, and Canada, United Kingdom, India, and Australia, who also export deer meat into the US (U.S. Department of Commerce, National Trade Data Bank, 1997).

Market Analysis

One of the most critical objectives of the market analysis is to determine what type of possible US and world markets exist for the output of the proposed facility. Caution must be exercised in market entry, considering such important factors as confirming a sustained growth trend into 1997-1998 and solid growth projections into the future, as well as defining the total market in dollars. This requires further in-depth analysis to include scenario analysis.

Market Size

There are a number of ways to describe the size of the market to gain an understanding of the true magnitude. For example, gross revenue, numbers of animals being produced, number of animals slaughtered, and numbers of growers are all measurable dimensions.

Ratite (Ostrich, Emu, and Rhea)

Webster defines ratite as a group of large flightless birds having a flat breast bone without the keel-like ridge of flying birds. Table 2 presents a comparison of known ratite characteristics and facts. In the US, there are approximately 1,000 ostrich producers raising 100,000 birds. There are an estimated 10,000 emu producers raising 1,000,000 birds. The number of rhea producers is unknown, but they produce approximately 15,000 birds annually. The characteristics of selected meats (Table 3) indicate generally higher protein, lower cholesterol, and lower calorie compared to other meats. Emu was the only meat that was significantly lower than the other selected meats.

Table 2. US Ratite (Ostrich, Emu, Rhea) Comparison of Selected Characteristics/Facts

Species	Origin	Height (Feet)	Weight (Lbs)	USDA Inspection Available	Estimated Number of US Growers	Estimated US Animal Population
Ostrich	Africa	7-8	300-400	YES	1,000	100,000
Emu	Australia	6	125-140	YES	10,000	1,000,000
Rhea	South America	5	60-100	YES	N/A	15,000

Source: USDA, Food Safety and Inspection Service, Washington, DC, August 5, 1998, <http://www.usda.gov/fsis/ratites.htm>

Table 3. Protein, Fat, Cholesterol, and Kcal % of Selected Meats

NUTRIENT CONTENT: Serving Size: 100 grams (3.5 oz.)				
Species	Protein	Fat	Cholesterol	Kcal
Beef (USDA choice)	22.0	6.5	72	180
Beef (USDA standard)	22.7	2.0	69	152
Pork	22.3	4.9	71	165
Whitetail Deer	23.6	1.4	116	149
Mule Deer	23.7	1.3	107	145
Elk	22.8	.9	67	137
Cottontail	21.8	2.4	77	144
Jackrabbit	21.9	2.4	131	153
Pheasant (Domestic)	23.9	0.8	71	144
Emu	23.0	3.0	45	120
Ostrich	25.5	2.3	67.7	113

Sources: USDA, *Nutrient DATABASE for Standard Reference*, Handbook No. 8, Release #12, on CD Rom, Stock Number 001-000-04664-1. Originated 1992, most recent update April 1999. Washington, DC.

Product Pricing

Secondary pricing information is limited, but an Internet search revealed prices from selected sources. Table 4 presents a current retail price list for various emu meat products. Table 5 lists current retail prices for ostrich meat products.

Table 4. USDA Emu Meat Price List

<u>UNIQUELY EMU PRODUCTS</u>					
We use only Prime U.S. Emus which are grain fed. No medications, steroids, or animal by-products are used.					
Item #	Item Description	Unit Size	Unit Price	Quantity	Total Price
2010	Ground Emu	1 lb	\$2.95		
1012	Ground Emu	10-1 lb	\$22.13		
2020	Ground Emu Patties	1 lb	\$3.75		
1022	Ground Emu Patties	10-1 lb	\$33.75		
2030	Boneless Prime Emu Filets	2-6 oz	\$4.95		
1032	Boneless Prime Emu Filets	20-6 oz	\$44.55		
2040	Boneless Prime Emu Roast	1 lb	\$4.95		
1042	Boneless Prime Emu Roast	10-1 lb	\$44.55		
2050	Emu Breakfast Sausage Links	12 oz	\$4.95		
1052	Emu Breakfast Sausage Links	10-12 oz	\$44.55		
2091	Emu Jerky with turkey/.75 oz sticks	10	\$9.95		
1092	Emu Jerky with turkey/.75 oz sticks	100	\$74.95		
2100	Emu Salami Slices with turkey	8 oz	\$2.95		
1102	Emu Salami Slices with turkey	10-8 oz	\$22.13		
2104	Emu Summer Sausage Roll	1-1 lb	\$4.95		
2106	Emu Summer Sausage Roll	10-1 lb	\$44.55		

Source: <http://www.angelfire.com/biz/emus/wmeatprices.html>

Table 5. Ostrich Meat Price Lists

Individual Cuts	
Tenderloins	\$11.45 per lb.
Fan Filets	\$11.45 per lb.
Stir Fry - Fajitas (4 oz. pkg..)	\$2.25 each
Portioned Filets (8 oz. package of two 4 oz. steaks) 1 Case = 10 lbs. / 20 pkg. / 40 servings @ 2.07 each	\$4.14 each \$83.20
Portioned Filets (12 oz. package of two 6 oz. steaks) 1 Case = 10 lbs. / 14 pkg. / 28 servings @ \$3.13 each	\$6.35 each \$89.04
Perfect Medallion Filets (4 oz.) 1 Case = 10 lbs. / 40 pkg. / 40 servings @ \$2.35 each	\$2.35 each \$94.00
Perfect Medallion Filets (6 oz.) 1 Case = 10 lbs. / 27 pkg. / 27 servings	\$3.49 each \$94.23
Summer Sausage (12 oz.) 1 Case = 18 lb. / 24 pkg.	\$4.37 each \$104.88
Ground (1 lb. package) 1 Case = 18 lb. / 18 pkg.	\$3.00 each \$54.00
Ground (package of four 1/4 lb. vacuum packed patties) 1 Case = 12 lb. / 12 pkg. / 48 servings @ \$.90 each	\$3.59 per lb. \$43.08
Breakfast Sausage (mild or spicy, 1 lb. pkg.) 1 Case = 18 lb. / 18 pkg.	\$3.29 per lb. \$59.22
Breakfast Sausage Patties - Mild or Spicy	\$3.90 per lb.
Bratwurst (12 oz. package) 1 Case = 18 lb. / 24 pkg. / 120 servings @ \$.66 each	\$3.31 each \$79.44
Cured Whole Muscle (2.5 lb. Ostrich Ham)	\$11.95 each

Bulk Wholesale	
1 Carton = 36 kg. 27 kg. Whole Muscle Steak & 9 kg. ground	\$357.12
1 Carton = 79.36 lbs. 59.5 lbs. Whole Muscle Steak & 19.84 lbs. ground	\$357.12

Source: <http://www.brightok.net/~aopi/PriceList7.html>

Lambs

Please refer to Appendix E, “Feasibility of Operating a Lamb Slaughter Facility in North Dakota,” November 1997.

Red and Fallow Deer

The modern practice of deer farming originated in New Zealand, West Germany, and Scotland (Golz and Aakre, 1993). Producers in these countries remain as intense established global competitors in today’s market. US producers provide the market with both red and fallow deer. The advantages and disadvantages of both breeds are numerous, but fallow is reported to be the finer table venison in the marketplace.

Total Venison Production (Estimated)

- **1991 United States:** There were approximately 25,000 deer on farms in the USA (Golz and Aakre, 1993).
- **1993 United States:** There were approximately 50,000 deer being farmed in the US in 1993 (Golz and Aakre, 1993).
- **1996 United States:** There were approximately 79,000 deer on farms in the US (Fox, North American Deer Farmers Association, 1998).
- Total venison production has increased by three times since 1991, indicating that this is a growing alternative livestock.

Total Number of Deer Farmers

- **1993 United States:** There were approximately 300 farmer members in the North American Deer Farmers Association, with herd sizes of less than 10 head to more than 2,000.
- **1998 United States:** The number of deer farmers nearly doubled to 600 farmer members (Fox, North American Deer Farmers Association, 1998).
- The trend in the number of deer farmers is increasing.

United States Imports (metric tons and value)

Table 6. Venison Imports into the US, 1994-96

Year	Metric Tons	Value
1994	776	\$ 7,365
1995	839	\$ 8,874
1996	880	\$11,650

Source: Easdale, Economic Research Service, 1998.

Pricing Opportunities

- There appears to be sufficient lamb production to support a baseline slaughtering incubator facility in southwest North Dakota.
- North Dakota presently has a comparative advantage in supply and cost of high quality feedstuffs for alternative livestock. This is a market opportunity that, if acted upon, could become a Sustainable Competitive Advantage (SCA) in the UK and other EU markets.
- There appears to be an opportunity to slaughter, process, and market emus, other ratites, deer, elk, and numerous alternative livestock in southwestern North Dakota.

Outside Influences

Technology. The value-added product market is ripe for new technology that can increase uses for food products. State-of-the-art processing advances in Europe, and in particular Germany and France, need to be investigated further to identify market opportunities. Recent changes in US food processing requirements (e.g., HACCP) need to be reviewed to see if a state-of-the-art processing facility is well-timed for potential success.

Economics. Cost and return figures are primarily based on limited and inadequate information from Europe and other countries. Subsidized farming operations in other parts of the world make a true estimate of production economics difficult at best. This suggests a need for further market, economic, and agronomic research to properly assess the true profit generating potential of a multi-species processing plant. A key issue in plant economics is sustainability of the niche market and its corresponding higher unit prices.

Government. Tariffs in the EU favor the import of US specialty meats now and into the immediate future.

Cultural. The trend in consumer demand for natural products that are environmentally and economically sustainable favors opportunity for alternative livestock production. The characteristics of alternative livestock are complemented by affluent consumer demand for specialty products. The interest in health and nutrition is opening markets for new meat products that are perceived to be lower in fat and cholesterol than traditional red meats (URL: <http://www.stat-usa.gov/BEN/>, 1998).

Demographics. Demographics can be a powerful force in the food market. This has already been demonstrated by the economic impact of the “fad” products associated with young people in the past five years and its contribution to the emergence of consumer-demanded food products. The 13- to 19-year old population in the US is expected to peak at 31 million in 2010 (Zinn, 1994), thus comprising 40 percent of the Baby Boomer impact of 77 million. Retailers have already discovered their influence on sales. Modern media exposes all cultures to the food preferences of other cultures. Ethnic dining experiences are a common practice for today’s consumer.

Further research targeting lamb, ratite, deer, elk, and others identified in this preliminary study is recommended. The best starting point and references to use in identifying specific potential buyers are: 1) Extension Report 38, *A Preliminary Market Study of the North Dakota and Minneapolis/St. Paul Wholesale Food Markets*, and 2) Extension Report 36, *A Preliminary Market Study of the Chicago Wholesale Food Market*.

Both references identify current wholesale buyers of food products. Efforts are currently underway to conduct a preliminary study of Denver wholesale food markets as well.

New Product Development/Sensory Evaluation

Consumers are not familiar with these non-traditional meat product groups. Therefore, new value-added product development is required and could be accomplished in the incubator facility. This also necessitates sensory evaluation and determining/anticipating consumer acceptance, which is the first step in successfully meeting identified lucrative market opportunities.

For the purpose of this study initial products may include jerky, meat sticks, stir fry, fajitas, sausage (i.e. Polish, summer, Italian), and marinated items. This list is by no means inclusive.

Once the final target markets and product types are determined, product development/sensory evaluation can be conducted. Product development could be conducted utilizing facilities in the Food and Nutrition Department at NDSU in collaboration with the new incubator facilities. These facilities include the Sensory Evaluation Lab and Food Product Development/Preparation Kitchens. Only food-grade ingredients would be used and the products would be prepared under sanitary conditions. Preliminary sensory trials could be conducted with 8 to 10 panelists from selected pools. The products would then be tested for consumer acceptance. A hedonic scale would be used to determine the extent of “liking” (i.e., 1 will equal “dislike very much” and 9 will equal “like very much”). The sensory panelists could consist of faculty, staff, and students at NDSU. There should be no fewer than 75 members in each consumer test. The products would be evaluated for sensory characteristics such as color, aroma, texture, flavor, and overall consumer acceptability.

Profitability

The reader is referred to Appendix E, “Feasibility of Operating a Lamb Slaughter Plant in North Dakota,” November 1997, for lamb baseline profitability. The need for more resources to gather available information was discovered in this preliminary study.

Cost and return data on returned surveys was quite diverse. There was no general trend of production costs or prices received in any of the species. This disparity could be partially attributed to the fact that different areas and different producers follow different production strategies. However, this may also be because many of these producers are not yet clear on how to compute enterprise budgets. This is especially true for cost data. Over one-third of the

producers who have already returned surveys stated they did not know their costs, left the cost question blank, or answered with a question mark.

Production

Procedure

One of the first steps necessary to assess production in the region was to identify producers of species that may be served by this facility and to inventory their current and potential future production levels. Since the non-traditional livestock species are not inventoried by the National Agricultural Statistics Service, finding producers and quantifying production amounts was a difficult task.

An initial effort to identify specialty producers in the region was to consult the 1998-1999 North Dakota Economic Development Resource Directory. The sections entitled “Adding Value to Animals and Livestock” (pp. 22-24) and “New and Emerging Cooperatives and Associations” (pp. 94-97) were used. More names were then publicly solicited via a news release submitted through NDSU Ag Communication to newspapers throughout the region. This news release brought forth a great number of interested producers who called, wrote, faxed, and e-mailed asking to be involved in the study. In addition, e-mail was sent to all county extension agents in the states of North Dakota, South Dakota, Minnesota, Montana, and Wyoming asking them to provide contact information for non-traditional livestock producers. The agents were helpful in locating producers in the region.

When approximately 100 of these names were received, a survey was created to determine how many animals each producer was raising and what their current processing and marketing procedures were (Appendix C). Twenty of these surveys were mailed initially to a test audience. As soon as it was determined that the questions on the study were appropriate for the audience, the remainder of the surveys were mailed.

Survey Results

There have been 600 surveys mailed to interested producers in North Dakota, South Dakota, Minnesota, Montana, and Wyoming. As of September 2, 1998, a response rate of nearly 25 percent was achieved with this mail survey. This is a relatively high rate of return for a mail survey, especially one done during the summer production season. It indicates a high level of interest by the potential users of this facility. Additional surveys continue to be returned and will be tabulated in the near future.

Current Specialty Meat Processing

Some specialty producers are currently processing their animals themselves. Most of these were the small scale animal producers, particularly those raising birds. Almost 90 percent of the producers who stated they raise pheasants process their own animals, using their own labor to at least butcher the birds into whole or half carcasses. About 19 percent of those raising emu also said they process their own animals, breaking them up into individual cuts and saving the oils. All of the goose, partridge, and pastured chicken producers responding to this survey said they process their own birds. One rabbit producer also processed those animals with family labor.

It was difficult to determine from the producers' answers just where the animals they are not processing themselves are being processed, if at all. The general idea, especially with the elk and ratite producers, was that many of them are still selling only in the breeder's market, or only selling live animals to other producers. Some of those specialty producers who are processing their animals are having them done by a custom processor for their own use. A few others have found a local USDA processor in their area. Emu producers were the only group to give a real cost estimate of that processing, which ranged on the surveys from \$25 up to \$90 per bird. The ratite producers have also formed cooperative slaughter plants, including Midwest Emu Grower's Alliance (which was mentioned earlier), and the Northern Plains Ratite Consortium. These plants also charge a starting price of \$25 per bird to kill, cut, and wrap it. There was very limited data provided on the surveys about the current processing procedures and costs for the other specialty animals.

Current Marketing Practices

There was limited information on returned surveys pertaining to producers' current marketing practices. As was evident in the processing data, some producers of these specialty products are not yet slaughtering their animals for meat. For instance, many elk producers are only marketing the antlers and velvet but would like to enter the evolving meat market. Other producers of animals such as emu and ostrich are still selling only breeding animals, and many game bird producers release their birds to the wild or keep them as part of a hunting preserve.

Other than the few extremely large producers (such as the turkey and hog organizations mentioned earlier), most of the producers returning surveys did not seem to have an established market or a notable consistent buyer of their products. In general, many of these producers' customer base included only family, friends, and local people. However, some businesses found are trying to market their meat products over the Internet and through mail-order. At this point, the scope of customers being reached and the true size of this Internet market is unclear.

Current Costs and Returns

Cost and return data on returned surveys were quite diverse. There was no general trend of production costs or prices received in any of the species. This disparity could be partially because different areas and different producers follow different production strategies. However, this may also be because many of these producers are not yet clear on how to compute enterprise budgets. This is especially true for cost data. Over one-third of the producers who have returned

surveys stated they did not know their costs, left the cost question blank, or answered with a question mark. One producer even stated that they have not been good at keeping cost of production data. These findings reinforce the need for further research into the cost and return portion of this project, and that there is a need for some type of service to help specialty producers document their true costs.

For the purpose of this study, these surveys were used to determine each producer groups' general level of interest in a multi-species meat processing plant and to estimate the number of each type of livestock being raised in the region.

Evolution of the Multi-Species Concept

The idea for an incubator type slaughter plant has its roots in a concept that has been around Europe for decades and has become popular in this country in the last few years (*The Advertiser*, July 1, 1998). That concept is kitchen incubators, which serve as pilot facilities for new food service businesses. These are shared-use or community kitchens that give entrepreneurs a chance to develop their product and a market for that product without needing to raise the large amounts of capital needed for construction of food processing facilities. Food processing facilities are expensive to construct, and low-volume start-up businesses are unable to generate sufficient revenue to pay the fixed costs of self-owned facilities. Kitchen incubators or community kitchens are currently in use in several communities in the US. Information about kitchens in Idaho, Colorado, Ohio, and Washington are presented in Appendix F.

These time share facilities operate under similar structures to the proposed multi-species meat slaughter facility. An important point to consider is the amount of additional service offered at these facilities in addition to the actual process location. Most offer services like marketing help, office assistance, and other services needed by small developing businesses. Researchers on this study heard of this concept and presented the idea that a multi-species incubator processing plant could do the same for specialty producers trying to develop and market their products.

Dan Nudell and Tim Petry, team members for this study, realized the need for small producer groups to share costs and plant scheduling after conducting a feasibility study of operating a lamb slaughter plant in North Dakota. They pointed out in the lamb study that unit costs for this size plant would be high and that lamb supply may be one of the factors affecting plant feasibility. Nudell and Petry suggested these lamb producers in North Dakota cooperate with several other livestock producer groups who want access to slaughter and processing facilities, and the idea for a multi-species incubator slaughter facility was born.

Summary

Research results indicate that there is sufficient alternative livestock producer group interest and that a reasonable chance for developing viable niche markets for specialty products exists. A previous study on the potential for slaughtering and processing lambs further substantiates this conclusion (Nudell and Petry, 1997). Therefore, further research to determine building, equipment, and operational costs for a multi-species livestock slaughter plant is suggested using lamb as the baseline commodity.

Due to the relatively low volume (by current industry standards) and the amount of specialty processing equipment that will be necessary, the per unit investment and processing cost will be high. Any public assistance that may be available to construct and/or operate the plant would increase the chance for success. The jobs committee should pursue all potential rural economic development funds that may be available for a demonstration incubator venture of this type.

For example, the cities of Bowman and Hettinger along with Pierce County have applied for a rural empowerment zone grant to help increase employment opportunities in the area. A section of this grant application includes grant funds to construct a multi-species slaughter plant. A feasibility study would complement this effort.

Funds to help finance the feasibility study may be available from state sources such as Agricultural Products Utilization Commission and The Department of Economic Development and Finance. Other entities such as the North Dakota Association of Rural Electric Cooperatives and The Institute of Natural Resources and Economic Development at NDSU are available to assist with feasibility studies.

Recommendations

This preliminary study reports on current efforts to define existing world markets and possible US markets for alternative livestock meat products, as well as estimated production and producer interest in a slaughter incubator facility. As with most alternative livestock or crops, a large percentage of the information available is provided by fledgling producers or non-agriculturists. In addition, the fact that documented information is difficult to find and much of the information is on the World Wide Web means credibility becomes an issue. Hence, a need was indicated for North Dakota to continue working with its agricultural counterparts to bring these potential alternative livestock into the agricultural research domain. Then it will be possible to properly conduct an accurate economic feasibility study.

The total number of interested producers, the wide variety of species, and the total number of animals already being produced in the area suggests research to determine organizational, building, equipment, and operational costs for a state-of-the-art multi-species livestock slaughter plant using lambs as the baseline commodity. Due to the relatively low volume (by current industry standards) and the amount of specialty processing equipment that will be necessary, per unit investment and processing costs will be high. Any public assistance that may be available to construct and/or operate the plant would increase the chance for success. The jobs committee should pursue all potential rural economic development funds that may be available for a demonstration incubator venture of this type.

This report includes a proposed three-year budget for an Agricultural Experiment Station Project. The end products and services would be: 1) a complete economic feasibility study of a multi-species alternative livestock incubator facility using lambs as the baseline livestock, 2) assistance in site selection, and 3) a plant establishment component. The plant establishment component would include assistance in the construction selection process.

Proposal for Establishing an Alternative Livestock Incubator Facility

Based on the findings in this study and its recommendations for the project, we submit the following proposed NDSU Agricultural Experiment Station Project budget for further research (Figure 4). The proposed budget allows for either two full-time positions or one full-time and two part-time positions, plus estimated operating expenses for three years. The Institute for Natural Resources and Economic Development would be the managing entity. The end products would be: 1) a complete economic feasibility study of a multi-species alternative livestock incubator facility using lambs as the baseline livestock, 2) assistance in market and product development, and 3) a plant establishment component. The plant establishment component would include assistance in the incubator kitchen development/HACCP/food safety requirements.

NDSU EXPERIMENT STATION STANDARD PROPOSAL BUDGET		Year 1	
Budget	BUDGET ELEMENTS	AMOUNT	NDSU
TCC		REQUESTED	MATCHING
	SALARIES & WAGES		
950	Salaries - PI	60,000	
950	Salaries - Res. Associate		
950	Salaries - Grad. Students		
951	Salaries - Support Staff		
951	Salaries - Research Technician		
951	Salaries - Prebaccalaureate Students		
953	Fringe Benefits	18,000	
	TOTAL SALARIES & FRINGE B.	78,000	
	OPERATING EXPENSES:		
954	Travel - Domestic	2,000	
954	Travel - Foreign	1,000	
955	Utilities		
956	Communications	2,000	
957	Insurance		
958	Data Processing		
959	Rents & Leases		
960	Office Supplies	1,500	
961	Repairs		
962	Supplies	1,000	
963	Fees	1,500	
964	Instructional	500	
965	General	500	
	TOTAL OPERATING EXPENSES	10,000	
	EQUIPMENT		
966	Equipment<\$500		
976	Major Equipment		
	TOTAL EQUIPMENT		
	TOTAL DIRECT COSTS	88,000	
972	INDIRECT COSTS		
	TOTAL REQUEST	88,000	

Figure 4. Proposed NDSU Agricultural Experiment Station Budget. (Complete economic feasibility, site selection, and plant establishment of a multi-species alternative livestock incubator processing facility). David G. Kraenzel. North Dakota State University, Fargo, October 1, 1998.

NDSU EXPERIMENT STATION STANDARD PROPOSAL BUDGET		Year 2	
Budget	BUDGET ELEMENTS	AMOUNT	NDSU
TCC		REQUESTED	MATCHING
	SALARIES & WAGES		
950	Salaries - PI	60,000	
950	Salaries - Res. Associate		
950	Salaries - Grad. Students		
951	Salaries - Support Staff		
951	Salaries - Research Technician		
951	Salaries - Prebaccalaureate Students		
953	Fringe Benefits	18,000	
	TOTAL SALARIES & FRINGE B.	78,000	
	OPERATING EXPENSES:		
954	Travel - Domestic	2,000	
954	Travel - Foreign	1,000	
955	Utilities		
956	Communications	2,000	
957	Insurance		
958	Data Processing		
959	Rents & Leases		
960	Office Supplies	1,500	
961	Repairs		
962	Supplies	1,000	
963	Fees	1,500	
964	Instructional	500	
965	General	500	
	TOTAL OPERATING EXPENSES	10,000	
	EQUIPMENT		
966	Equipment<\$500		
976	Major Equipment		
	TOTAL EQUIPMENT		
	TOTAL DIRECT COSTS	88,000	
972	INDIRECT COSTS		
	TOTAL REQUEST	88,000	

Figure 4. Proposed NDSU Agricultural Experiment Station Budget. (Complete economic feasibility, site selection, and plant establishment of a multi-species alternative livestock incubator processing facility). David G. Kraenzel. North Dakota State University, Fargo, October 1, 1998.

NDSU EXPERIMENT STATION STANDARD PROPOSAL BUDGET		Year 3	
Budget	BUDGET ELEMENTS	AMOUNT	NDSU
TCC		REQUESTED	MATCHING
	SALARIES & WAGES		
950	Salaries - PI	60,000	
950	Salaries - Res. Associate		
950	Salaries - Grad. Students		
951	Salaries - Support Staff		
951	Salaries - Research Technician		
951	Salaries - Prebaccalaureate Students		
953	Fringe Benefits	18,000	
	TOTAL SALARIES & FRINGE B.	78,000	
	OPERATING EXPENSES:		
954	Travel - Domestic	2,000	
954	Travel - Foreign	1,000	
955	Utilities		
956	Communications	2,000	
957	Insurance		
958	Data Processing		
959	Rents & Leases		
960	Office Supplies	1,500	
961	Repairs		
962	Supplies	1,000	
963	Fees	1,500	
964	Instructional	500	
965	General	500	
	TOTAL OPERATING EXPENSES	10,000	
	EQUIPMENT		
966	Equipment<\$500		
976	Major Equipment		
	TOTAL EQUIPMENT		
	TOTAL DIRECT COSTS	88,000	
972	INDIRECT COSTS		
	TOTAL REQUEST	88,000	

Figure 4. Proposed NDSU Agricultural Experiment Station Budget. (Complete economic feasibility, site selection, and plant establishment of a multi-species alternative livestock incubator processing facility). David G. Kraenzel. North Dakota State University, Fargo, October 1, 1998.

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Appendix A

Original Proposal

Multi-Product Meat Processing
A Proposal For Consideration
Presented to the Jobs Committee of Bowman, Slope and Adams Counties
January 9, 1998
By Tim Petry and Dan Nudell
North Dakota State University

The number of small livestock slaughter plants in ND, SD, MT, and WY is declining due to economies of scale and relatively stringent federal inspection specifications along with new HACCP (Hazard Analysis Critical Control Points) requirements (e.g. the Hettinger, ND slaughter plant recently withdrew from federal inspection status). Meat must be federally inspected before it can be sold to any retail or wholesale customer. HACCP requirements alone are expected to cause one or two additional employees even in small plants, which will increase unit costs.

Several livestock producer groups (lamb, ratite, elk, deer, goat, poultry, rabbit, specialty beef, organic livestock, etc.) would like to have access to slaughter and processing facilities. These groups would produce meat and co-products for niche markets with unique requirements that large plants do not satisfy. Generally, these customers are willing to pay premium prices and are more interested in quality, specifications, and service rather than quantity.

However, individually these producer groups may not have enough volume to cover the costs of constructing and operating a federally inspected slaughtering and processing plant. Rural economic development funds may be available to assist producer groups in collectively constructing a multi-species “incubator” type of slaughter facility whereby the various groups could share in the costs and scheduling of the plant. It could be promoted as a demonstration project for possible adoption in other geographic areas if it is viable here.

Other “spin off” projects may include processing hogs for the Western Dakota Pork Cooperative and cattle from the proposed Dakota Prairie cattle feeding cooperative, and selling the product under a private brand. There may also be opportunities for further value-added processing and marketing opportunities including packaging of specialty meat and co-products for the catalog, cable TV, and Internet markets. These products could be packaged with other regionally grown products such as specialty grains, honey, herbs and spices, cheese (from Hebron), etc.; which could also be processed and packaged in an “incubator” kitchen type facility.

High value co-products could include such things as hides, feathers, emu oil, horns and skulls, Native American crafts, specialty wool, etc. For example, a wool producer group is currently marketing wool clothes from sheep they advertise as being protected from predators by llamas and donkeys rather than trapped or shot. These clothes are selling for a very premium price to the so-called “green” customers located on the East and West coasts.

Depending on the size of the plant and the extent of value-added processing, possibly 5 to 20 employees would be necessary. The market for these specialty products is growing. A Southwest ND location may be good from an environmental standpoint because of the low population base and the “wide-open space”.

Livestock production is an economic development endeavor with high potential since each dollar received for livestock in ND generates about \$4.49 in increased economic activity due to the multiplier effect - more than any other agricultural commodity.

Appendix B

StratSense™

Project Number: To be assigned

Project Title: Identifying market opportunities for new and value-added agricultural products.

Objectives: There are four specific objectives:

1. To design a method for identifying potentially lucrative market opportunities.
2. To investigate success/failure factors for selected regional agribusinesses.
3. Develop value-added concepts and initiate implementation strategies.
4. Develop market information and educational materials for targeted audiences.

Justification:

In the past few years, regional farmers and ranchers have experienced shrinking profit margins at the farm gate marketing level (Hauck, Kraenzel and Rose, 1997). While margins shrink for much of production agriculture, trends in the food industry are increasingly driven by consumer demand. In this environment, producers are faced with a decision: Do they do more of the same? Do they differentiate their product at the farm gate? Do they vertically integrate forward to the consumer? Or, do they do some of each? Any decision other than “more of the same” means the producer has selected a value-added marketing opportunity.

The NDSU College of Agriculture, the Agricultural Experiment Station and Agricultural Extension Service are working with industry to develop, produce and market new value-added agricultural products. The author’s current position as agribusiness development specialist was created to assist in meeting this need. Previously, a high-value crops coordinator position was created in Barnes County to begin to build up the statewide production base for specialty value-added crops. As this base grows the need to focus on markets is critical, as ideally markets should lead production. By the same token, production must be geared up to meet emerging markets. Rapid change is occurring in the U.S. and world food supply system (IAMA Conference, 1997). Vertical integration and vertical coordination create the need for timely, accurate market information to guide short, intermediate and long term production and enhance profitability (Saxowsky and Duncan, 1998).

This project will develop a market-oriented, decision-making framework for agricultural producers and agribusinesses that is highly responsive to the rapidly changing consumer environment. This system will assist the agribusiness sector’s competitiveness (as measured by market share and volume of business) while being supportive of rural communities. In addition, the project will aim to enhance economic opportunities and quality of life for North Dakotans as measured by the number of living-wage jobs and income levels.

Previous Work and Present Outlook:

The design, development and use of agribusiness market strategies in the value-added marketplace have progressed from general business strategies (the early 1900s) to competitive market strategies (Porter, 1980, 1985) to the current acceptance of sustainable competitive advantages (SCAs) (Aaker, 1995, Drucker, 1995). These strategies are derived from the use of a “strategic market management system” approach to the overall business. This process has been described variously as budgeting/control, long-range planning, strategic planning and now strategic market management. When these various management system terms are examined in a historical context, some useful distinctions arise.

The budgeting/control system is associated with the early 1900s. This management system utilizes periodic planning cycles, usually with annual budgeting. The emphasis is on managing complexity and controlling deviations from historical or expected costs and revenues. Deviations are examined carefully to determine the cause and develop corrective measures. The basic assumption is that the past (management, sales, costs, conditions, labor supply, plant/facility and so forth) will be repeated.

The long-range planning system began in the 1950s. The basic assumption in this management system is that past trends will continue, with the spotlight on anticipating growth and managing complexity. Proforma statements project anticipated costs, sales, conditions and technology based on past experience. The time frames may consist of three, five or even ten years. The expansion or contraction of human resources, physical plant and equipment then become the concentrated objectives. Periodic planning cycles are utilized.

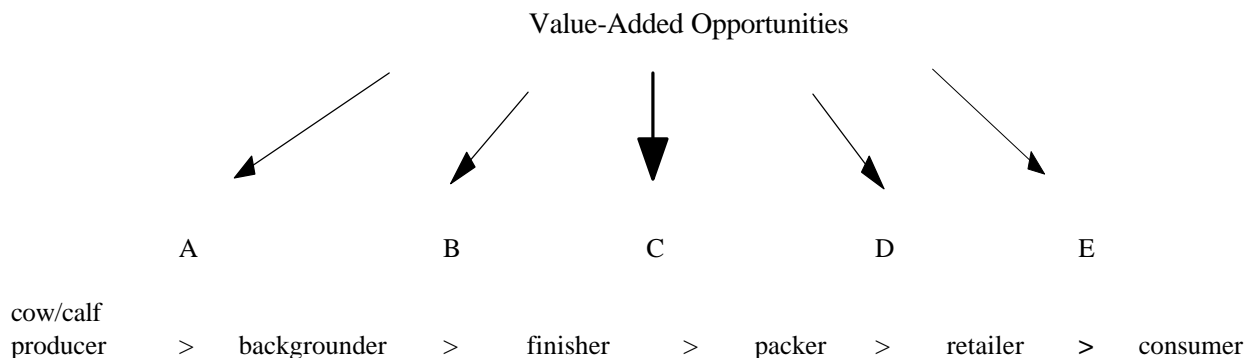
Strategic planning emerged in the 1960s and 1970s. The basic assumption is that new trends and discontinuities are predictable. This management system assumes that extrapolations of the past are inadequate. Therefore, strategic thrusts and capabilities are required to deal with inconsistencies and divergence from the past. Examples include introduction of new products into existing markets, or introduction of existing products into new markets. The focus is on the market environment facing the firm, especially customers and competitors. Periodic planning remains a characteristic. The reality of the marketplace may become a constraint as managers become preoccupied with the day-to-day operational tasks and crises. This suggests that the periodic planning cycle is inadequate, especially in today’s fast paced and quickly changing marketplace.

Strategic Market Management is a complete, real-time system adapted for today’s fast paced changing market environment. The basic assumption is that the planning cycle is inadequate to deal with the rapid rate of change that can occur in the firm’s external environment (for example, markets, technology or interest rates). Therefore, a management framework needs to be provided to cope with strategic surprises and fast-developing threats and opportunities, thus allowing strategic decisions and immediate problem solving to occur outside the planning cycle, but within the boundaries of the periodic plan. These rapidly changing environments require new methods, systems and options in order for the firm to be responsive and remain profitable. Specifically, the need for continuous, real-time information systems arises as a way to augment the traditional periodic planning cycles. The benefits of a real-time information system include enhancing entrepreneurial thrust and developing strategic flexibility. An “information need area” is an area of uncertainty that will affect strategy. Examples would be a new emerging consumer market opportunity such as a ready-to-eat prepared

salad food product or a microwavable beef and gravy food product. Another example might be the immediate producer need to “Ask an Expert” for quick and accurate advice on a fast developing insect or scab threat. Such a program was initiated by the University of Illinois in 1995.

An important aspect of strategic marketing management is that it does not necessarily accept the external environments as given, with the strategic role confined to adaptation and reaction. Rather, the possibility exists for strategy to be pro-active, affecting environmental change. Thus, governmental policies, customer needs, and technological developments can be influenced by creative, active strategies. The evolving systems related to strategic market management actually build on all four management systems: the budgeting/control system, the projection-based approach of long-range planning, the elements of strategic planning, and the refinements needed to adapt strategic decision making to real-time. In strategic market management, there is normally a periodic planning process supplemented by techniques to allow the organization to be strategically responsive outside the planning process. The inclusion of the term “market” into the phrase “strategic market management” emphasizes that strategy development needs to be driven by the market and its environment rather than being internally oriented. It also points out the process should be pro-active rather than reactive, and that the task should be to try to influence the environment in addition to responding to it (Aaker, 1995).

A prime example of value-added opportunities that are ripe for strategic marketing management is illustrated in the state beef industry food value chain shown below. Each level of the chain offers the opportunity for additional profits (or losses).



The cow/calf producer captures the profits “A” in the sale of the calf to the back grounder, who in turn captures the profit “B” in the sale to the finisher and so on up the chain. “B” profits are a result of adding value to the product produced or received (the backgrounder adds 200 to 250 lbs. of weight to the calf). To seek additional profit opportunity, the producer must perform the function of the next participant(s) already functioning in the food value chain at each subsequent level. So the producer “adds a backgrounding profit center” to his operation and becomes a cow/calf producer/backgrounder adding value to his calves. Other backgrounders, who may have been a market for their calves before, now become competitors or alliances. The producer must choose how far up the food value chain to go in order to capture additional profit margins (or losses) which are now going to other people. One might ask, “Where am I going to stake my claim along the food value chain?” This poses a new competitive challenge for the producer’s management ability, quality control, capital demands and role in the distribution channel. It also requires a knowledge of local, regional, domestic and international markets.

Scenario analysis, as introduced for use in agriculture by Godet 1987, 1994 and Schoemaker, 1995 is relatively new on the agricultural scene but is mostly linked to strategic planning. The first linkage between strategic marketing management and scenario analysis was presented by this author in the paper entitled “*From General Scenario Analysis to Specific Strategic Market Management and Back: A Continuous Information Flow Process*”. University of Illinois, 1996. The purpose of this AES research project is to develop the real-time information systems required to assess value-added markets, and facilitate access to new market opportunities for ND businesses. Therefore, extensive effort will be devoted to **educational design**: the process of creating effective learning experiences that reflect an understanding of the learners and their needs; examining and organizing content; selecting appropriate teaching tools; creating an effective learning environment and assessing learning outcomes.

Furthermore, of the thirteen trends presented by Hauck, Kraenzel and Rose, 1997, consumer driven markets, value-added interest, increased globalization of markets and the industrialization of agriculture were selected as the core trends given priority in this project:

- ! Consumer driven markets — Consumers are demanding greater variety, quality, safety and convenience. This has resulted in an increased use of quality management systems, such as Total Quality Management (TQM), in the value chain (i.e. production systems and processing systems) and the opportunity for market-driven production.
- ! Industrialization of agriculture — As the agriculture sector seeks greater efficiency and lower risks, it is using more contracts, joint ventures, special credit arrangements, and other mechanisms to conduct business. Farm machinery designs also continue to be larger and more efficient, enabling farmers and ranchers to increase the size of their operation.
- ! Value-added interest — Interest in value-added food products, branding, high value crop production, the vertical integration/coordination of farms and ranches, and food processing/manufacturing is at an all time high in the region.
- ! Increased globalization of markets — Trade will continue to increase, providing more international market opportunities as well as more competition in domestic and foreign markets. Information technology is the key to thriving in this market environment.

Procedure:

The specific objectives will be accomplished through the following steps:

Objective 1. To design a method for identifying potentially lucrative market opportunities. Market opportunities will be defined using the contemporary strategic market management framework first developed by David A. Aaker, University of California, Berkeley and presented in 1995. External market analysis will be conducted focusing on customers, competitors, the markets, and environmental factors affecting the business climate. Elements from the more classical competitive strategy approach embraced by Michael E. Porter, Harvard Business School, will be integrated into the strategic market management framework. The virtual approach (using the INTERNET) to competitive strategy advanced by Peter Drucker, Claremont University, Claremont, California will also be utilized.

Objective 2. To investigate success/failure factors for selected regional agribusinesses.

Specific success/failure factors of the selected agribusiness firms will be conducted in consultation with NDSU agricultural economists having intimate planning, feasibility and business establishment knowledge of these ventures. Factors to be considered relevant include but are not limited to profitability, solvency, number and type of jobs created and economic impact on the community and region.

Objective 3. Develop value-added concepts and initiate implementation strategies. The “internal analysis” will focus on elements internal to the farm, firm or organization. Emphasis will be on present and potential opportunities, threats, strategic questions and strategic choices. The internal analysis focuses on performance (profitability, Return on Investment, Return on Assets, costs). Examinations of the key determinants of strategy such as strengths, weaknesses, and strategic problems. The Kraenzel linkage will be expanded and applied to specific North Dakota new and value-added marketing opportunities.

Objective 4. Develop market information and educational materials for targeted audiences to include producers, in-service extension personnel, agribusinesses and agribusiness related businesses. Dissemination of the information will be accomplished using a segmented reader (audience) market approach. Findings, conclusions, recommendations and information from various data bases will be published using established delivery methods. These methods include Experiment Station reports, Extension Reports and various other circulars and publications; the World Wide Web; traditional media outlets such as newspapers, magazines and others; audio tools such as radio, tapes and CDs; visual tools such as IVN, videotapes and CDs; and interactive tools such as workshops, tutoring and classroom lectures.

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IMPORTANCE TO THE STATE OF NORTH DAKOTA: This project is of vital importance to the value-added projects and efforts in North Dakota, especially branded product development. In today's consumer-driven markets the ability to properly assess these markets and identify marketing opportunities will allow producers to tailor their production to the specific product characteristic criteria that now abound in the food, fiber and industrial use markets. The structure of the project lends itself to providing an umbrella marketing/sales framework under which a diverse array of value-added projects will benefit and flourish. The interdisciplinary and interactive nature of the project promotes a team approach to creating value for North Dakota's overall economy.

Probable Duration: The project duration is 5 years.

Personnel: Principal Investigator: David G. Kraenzel, various colleagues in complementary disciplines and areas of expertise.

David G. Kraenzel .30SY

Cooperation: Cooperating entities are the Agricultural Experiment Station, university faculty, Extension Services, and various state agencies, strategic groupings and economic developers. Alliances will be formed where appropriate with personnel from various business, industry, government, other countries and states, and land grant university entities.

ANIMAL CARE, DNA/RNA OR HUMAN SUBJECTS: N/A

APPROVED:

Institutional Unit Administrator

Date

Director
N.D. Agricultural Experiment Station

Date

Appendix C

Survey

Specialty Meat Animal Producer Survey

1. What type(s) of livestock do you raise? _____
2. How many of these animals are you currently raising? _____
3. Do you process these animals yourself? Yes _____ No _____
If Yes, how much does this processing cost you? _____
If No, where are they processed? _____
4. How much processing is done to the animal? _____
5. Do you sell the live animal, the processed products from the animal, or both?
Animal _____ Products _____ Both _____
6. Where do you market your animals/products (who buys them?) _____

7. What price do you receive for these animals/products? _____
8. About how much does it cost for you to raise these animals? _____

Appendix D

Ratite Processor List

Ratite Processor List

<http://RAtite.morgan.net/processor.htm>

ALABAMA

Sasser's Meat Company 334-493-7679
Route 2 Box 140J, Andalusia, AL 36420
Rhea-Emu

ARIZONA

Heartfare Foods 602-214-0071
17016 W. Jomax, Sun City West, AZ 85375
USDA/Slaughtering Ratites
Selling Ostrich Meat Worldwide

ARKANSAS

Ostrich Select, Inc. 501-594-5465
P.O. Box 24008, Little Rock, AR 72221-4008
Ostrich, Emu, Rhea - Custom Processing Only

CALIFORNIA

Carpenter Squab Ranch 805-649-1474
5207 Casitas Pass Road, Ventura, CA 93001
Emu - Custom Processing
New Stockton Poultry 209-466-9503
P.O. Box 2129, Stockton, CA 95203
Emu - Custom Processing
Panoche Livestock, Co. 209-923-4009
4319 E. Cooper, Clovis, CA 93612
Emu - Custom Processing
Shamrock Rabbit Ranch 619-766-4607
39990 Roadrunner Lane, Boulevard, CA 91905
Ostrich and Emu - Custom Processing
United Ratite Cooperative 916-885-9825

13620 Lincoln Way, Suite 290, Auburn CA 95603

Processing Members' Birds - Ostrich, Emu, Rhea

Walt MiKenny Foods, Inc. 209-625-4600

P.O. 1364, Visalia, CA 93291

Ostrich & Emu - Custom Processing - USDA Approved

COLORADO

Emu Producers Cooperative 303-363-8597

P.O. Box 66, Watkins, CO 80137

Process and Market Co-op Birds (USDA Approved)

Selling Emu Meat

G&C Packing 719-634-1587

Colorado Springs, CO 80904

USDA Custom Only, Ostrich & Emu

Hi Plains Ostrich Meats 303-841-4990

P.O. Box 1307, Elizabeth, CO 80107

USDA Ostrich Only, Buying Only, Rail Weight Paid

FLORIDA

Little Creek Ostrich Ranch, Inc. 800-933-2767

Ft. Myers, FL • Zolfo Springs, FL

Ostrich (USDA Approved) - Buying Birds

RBP Meats, Inc. 904-682-2259

5713 Seminole Dr., Crestview, FL 32536

Ratite - Beef - Pork

GEORGIA

Miller Brothers Packing Co., Inc. 912-776-2014

Hwy. 82 East, Sylvester, GA 31791

State Approved Custom Processing Only - Rhea, Emu, Ostrich

Georgia State Inspection. 912-758-3155

1192 Hwy. 91 S, Calquitt, GA 31737

Ostrich & Emu

IDAHO

C&L Lockers 208-882-3396

Moscow, ID

State of Idaho Approved

Jones Custom Packing 208-745-6523 • FAX 208-745-6565

Rigby, ID

USDA Approved

ILLINOIS

Eickman's Processing Co. 815-247-8451

Box 118 Grant Street, Seward, IL 61077

Ostrich, Emu and Rhea - Custom Processing Only

Golden Locker Co-op 217-842-5216

115 E. 5th Street, Bowen, IL 62316

Emu Only - Custom Processing

Houser Meats 217-322-4994

Rt. 2 Box 180-B, Rushville, IL 62681

Ostrich and Emu - Custom Processing Only

Jones Meat & Locker 217-243-2212

Jacksonville, IL

Longneck Ranch, Inc. 815-334-9003

10625 US Hwy. 14, Woodstock, IL 60098

Ostrich Only - Buying Slaughter Birds - USDA Approved

USA Classic Ostrich Meats 800-642-7239

7 Lakewood Drive, Centralia, IL 62801

USDA Inspection - Ostrich Only - Buying Slaughter Birds

Selling Meat - Shipping Everywhere

INDIANA

Country Meats Unlimited, Inc. 219-353-1616

P.O. 636, Mentone, IN 46539
Ostrich - Custom Processing (USDA)
Dewig Family Farm Market 812-768-6841
RR 2 Box 8, Haubstadt, IN 47639
Custom Processing - Ostrich, Emu and Rhea
State Inspected - Complete Line of Ratite Products
Fishers Packing Co. 219-726-7355
309 W. High St., Portland, IN
Processing Ostrich
Little Creek Ostrich Ranch, Inc. 800-933-2767
Mt. Vernon, IN
Ostrich - Buying Birds (USDA Approved)
Prime Ostrich Products 812-934-2902
106 Sycamore St, Batesville, IN 47006
State Inspected

IOWA

Ostrich Producers Co-op of the Midwest 319-382-0022
2486 171 Ave., Decorah, IA

KANSAS

Bronson Locker 316-939-4575
Bronson, KS
Custom Processing
Frontier Meats 316-835-2155
135 Main, Halestead, KS 67056
Custom Processing Only
Hillsboro Refrigerated Lockers. 316-947-3781
411 South Ash, Hillsboro, KS 67063
Custom Processing Emu

KENTUCKY

Farmers Custom Processing, Inc. 502-286-8612

Hwy. 187, Sunfish, KY 42284

Ostrich Only - Custom Processing Only

LOUISIANA

Acadian Prime Cut Ostrich Meat 504-683-9988

910 Hwy. 961, Clinton, LA 70722

Restaurant and Mail Order Processing

Superior Ostrich Products 800-905-6287

P.O. Box 547, Ringgold, LA 71068

Buying Ostrich Now

Tragos Hill Processing Co. 504-848-9700

FAX 504-848-9755

Angie, LA 70426

Emu - Custom Processing

MASSACHUSETTS

New England Ostrich Specialty Meats Int'l 413-665-BIRD

P.O. Box 368, Turner Falls, MA 01376

Custom Processing Only (USDA)

MICHIGAN

Kaynor Meats, Inc 616-533-6056

4135 School Craft Rd, Bellaire, MI 49615

Custom Processing Ostrich, Emu & Rhea

MINNESOTA

Royal Choice Ostrich, Inc. 612-430-2764

Buy Ostrich Wholesale - USDA Ostrich Meat

MISSISSIPPI

All South Marketing Corp 601-798-4621/601-798-4297

1402 W. Union Road, Picayune, MS 39466

Buying - Pay Live or Rail Weight - Custom Processing

USDA and State Inspected

M&M Processing Plant 601-628-4185

Calhoun City, MS

Process Birds and Package Meat

Orea Secrets MS Emu Farms Co-op 601-743-2626

P.O. Box 986, Dekalb, MS 39328

Processing All Ratites

Two State Processing 601-798-4297

3885 Hwy. 63 South, Waynesboro, MS

Emu - Private Marketing and Processing

MISSOURI

DDR Emu Ranch 417-683-5532

P.O. Box 1162, Ava, MO

Emu Meat and Oil

Highlandville Packing

P.O. Box 186, Highlandville, MO

USDA Approved, Custom Slaughtering

Ozark Packing 417-581-2449

273 Camelot Drive, Ozark, MO

Approved for Ostrich - Custom Processing Only

Swiss Meat & Sausage Co. 800-793-SWIS

Hermann, MO

USDA Approved, Summer Sausage/Emu Jerky

Swiss Meat & Sausage Co. 800-793-SWIS

Hermann, MO

USDA Approved, Summer Sausage/Emu Jerky

USA Classic Ostrich Meats. 800-642-7239

19998 Sky View Lane, Blackwater, MO 65322

USDA Inspection - Ostrich Only - Buying Slaughter Birds

Selling Meat - Shipping Everywhere

NEVADA

Nevada State Meat Processing Corp 702-751-3555
1190 South Linda, 4000 Box 154, Pahrump, NV 89041
Custom Processing Ostrich/Emu and Slaughtering
USDA Custom/State Inspected

NEW JERSEY

Bringhurst Meats 609-767-9107
38 W. Taunton Road, Berlin, NJ 08009
Ostrich Only - Custom Processing & Slaughtering
(No Purchasing), USDA

NORTH CAROLINA

Oro Verde Farms 888-681-6328, 888-218-0270 Fax
9001 Poole Rd., Knightdale, NC 27545
Pinetucky Ranch & Meat Processing, Inc. 704-872-4869
219 Lippard Farm Road, Statesville, NC 28677
Buying Ostrich, Rhea, Emu on Demand
USDA Inspected, Also Custom Processing & Private Label
Volstris Ranch 910-670-2188
2179 Yellow Banks Road, North Wilkesboro, NC 28659
Ostrich and Emu - Buying - Paying Live Weight

OHIO

Blackwing Ostrich 800-326-7874
Atwater, OH
Ostrich Only - Buying Birds - Pay by Bird or Rail Weight
USDA Approved/State Inspected
Green's Quality Meat Service 419-586-7425
Celina, OH

Ostrich - Custom Processing Only - USDA Approved

Mount Victory Meats Store 513-354-2326

Mount Victory, OH 43340

Custom Slaughtering - Ostrich, Emu and Rhea

Ohio Ratite Breeders 216-325-8751

3468 Eberly Road, Hartville, OH

Ostrich, Emu and Rhea - Buying Members' Birds

OKLAHOMA

Birds of Paradise 405-248-2003

Rt. 1 Box 260, Lawton, OK 73501

Ostrich, Emu and Rhea - Buying - Pay Rail Weight

Southwest Ostrich Processors 405-288-6231

Washington, OK

Buying - Pay Rail Weight

OREGON

Boyer Meat Company 541-673-6323

5357 N. Umpqua Hwy., Rosenberg, OR 97490

Process All Three Ratites

Ostrich Producers Co-op 800-672-4456

P.O. Box 318, Gervais, OR 97026

Ostrich Only - Pay Live Weight

Little Ol' Fashioned Smokehouse 541-296-6328

Processing Emu Only

Tim's Custom Meat 541-826-5260

6000 Azalea, Central Point, OR 97502

Emu and Ostrich - Custom Processing

PENNSYLVANIA

Leona Meat Plant, Inc. 717-297-3574

Troy, PA

USDA Approved - Ostrich and Emu

Reiff's Poultry 717-966-0769

RR 2, Box 484, Mifflinburg, PA 17844

Emu - Custom Processing

Rothermel Meats 717-275-1439 (ask for Skip)

Danville, PA

Custom and PDA Processing of Emu

TENNESSEE

Bill's Meat Block 615-728-3148

Manchester, TN

Emu and Ostrich - Custom Only - USDA Approved on Ostrich

Featherlite Meats 615-459-6192

Smyrna, TN

Paying Rail Weight - Ostrich, Emu, Rhea

Skinned and Rib Cage Removed - Rhea, Emu, Ostrich

TEXAS

Cain's East Texas Meat 903-655-0786

606 Hwy. 64 West, Henderson, TX 75652

Emu - Custom Processing

Caprock Meat Co. 806-983-5844

807 E. Missouri Street, Floydada, TX 79235

Emu - Custom Processing

C.O.R.E. Processing of Texas 409-875-2223

Lufkin, TX

Custom Processing

Earthwide Enterprises, Inc. 800-554-1506

Elcampo, TX

Ostrich and Emu - Custom Processing Only

Empco Co. Inc. 817-583-2046

P.O. Box 479, Rosebud, TX 76570

Processing

Emu Prime Processors, Inc. 817-481-6809 • FAX 817-421-5049

2937 Robin Dale, Grapevine, TX 76051

Emu - Private Marketing and Processing

Emu Producers Int'l Co-op 903-626-6640

P.O. Box 295, Jewett, TX 75846

Emu - Members' Birds Only

Emu Ranchers, Inc. 800-443-6874

2700 Industrial Lane, Conroe, TX 77303

Emu Only - Buying Co-op Members' Birds Only

Henderson Packing 903-655-0786

606 Hwy. 64 West, Henderson, TX 75652

Custom Processing - Will Not Necessarily Purchase Meat

Jackson Brothers Processing 806-495-3240

Post, TX

Ostrich - Emu - Rhea

Lonestar Longneck Processors, L.L.C. 903-757-7110

1522 FM 1845, Longview, TX

Processing Ostrich, Emu & Rhea

Lonestar Specialty Products 800-800-7712

P.O. Box 603, LaVernia, TX 78121

Buying Birds As Needed - Emu, Ostrich, Rhea - Pays on Per Bird Basis - Wholesale or Retail

UTAH

Advanced Genetics Ostrich Ranch 801-534-7524

159 W. 300 Street, Salt Lake City, UT 84101

Buying, Pay Rail or Live Weight

InterMountain Ratite Co-op and Fillmore Custom Meats

801-743-5223

571 W. 100 North, Fillmore, UT 84074

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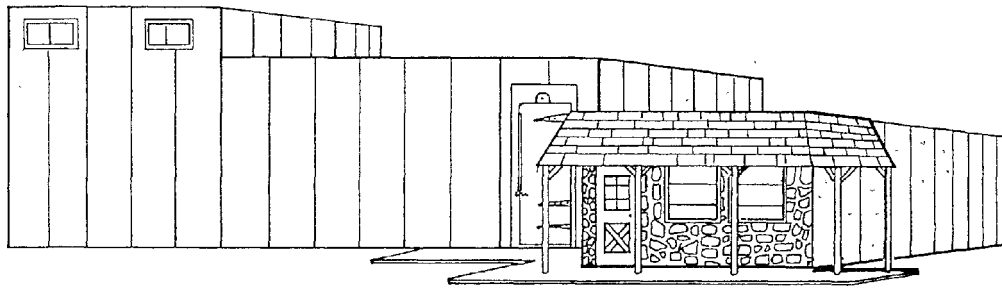
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Appendix E
Feasibility of Operating a Lamb
Slaughter Plant in North Dakota

FEASIBILITY OF OPERATING A LAMB SLAUGHTER PLANT IN NORTH DAKOTA

A Report To Valley Wool Growers
By
Dan Nudell and Tim Petry

Institute of Natural Resources and Economic Development
Department of Agricultural Economics



and
Hettinger Research and Extension Center
North Dakota State University
In Cooperation With
N.D. Agricultural Products Utilization Commission

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ABSTRACT

A group of North Dakota lamb producers who are members of Valley Wool Growers Association identified several niche markets for high quality North Dakota lambs. The potential availability of a closed, but formerly federally inspected, livestock slaughter and meat processing facility in Steele County heightened their interest in determining the feasibility of a cooperatively owned lamb slaughter and processing facility. The cooperative would be patterned after existing and proposed slaughter cooperatives, whereby cooperative members would own shares to supply lambs to the plant on a year-round basis.

The analysis was conducted in several sections corresponding to critical factors which affect feasibility of the plant. The critical factors analyzed included federal inspection requirements, the potential of an adequate supply of lambs, the potential for a viable niche market, plant investment and operating costs, expected return, alternative lamb purchase prices, alternative lamb carcass sales prices, and several investment and expense scenarios.

The building and equipment investment was projected to be \$1,468,000, which was higher than originally expected due to the extensive refurbishing necessary to meet federal inspection and increased capacity requirements. Plant operating expenses at full capacity were projected to be \$3,013,877 per year which included \$673,877 in operating expenses and \$2,340,000 for lamb purchase. Income from lamb meat sales and pelts was estimated at \$2,800,000 per year.

The assumptions of purchasing 20,000 lambs per year for \$0.90 per pound and selling for \$2 per carcass pound resulted in an annual negative margin of \$213,877 at full capacity. Therefore, other scenarios were investigated which would enable the plant to operate profitably. The maximum price that could be paid for lambs to pay all investment and operating costs, including a 7.5 percent return to member equity, was \$0.8004 per pound. A 25 percent increase in projected costs would reduce the purchase price to \$0.7358, or a reduction in the lamb carcass sales price to \$1.80 per pound would reduce the lamb purchase price to \$0.7004.

The range in probable prices that could be paid for lambs is \$0.70 to \$0.80 per pound with a likely price of \$0.75. The proposers of the cooperative will need to decide if prices in this range would be sufficient to lure enough member investors to provide the 20,000 lambs necessary to operate the plant.

Key Words: lambs, slaughter, processing, niche market, lamb prices, lamb carcass prices, feasibility, cooperative, federal meat inspection, plant operating expenses.

HIGHLIGHTS

A group of North Dakota lamb producers who are members of Valley Wool Growers Association identified several niche markets for high quality North Dakota lambs. The potential availability of a closed, but formerly federally inspected, livestock slaughter and meat processing facility in Steele County heightened their interest in determining the feasibility of a cooperatively owned lamb slaughter and processing facility. The cooperative would be patterned after existing and proposed slaughter cooperatives, whereby cooperative members would own shares to supply lambs to the plant on a year-round basis.

The analysis was conducted in several sections corresponding to critical factors which affect feasibility of the plant. The critical factors analyzed included federal inspection requirements, the potential of an adequate supply of lambs, the potential for a viable niche market, plant investment and operating costs, expected return, alternative lamb purchase prices, alternative lamb carcass sales prices, and several investment and expense scenarios.

Current sheep numbers in North Dakota and the region, coupled with new technology in year-round lamb production indicate that enough lambs could be available to meet the 20,000 head per year needed by the plant. Producers of the cooperative identified several confidential niche markets for high quality North Dakota produced lambs. Some examples include marketing to ethnic and religious groups in more urban markets and production of hothouse lambs for that market. A premium price for the product can be expected because it meets the specifications of unique consumer groups.

The building and equipment investment was projected to be \$1,468,000, which was higher than originally expected due to the extensive refurbishing necessary to meet federal inspection and increased capacity requirements. Plant operating expenses at full capacity were projected to be \$3,013,877 per year which included \$673,877 in operating expenses and \$2,340,000 for lamb purchase. Income from lamb meat sales and pelts was estimated at \$2,800,000 per year.

The assumptions of purchasing lambs for \$0.90 per pound and selling the meat for \$2 per carcass pound resulted in an annual negative margin of \$213,877 at full capacity. Therefore, other scenarios were investigated which would enable the plant to operate profitably. The maximum price that could be paid for lambs to pay all investment and operating costs, including a 7.5 percent return to member equity, was \$0.8004 per pound. A 25 percent increase in projected costs would reduce the purchase price to \$0.7358, or a reduction in the lamb carcass sales price to \$1.80 per pound would reduce the lamb purchase price to \$0.7004. The range in probable prices that could be paid for lambs is \$0.70 to \$0.80 with a likely price of \$0.75. The proposers of the cooperative will need to decide if prices in this range would be sufficient to lure enough member investors to provide the 20,000 lambs necessary to operate the plant. The idea to add value to locally produced lambs and provide product to a niche market is certainly a good one. It should not be lost even if the purchase prices are considered too low to generate sufficient interest. A viable niche market for high quality, specialty lamb products does exist; so producers may want to pursue slaughtering lambs on a custom basis in an existing slaughter facility. This would eliminate the initial investment costs in buildings and equipment and enable producers to

concentrate on producing and marketing a high quality product. It would allow starting on a smaller scale with fewer lambs per year.

FEASIBILITY OF OPERATING A LAMB SLAUGHTER PLANT IN NORTH DAKOTA

Dan Nudell and Tim Petry¹

INTRODUCTION

The production and sale of livestock and livestock products are important sources of income for North Dakota agricultural producers. Cash receipts from livestock and products typically amount to 20 to 30 percent of North Dakota farm income. In some counties, cash receipts from livestock are quite important and amount to three-fourths of total farm income (NASS, 1997).

There were 135,000 sheep and lambs on 1000 North Dakota farms and ranches on January 1, 1997. Sales of sheep and lambs generated approximately \$6,978,000 in 1996 with sales of wool generating about \$676,000 (NASS, 1997).

The North Dakota livestock slaughtering and processing industry is composed primarily of relatively small facilities that serve local communities. A medium-sized (by industry standards) cow slaughter and processing facility, a medium-sized hog slaughter and processing plant, and a bison slaughter and processing facility do exist. A group of cattle producers is promoting a cooperatively owned medium-sized market cattle slaughter and processing plant which could be located in North Dakota. Slaughtering and processing lambs occurs in several small plants in North Dakota amounting to less than 500 head per year.

Rural economic development has emerged as a high priority public policy issue in North Dakota. Policymakers have set goals to increase value-added livestock enterprises in the state to increase economic activity. Each dollar received for livestock in North Dakota generates approximately \$4.49 in increased economic activity due to the multiplier effect, so expanding livestock production is an economic development endeavor with high potential.

The lack of a major lamb slaughtering facility in or near North Dakota means that many lambs must be transported several hundred miles for marketing. Declining sheep numbers nationwide and increased concentration in lamb processing have resulted in only a few large lamb slaughter plants. These large plants are not necessarily responsive to the unique needs of niche markets which are developing for lamb.

A group of North Dakota lamb producers identified several niche markets for high-quality North Dakota lambs. The potential availability of an existing federally inspected livestock slaughter and meat processing facility in Steele County heightened their interest in determining the feasibility of a cooperatively owned lamb slaughter and processing facility. The cooperative would likely be patterned after existing and proposed livestock slaughter cooperatives, whereby cooperative members would own shares to supply lambs to the plant on a year-round basis.

¹Nudell is an assistant experiment station scientist, North Dakota State University Research and Extension Center, Hettinger, ND and Petry is an associate professor, Department of Agricultural Economics, North Dakota State University, Fargo.

The proposed plant would slaughter and process 20,000 lambs per year. Although this plant is small by industry standards, there are several advantages for a plant of this size. The plant would process lambs for small niche markets with unique requirements that large plants cannot satisfy. Generally, these markets are willing to pay higher prices and are more interested in quality, specifications, and service rather than quantity. Furthermore, the plant would not be in direct competition with larger major packers because of the unique market that would be served. A steady dependable market for lambs would be available in eastern North Dakota, which would help to stabilize an industry which has been declining. Several new jobs would result.

In April 1996, Valley Wool Growers Cooperative applied to the Agricultural Products Utilization Commission in North Dakota for a grant to cover the cost of a feasibility study of the proposed plant in Hope. Funding was granted, and this report is the result of that work.

The analysis was conducted in several sections corresponding to critical factors which affect feasibility of the plant. If analysis shows any of these factors to be unsatisfactory, the plant would not be feasible and the feasibility analysis could stop at that point. The critical factors analyzed by sector include federal inspection requirements, the potential for an adequate supply of lambs, the potential for a viable niche market, plant investment and operating costs, and the expected returns.

THE WHOLESOME MEAT ACT

Livestock slaughter plants operate under meat inspection regulations administered by the United States Department of Agriculture, Food Safety and Inspection Service (USDA, FSIS). Regulation began in 1891 when a comprehensive federal meat inspection law was passed. The 1891 legislation provided for inspecting the animal prior to slaughter and the meat after slaughter.

The 1891 legislation was extended in 1906 to include sanitation standards for slaughtering and processing plants trading in interstate commerce. This legislation was the basis of all meat inspection until the passage of the Wholesome Meat Act of 1967, which extended the requirements for inspection to plants that only sold meat within the state of operation.

The 1967 legislation gave individual states until 1969 to establish state inspection of processing plants that were not previously federally inspected. North Dakota passed a state inspection bill but did not allocate funds to initiate the program. Consequently, in 1970, federal inspection was initiated in North Dakota.

The 1967 Wholesome Meat Act has been modified several times. The regulations, designed to insure a safe and wholesome supply of meat, govern the operation of all slaughter plants which retail or wholesale meat products. Some exemptions to the act were made for small local plants. Custom-exempt plants may slaughter and process meat for the livestock owner and are inspected only quarterly. The meat cannot be sold to other customers. Retail exempt plants, such as grocery stores, may cut, process, and retail meat that has been purchased from a federally inspected plant.

The USDA is implementing a new series of regulations for meat slaughter plants and processors called HACCP, which stands for Hazards Analysis Critical Control Points. The intent of the regulation is to identify potential problem areas in food safety and implement standard plant practices to insure a wholesome meat supply. The regulation has a staggered implementation scheme with the largest plants being required to meet the new guidelines first. By 1999, all plants must meet the new guidelines. The proposed plant would be required to meet the new regulation by 1999.

The HACCP regulation will require each plant to develop a plan to identify the critical control points for meat safety critical points and develop specific action plans to insure food safety. These plans may include employee monitoring of certain processes, enhanced record keeping or even laboratory testing of products and process.

HACCP is estimated to require up to two (2) additional full-time equivalents in payroll when fully operational and approved by USDA. Since these employees will have an inspection/supervisory capacity and, consequently, will be near the top of the pay scale at the Hope plant, this will have a substantial impact on the plant's operating costs.

The proposed plant will market all or nearly all of its product to wholesale and retail customers. None of the exemptions provided in the Wholesome Meat Act for custom-exempt and retail-exempt plants will provide any relief from the regulations of the act. Compliance with the requirements of federal inspection are expensive, but are mandated by law. Furthermore, the liability risk of selling an unsafe product is extremely high. The cost of meeting the requirements of the Wholesome Meat Act and the HACCP regulations will significantly impact the cost of doing business in the proposed slaughter plant.

Dr. Robert Anderson, supervising veterinary medical officer, FSIS, USDA, toured the existing plant with the authors and sheep producer members of the proposed lamb packing plant cooperative. He identified potential problem areas in the existing facility, and concluded that the plant should be renovated to a "like new" status before it would be approved for reopening under federal inspection. The proposed cooperative would need to submit a request for federal inspection, including blueprints and all anticipated building and equipment requirements for approval.

SUMMARY

Since federal inspection is mandated by law, the USDA is obligated to provide inspection to a plant that meets their specifications. Therefore, if the plant was renovated to a "like new" status and approved, federal inspection requirements would not prevent the plant from being operational.

NORTH DAKOTA LAMB SUPPLY

A major assumption of this study is that the cooperative will be successful in recruiting sufficient lamb producer members to supply 80 lambs each processing day throughout the year. The supply

of lambs to operate a slaughter plant is one of the critical factors investors must verify prior to investing in the facility. In the tight margin industry of meat packing, the inability to operate facilities at full capacity can have a serious negative effect on the plant's profitability. A large portion of the financial obligation of the plant is in fixed costs: the physical structure of the building and equipment. While variable costs, such as utilities and labor, can be reduced during periods of lamb shortages, the cost of the capital investment does not change during periods of reduced use. Ensuring a steady supply of lambs is critical for success.

The total supply of lambs in North Dakota is sufficient to supply a plant of this size with all the product needed to run at full capacity. In 1996, North Dakota sheep producers marketed 80,000 lambs from 77,000 ewes (USDA, 1997). The inventory of ewes in 1997 rose to 91,000, so more than 90,000 head of lambs may be marketed in 1997, depending on the number of ewe lambs retained for flock expansion. Also, Minnesota and South Dakota producers will be invited to join the cooperative which will expand the availability of lambs.

The geographic distribution of lamb production in North Dakota would be a concern for the plant. USDA data for 1997 indicate that 22 percent of the North Dakota sheep inventory is in the eastern one-third of the state, 31 percent is in the central one-third and 47 percent is in the western one-third. Therefore, recruiting cooperative members from western North Dakota would be important, or members in eastern North Dakota would need to purchase and feed additional feeder lambs to supply the plant's needs.

Two supply related concerns need to be addressed: the seasonality in lamb production and the practice of selling feeder lambs instead of slaughter weight lambs in North Dakota.

Due to the reproductive biology of sheep, lamb production has been characterized by seasonal production patterns. The weekly U.S. federally inspected lamb slaughter for 1996 ranged from a high of 102,500 head at the end of March to a low of 52,800 in the first week of July. Higher slaughter occurs before the spring religious holidays and is lower during the mid-summer between the spring and fall lamb crops. Weekly sales data for North Dakota are not available, but data from West Fargo Stockyards indicate that in only 5 weeks of the year did the market receive enough lambs to meet the needs of the plant and could meet 75 % of the need in only 12 weeks. In addition the range of supply was 0 to over 800 head per week. In 16 weeks, the available supply was less than 50 head.

Since the plant has a maximum capacity inherent in its design, shortfalls in production cannot be made up in a following period without adding extra shifts. A rural plant is not expected to have available trained labor that can fill extra shifts on short notice. Weeks where full production is not achieved will adversely affect the profitability of the plant.

The technology exists today to provide a more stable year-round supply of lambs. Traditional lambing time has been in the spring. Sheep are seasonal breeders and, if left to their own devices, would always lamb in the spring. Technologies are available using hormones, light or the ewe's natural responses to lengthen the time she is reproductively active. All these methods increase the amount of management input needed by the sheep flock and have not been widely accepted in the industry.

Researchers at North Dakota State University at Hettinger have had good success in getting ewes to lamb in August, September, and October, using the ewes' response to rams and selection to choose replacement females from fall lambing ewes. The lambing and conception rates are not as high as spring lambing, but are high enough to be feasible.

South Dakota State University has done extensive work with light control and has used hormone control to extend the lambing season. Their work confirms the ability to extend lambing to non-traditional times. Extending lambing into the fall is more labor intensive than spring lambing.

The operators of the plant will have to overcome traditional production practices and competition for resources during non-traditional times of lamb production. Other farm enterprises may compete for available resources in non-traditional lambing flocks.

Based on official USDA saleable receipts at the West Fargo Stockyards in eastern North Dakota and lambs marketed by producers enrolled in the North Dakota Sheep Development Project in western North Dakota, it was estimated that less than 40 percent of the lambs marketed in the state were slaughter weight. The remaining 60 percent were feeder lambs weighing from 50 to 110 pounds. The cooperative would need high quality slaughter lambs with a consistent weight and grade. An educational program would be necessary to inform members of the additional feeding requirements necessary to meet the weight and quality goals of the cooperative.

It will be very important that the plant manager monitor the progress of the lambs committed by members to assure production would remain on schedule. In the event that members could not meet quality and quantity commitments of the contract, lambs may have to be purchased from livestock markets. Five markets are within a 100-mile radius of Hope, with West Fargo Stockyards being the largest seller of lambs. Purchasing lambs at the necessary weights and grades during the summer at these markets may be difficult.

Existing slaughter plants are offering or exploring the option of offering contracts to producers to ensure their supply. The lamb industry has been experiencing good prices and a tight supply. The supply side is not expected to change. A continuing tight supply of lambs would indicate that existing buyers probably will compete strongly for the available supply. Reaction to a new market entrant from existing slaughter lamb buyers at markets is a possibility that must be considered.

SUMMARY

Sheep numbers in North Dakota and the region coupled with new technology in year-round lamb production indicate that enough lambs could be available to meet the needs of the plant. However, recruiting sufficient members to supply the plant on a daily basis will be difficult. The Northern Plains Premium Beef effort to recruit members is an example of the difficulty a new livestock cooperative may experience. On the other hand, the North American Bison Cooperative is an example of a successful effort.

VIABILITY OF THE NICHE MARKET

The national market for carcass lamb has averaged less than \$2 per pound. In the 1990s, the price ranged on an annual basis from \$1.17 to \$1.77 a pound (see Table 1). 1997 year-to-date prices have averaged \$1.83 a pound. This study used a projected price of \$2 per carcass pound, a premium of near 9 percent over 1997 prices and near 23 percent over the average price during the 1994 to 1996 period.

The premium price was chosen because the cooperative plans to market specialty wholesale cuts that meet the unique specifications of quality conscious buyers. High value markets for lamb products exist in affluent geographic areas influenced by ethnic and religious demand. These consumers typically demand specialty products and services not provided by major packers, and are willing to pay premium prices.

Certified Fresh American Lamb, a brand name developed by the Sheep Industry Development Council, meets high quality specifications and typically sells for a premium over non-branded lamb. For example, the USDA carcass lamb report dated February 14, 1997, quoted Choice and Prime, Yield Grade 1-4, 55-65 lb., less than carlot (LCL) volume, CAF East Coast, lamb carcasses at \$188.50 to \$191.50 per hundredweight (cwt.). The same specifications of Certified Fresh American Lamb were quoted at \$214/cwt.

Table 1. Lamb Carcass Price History, Choice-Prime, East Coast, 55-65 lb, 1990-1997.

Time Period					
Year	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter	Annual
	-----\$/cwt.-----				
	-				
1990	125.10	122.96	121.71	116.12	121.47
1991	111.51	123.83	121.65	117.33	117.33
1992	124.99	142.28	129.32	130.05	131.66
1993	157.24	143.25	133.59	141.78	143.97
1994	134.08	135.90	167.45	153.05	147.62
1995	148.00	167.21	177.75	160.92	163.47
1996	168.25	187.81	186.33	168.02	177.56
1997	186.87	186.90	175.35	NA	183.04 YTD

Source: USDA, Agricultural Marketing Service.

Marketers are selling lamb to consumers at premium prices. Many of these sellers are direct marketing. They are also operating at a level below 400 per week and are located in major urban areas where the potential customer base is larger than North Dakota's.

Producers of the cooperative have identified several confidential niche markets for high quality North Dakota produced lambs. Some examples include marketing to ethnic and religious groups in more urban markets and production of hothouse lambs² for that market.

SUMMARY

There is a niche market for the high quality, specialty product this plant would produce. In addition, a premium price for the product can be expected because it meets the specifications of unique consumer groups.

PROPOSED PLANT LOCATION

Hope, North Dakota, is located in southern Steele County in eastern North Dakota. The city is located approximately 35 miles northeast of Valley City, North Dakota. Hope has access to the federal interstate highway system via state highway 32 or 38. The city had a 1990 census population of 281 people. A municipal electric system and a sewer and lagoon system are in place and have the capacity to handle effluent from the proposed plant. Propane and fuel oil are available, but there is not a natural gas supplier.

Hope is the center of 9 percent of the N.D. lamb industry with approximately 8000 lambs available within the east central region. Five livestock auction markets are within 100 miles of Hope.

The Hope city government favors the proposed project and has agreed to award incentives to encourage reopening the plant. The city has guaranteed electrical and water rates for five years with no increase. In addition, they are offering a five-year property tax abatement, pending county approval.

There are several concerns to the proposed location in Hope. Its location away from an interstate highway may add some transportation difficulties. In addition, it may not be as easy to access air transportation, overnight parcel delivery and other transportation options as in a more urban setting.

The plant in Hope is located on the main street of this small community abutting a grocery store on one side and a single family home on the other. There is little room for expansion and only limited room for holding pens, semi-trailer parking and loading/unloading facilities. The building's close proximity to residential areas could be a potential problem for neighborhood complaints about noise, odors, and pests. The highly visible location makes the plant an easy target for complaints.

²A lamb born and raised out of the normal season and marketed at six to ten weeks of age.

The existing structure is available for a reasonable price. However, the building and equipment need extensive renovation to meet federal meat inspection standards.

The city of Hope has offered several inducements to establish the plant in Hope. The community supports the venture and would receive a positive economic impact if the plant were reopened. Balancing this support is the small size of the town. There is a small labor pool to draw from and only limited amenities in Hope to attract new workers to the plant.

SUMMARY

While the proposed location is not ideal, it does meet the minimum requirements of the project and has strong local support.

PLANT INVESTMENT

The estimated purchase price for the existing building and equipment was \$22,000 (Erickson). The cost of renovating and adding on to the building to meet the standards needed to obtain federal inspection was estimated at \$246,000 (Triple E Construction). Renovations would include a new roof; adding additional floor space; resurfacing existing floor space; changing the layout of the existing plant; and completely refurbishing all walls, electrical fixtures and plumbing. The purchase price and renovation would cost \$268,000.

Some equipment was included in the purchase price of the original building; however, the study budgeted for new equipment at \$1,200,000 (Koch Supply). Included was new refrigeration equipment, an entirely new set of killing and processing equipment, sausage-making equipment and a smokehouse. Trade sources contacted recommended complete replacement of the equipment presently in place in the existing structure.

Total building and equipment investment was estimated at \$1,468,000, but does not include any charges for infrastructure changes, such as road work or water and sewer line upgrades. These costs, if any, were projected to be paid with a grant from the regional development council (Lake Agassiz Regional Council). Projected costs for offal disposal facilities were estimated at \$10,000 for 10 acres of land, \$20,000 for a front-end loader and \$2000 for fencing and access.

The cost of constructing a new structure was also investigated. Construction costs for a new building were estimated at \$250,000 plus additional expense for land acquisition. The cost of renovating the existing plant or constructing a new facility were nearly equal and were treated the same in the rest of the analysis.

Total investment in fixed costs was estimated at \$1,500,000 plus up to \$100,000 in infrastructure improvements. In addition, nearly \$500,000 in operating capital would be needed for the project. This project would require \$2,000,000 in funds to begin operation.

SUMMARY

Investment costs were higher than originally expected due to the extensive refurbishing necessary to meet federal inspection and increased capacity requirements. While this raises concerns about the ability of the proposed cooperative to raise necessary investment capital, the total investment does not determine success or failure of the project.

ESTIMATED LAMB SLAUGHTER PLANT BUDGET

The largest single variable operating cost category estimated for the proposed plant was the cost of purchasing lambs to slaughter. Lamb purchase expenses from members were estimated, using 130 pounds live weight and a live price of 90 cents per pound for animals delivered to the plant. At full capacity the lamb purchase costs were estimated at \$2,340,000 per year. This figure could vary widely if lambs were purchased on the open market. Live lamb prices can be volatile and follow seasonal price patterns.

The second largest expense category is salary and wage requirements. Five employment categories needed for the plant are management, office staff, maintenance, production and food safety. Table 2 provides a breakdown of salary expenses at three levels of plant operation.

The plant was budgeted for one management position. This person would be expected to monitor performance, judge quality and buy lambs; supervise the production facility; oversee the sales and accounting office functions; supervise the maintenance of the plant and its equipment; oversee the operation of the offal disposal operation and be the only salesman for the lamb meat and by-products produced. The manager's job was budgeted at \$40,000 per year with a 25 percent allowance for fringe benefits. Salary and fringe benefits at \$50,000 per year may be unrealistically low. The 1997 survey of wages in the meat processing industry (Nunes, 1997) shows a median base salary of \$75,000 for plant managers/general managers. While this survey was for larger plants than the proposed plant in Hope it is reflective of the competition for the quality of manager needed to handle the diverse needs of this plant.

Table 2. Proposed Slaughter Plant Salaries and Fringe Benefits, ND, 1997.

		Plant Capacity		
		100%	75%	50%
Position	Salary ¹	Salary & Fringe	Salary & Fringe	Salary & Fringe
	-----	\$-----		
	-			
Manager	1 @ 40,000	50,000	50,000	50,000
Office	1 @ 10,000	12,500	9,375	6,250
Maintenance	1 @ 15,000	18,750	14,063	9,375
Production	5 @ 20,000	125,000	93,750	62,500
HACCP	1 @ 22,000	27,500	27,500	27,500

¹Salary is cash only; final cost includes fringe benefits at 25% of base wage for all workers. The proposed budget allowed \$10,000 for a part-time office worker. At the same level of benefits this was an annual expense of \$12,500 for office labor. The office worker would function as the receptionist and bookkeeper, process payroll, generate the billings and answer the phone.

One full-time maintenance person was budgeted at a slightly higher rate than the office person. This employee would be responsible for maintenance of the buildings, grounds, and equipment; and would have responsibility for offal disposal and maintenance of the offal disposal site. Most importantly, this person would be responsible for plant cleaning on a daily basis.

Five production workers were assumed to be required, based on the 1976 survey of slaughter plants in North Dakota. The average output per worker in that survey was used to determine the amount of production labor needed for a plant of this size. Assuming 80 lambs per day each worker would need to completely process 2 head per hour to meet production goals. The average wage for butchers in North Dakota in 1996 was \$19,900 per year (N.D. Labor Dept). An estimated \$20,000 per year with the same level of benefits as all other employees was budgeted. Production employees accounted for \$125,000 in annual payroll.

The federal veterinarian estimated that the additional payroll needs to meet the requirements of HACCP could add up to two additional full-time employees. One person dedicated to HACCP compliance was budgeted. The manager, maintenance person and office staff would perform also some of the tasks. The HACCP person was budgeted at \$22,000 plus benefits, due to the semi-supervisory role in insuring compliance with the requirements of the HACCP program.

Investment capital was budgeted to come from three sources including a low interest loan from the regional development council, a loan from commercial sources and members' equity. Public infrastructure investment was projected to come from grant sources. Investment sources and annual payment schedule at various use levels are shown in Table 3.

Table 3. Proposed Slaughter Plant Investment Sources and Repayment Schedule, ND, 1997.

Source	Plant Capacity and Annual Scheduled Repayment		
	100%	75%	50%
	-----\$-----		
	-		
\$100,000 Loan	6,721	6,721	6,721
\$800,000 Loan	93,963	93,963	93,963
\$600,000 Member Equity	0	0	0
\$1,500,00 Total	100,684	100,684	100,684

Total capital investment requirement was estimated to be \$1,500,000. A 40 percent equity position is a common requirement, so up to \$900,000 could be borrowed capital. Sources of

borrowed capital would include \$100,000 from the regional development council at 3 percent interest with a \$6721 annual payment for 20 years and \$800,000 from commercial sources at 10 percent interest for 20 years. The budgeted annual payment was \$93,962.89. Mortgage loans are fixed costs with constant annual payments at all levels of plant operation.

The final source of funds for investment was member equity capital budgeted at \$600,000. No repayment was assumed, but a return on investment will be computed. Profits will either be distributed to the investors as dividends or retained by the cooperative and called retained earnings for capital expenditures. Bylaws adopted by the cooperative will designate methods for dividend disbursement and uses for retained earnings.

Depreciation is a major expense category for the plant. The building, valued at \$268,000, was depreciated over 20 years using the straight line method. Building depreciation was budgeted at \$13,400 per year for the life of the plant. (Table 4)

Equipment, including all new refrigeration, a smokehouse, and new slaughtering and processing equipment, was valued at \$1,200,000 and was depreciated over ten years using the straight line method. Budgeted expense for equipment depreciation was \$120,000 per year. Both building and equipment depreciation is constant regardless of the percent of plant capacity used. Depreciation expense is documented in Table 4.

In addition to physical plant investment, the plant would require operating capital estimated at \$468,400. The major draws on operating capital are live animal purchases and payroll obligations. The operating budget for the plant assumes that the turnaround time on product, i.e. the time between when the expense is incurred and when the payment is received for product, is 60 days. Other studies have used 30 or 45 days for an operating budget. Industry sources indicate that funds for less than 60 days may be insufficient capital for the successful operation of the plant. The operating budget was derived by dividing total expenses for the year by 12 to determine a monthly expense. Monthly expenses were doubled to compute 60 days of operating capital.

The two most significant variable cost items were lamb purchase and labor costs. At projected full capacity, the plant would purchase 1667 lambs a month. The 60-day lamb purchase expense was just under \$390,000³. Monthly salary needs were near \$19,000. Operating capital needs for salaries would be nearly \$38,000. These two expense items alone required working capital of \$428,000 to operate 60 days. Together with the other variable expenses, the working capital needs of the plant were estimated at \$486,400. The cost of maintaining this pool of capital was estimated at \$48,640 per year.

Insurance for property, liability, directors, and workers compensation was budgeted at \$33,803 per year. Insurance premiums are constant at all capacity levels and were obtained from a major insurer of commercial property in North Dakota. A breakdown of the insurance expense categories is provided in Table 4. Workers compensation insurance rates for production workers at near \$16 dollars per \$100 of wages resulted in the total annual bill for workers compensation at over \$18,000.

³Assuming 130-pound lambs at \$0.90 per pound.

Repairs and maintenance were budgeted at 1 percent of value for the building and 2 percent of value for the equipment. The building repairs are assumed to remain constant at all levels of use. Table 4 records repairs and maintenance costs at various levels of use. Equipment repairs and maintenance were prorated with level of capacity usage in the plant. Equipment repairs were budgeted at \$24,000 per annum at full capacity dropping to \$18,000 at 50 percent capacity. The rate for reduced capacity use repairs was 1.75 percent of value at 75 percent capacity and 1.5 percent of value at 50 percent capacity. The assumption was that reduced capacity will reduce the amount of wear and tear on machinery and equipment. The reduction in wear and tear was not proportional to the reduction in plant use since some equipment, such as refrigeration, would operate at nearly the same levels regardless of the plant's usage.

Table 4. Proposed Slaughter Plant, Depreciation, Repairs and Insurance Expenses, ND, 1997.

		Plant Capacity		
		100%	75%	50%
Depreciation		-----\$-----		
		-		
	Building	13,400	13,400	13,400
	Equipment	120,000	120,000	120,000
Insurance				
	Property ¹	6,300	6,300	6,300
	Liability ²	5,120	5,120	5,120
	Directors	4,250	4,250	4,250
	Workers Comp	18,133	18,133	18,133
Repairs				
	Building	2,680	2,680	2,680
	Equipment	24,000	21,000	18,000

¹Includes building, equipment, and \$300,000 of inventory.

²Liability insurance estimate also includes employee theft coverage. Coverage is for \$5 million liability and \$100,000 employee theft.

³Coverage is \$1 million.

The budget for general travel, dues, and conventions was estimated from a survey of slaughter plants in North Dakota where travel and associated costs ranged from \$0.00019 to \$0.00025 per pound of live animal sold. Travel and dues for the proposed plant were estimated at \$0.00046 per pound. While budgeted at nearly twice the rate of the survey, the total amount was only sufficient to allow travel to one national sales meeting per year.

General office expense was budgeted at \$750 per month. While at first glance this may appear excessive, the cost of photocopiers, fax machines, computers, and the service contracts and supplies needed to maintain them have risen dramatically. For example, the service contract at the Hettinger Research and Extension Center for the copy machine alone was \$1300 in 1996.

Advertising was budgeted at \$1200 per year. This is higher than figures in the survey of slaughter plants, but this survey included many plants whose market was local and whose advertising needs were small. Twelve hundred dollars may be a conservative estimate of the advertising needs of this plant.

No property tax was budgeted for the first five years, because the city offered a property tax exemption for that period. After five years this would need to be added to the budget. The amount of tax obligation at the end of the exemption period was difficult to estimate.

Water use in the plant was estimated from Utility Usage in Small Slaughter Plants (Brasington, 1978). Plant water use was estimated at .36 gal per pound of live weight for processing and 1.36 gal per square foot of building per day for cleanup. The plant expects to process 2,600,000 pounds of live animal causing an annual water use need of 936,000 gallons. The building is approximately 3800 square feet in size. Projecting cleaning for 250 days per year in that size building gives a water use of 1,301,520 gallons. Total water needs were slightly greater than 2.2 million gallons per year. Based on water rates at Hope, the annual water charge was \$4620 when operating at full capacity. Water usage would be slightly reduced at lower operating capacity; however, the budget held the charge steady at all use levels since estimating the reduction in use would be difficult.

Utility usage was also estimated from the same study as water usage. Energy use was estimated at 965,000 BTU per 1000 pounds of live weight slaughtered per year. The plant expects to slaughter 2,600,000 pounds at full capacity. An annual use of near 2,500,000,000 BTU would be electricity combined with propane, natural gas or fuel oil. Twenty-five percent electricity and 75 percent propane levels were selected. The plant would need just over 700,000 kwh of electricity and slightly more than 26,000 gallons of propane annually. Municipal electric rates for Hope of \$0.037 kwh and the summer fill price of \$0.60 per gallon for propane were used to estimate \$6500 annually for electricity and \$11,700 for propane. These amounts may be reduced at lower capacity uses; however, it is difficult to estimate the energy reduction at lower slaughter rates.

Laundry is a necessary expense in a slaughter plant. Plant workers need large volumes of clean smocks, aprons, hats and other protective clothing. Laundry expenses were estimated to be \$1600 based on a survey of small meat processing plants. At reduced slaughter rates, laundry is reduced proportionately. The demands of HACCP may make this expense item even higher.

Slaughter and processing supplies are a surprisingly large expense. Based on the survey a plant this size would need slightly over \$9500 in supplies. HACCP will also increase supply costs by an estimated \$4,500. Also, HACCP required laboratory analysis will add costs, estimated at near \$12,000 per year (Meat and Poultry, May 1997). This brings the total annual supply cost to \$26,000. These costs were reduced proportionately in the budgets for reduced slaughter rates.

Miscellaneous charges were based on the survey and estimated at \$1600 per year. They were reduced proportionately in the reduced slaughter rate budgets. Delivery charges were not included

in the budgets for the proposed plant. All sales were assumed FOB Hope. This may be an optimistic assumption especially, for by-product sales.

Offal disposal was assumed to be by composting. The investment needed to set up a site and purchase equipment was included in investment costs. The maintenance employee was expected to provide the labor. Variable expense for offal disposal was expected to be for the purchase of straw for bulking and fuel for the equipment. Total disposal of offal was calculated at 650 tons per year. Assuming straw is added at 2 times the rate of offal and can be purchased delivered for \$25 a ton, the straw bill was estimated at \$32,500. Fuel for unloading, delivery and stacking was estimated to be 1000 gallons per year. Variable costs for offal disposal totaled \$33,500 per year and were adjusted proportionately as slaughter rates are reduced.

SUMMARY

Before lamb purchase variable costs were estimated at slightly over \$650,000 per year, and at full capacity the lamb purchase costs were \$2,340,000 per year. Total annual plant operating costs were near \$3 million. At reduced slaughter rates, the lamb purchase expense dropped; however, many of the other costs did not decline.

INCOME

Income was estimated at \$2.8 million per year. This included \$2.6 million of meat sales and \$200,000 from pelt sales. Meat was projected to be sold at \$2 a carcass pound, which was a premium over 1997 lamb market carcass prices. Pelts were projected to sell at \$10 each. This was under the 1997 market price but is probably reflective of the distribution in quality of pelts that can be expected at the plant, as well as the low volume being offered for sale.

There was no allowance for other by-product sales or sales of compost, which may be a potential income source. The low volume available makes predicting the potential return difficult. Sales from this category should be considered a bonus to this plant. A summary of all expense and income items are detailed in Table 5. A five-year projected cash flow was generated in Table 6. The analysis assumes that the plant operates at 75 percent capacity the first year of operation and then attains 100 percent capacity in year two and on. Profit or loss from the previous year is carried into the next year in this table.

SUMMARY

Estimated operating expenses for the plant exceeded projected income by more than \$200,000. Initial estimates of expenses were deliberately made at minimal values to determine if the plant had a chance to operate profitably. Several categories of expenses could realistically exceed initial estimates. However, since initial expenses already exceeded expected income, further refinement and documentation of expenses was not necessary.

Table 5. Proposed Slaughter Plant Expenses, Revenue and Profit, ND, 1997.

	Plant Capacity
--	----------------

	100%	75%	50%
	-----\$-----		
	-		
Depreciation	133,400	133,400	133,400
Insurance	33,803	33,803	33,803
Repairs	26,680	23,680	20,680
P and I	100,684	100,684	100,684
Operating	48,640	48,640	48,640
Salaries	233,750	194,688	155,625
Travel, Dues, Etc	1,200	1,200	1,200
Office	9,000	9,000	9,000
Advertising	1,200	1,200	1,200
Property Tax	0	0	0
Water	4,620	4,620	4,620
Electricity	6,500	6,500	6,500
Fuel	11,700	11,700	11,700
Laundry	1,600	1,200	800
Slaughter Supp	26,000	19,500	13,000
Misc.	1,600	1,200	800
Delivery	0	0	0
Offal	33,500	25,125	16,750
Subtotal	673,877	616,140	558,402
Lamb Purchase	2,340,000	1,755,000	1,170,000
TOTAL	3,013,877	2,371,140	1,728,402
Lamb Sales	2,600,000	1,950,000	1,300,000
Pelt sales	200,000	150,000	100,000
By-Product Sal	0	0	0
Subtotal	2,800,000	2,100,000	1,400,000
Profit	-213,877	-271,140	-328,402

A five year cash flow projection is presented in Table 6. Projections assume that the plant operates at 75 percent of maximum capacity in the first year of operation and then achieves 100 percent capacity in the following four years.

Table 6. Projected Slaughter Plant five Year Cash Flow Projection, ND, 1998-2002.

	Year 1 @ 75%	Year 2 @ 100%	Year 3 @ 100%	Year 4 @ 100%	Year 5 @ 100%
	-----\$-----				
Depreciation ¹	133,400	133,400	133,400	133,400	133,400
Insurance ²	33,803	33,803	33,803	33,803	33,803
Repairs ³	23,680	26,680	26,680	26,680	26,680
P & I Payments ⁴	100,684	100,684	100,684	100,684	100,684
Operating	48,640	48,640	48,640	48,640	48,640
Salaries	194,688	233,750	233,750	233,750	233,750
General ⁵	11,400	11,400	11,400	11,400	11,400
Utilities ⁶	22,820	22,820	22,820	22,820	22,820
Laundry	1,200	1,600	1,600	1,600	1,600
Supplies	19,500	26,000	26,000	26,000	26,000
Misc	1,200	1,600	1,600	1,600	1,600
Offal	25,125	33,500	33,500	33,500	33,500
Subtotal ⁷	616,140	673,877	673,877	673,877	673,877
Carry Over ⁸		-271,140	-485,017	-698,894	-912,771
Lamb Purchase	1,755,000	2,340,000	2,340,000	2,340,000	2,340,000
Total Exp. ⁹	2,371,140	3,285,017	3,498,894	3,712,771	3,926,648
Lamb Sales	1,950,000	2,600,000	2,600,000	2,600,000	2,600,000
Pelt Sales	150,000	200,000	200,000	200,000	200,000
Total Sales	2,100,000	2,800,000	2,800,000	2,800,000	2,800,000
Profit/Loss	-\$271,140	-\$485,017	-\$698,894	-\$912,771	-\$1,126,648

¹Includes building and equipment.

²Property, liability, theft and workers comp.

³Building and equipment.

⁴Includes all loans, but no provision for member equity repayment.

⁵Includes general travel, dues, convention expense, general office expense and advertising.

⁶Includes water, electricity and fuel.

⁷All variable expenses except lamb purchase.

⁸Previous operating years profit or loss carried into current year.

⁹All expenses including lamb purchase.

ECONOMIC PROFITABILITY

An economic profitability analysis to determine an internal rate of return for the proposed plant and a potential return to member equity was not computed because initial cost and return assumptions resulted in a net loss. However an opportunity cost of equity capital was computed to use in subsequent analyses to identify alternatives which may allow the plant to be feasible.

The original assumption was that the investors in the proposed cooperative would provide \$600,000 in equity capital. The opportunity cost of that capital to the investors is equal to the return the members could receive from an alternative investment with similar risk. One argument may be that lamb producer investors may be willing to accept a lower return from their investment in the proposed plant because they would be guaranteed a local market for lambs at a pre-

determined price. An alternative argument is that producers would need a higher return on investment because the proposed plant may be riskier than alternative investment opportunities.

A wide variety of investment alternatives can be used for comparison including stocks, bonds, certificates of deposit, mutual funds, and farmland; as well as a number of existing and potential producer-owned cooperatives that require an investment in equity capital. Twenty-year U.S. Treasury Bonds, which may be considered a relatively safe investment, are yielding about 7 percent interest. Shorter term certificates of deposit are yielding about 5 percent, while some stocks and mutual funds are generating close to a 10 percent return. Producer investors may expect a return of from 5 to 10 percent on equity, which means the project would need to generate an additional \$30,000 to \$60,000 per year to entice producers to invest.

Each individual investor would have a different minimum rate of return that would be acceptable. An average of 7.5 percent or \$45,000 was chosen as an example of an opportunity cost of equity capital for use in subsequent analyses.

MAXIMUM BREAK-EVEN INVESTMENT

Previous projections indicated that the total fixed and variable costs would exceed total revenue. Consequently, it was decided to determine what level of costs would allow the proposed plant to break-even. Variable costs vary directly with production and may have been underestimated in some cases. Therefore, it would be difficult to reduce the variable cost category.

Fixed costs are "sunk" costs that include investment in plant and equipment, insurance, etc. These costs do not vary with production, but do affect profitability because of their magnitude.

Two possible solutions for fixed costs that are too high are to either 1) increase volume to lower the per unit fixed costs or 2) reduce the fixed cost expenditure. Since increased volume is probably not a viable option for the proposed plant, the potential for reducing fixed investment was examined. The question is what can be paid for the plant and equipment to break-even.

A budget for operating a slaughter plant at 20,000 lambs a year in North Dakota is shown in Table 7. The analysis works backwards from the previously developed budgets. Starting with the total expected income of \$2,800,000 at a production level of 20,000 lambs, the lamb purchase expense of \$2,340,000 was subtracted. This provides the gross margin of \$460,000 available to pay all other costs. From this gross margin, all other variable costs amounting to \$406,813 were subtracted. The balance of \$53,187 was the amount that is available to pay for fixed expenses and return on investment, assuming that all other expense items do not change in a plant with less investment.

Table 7. Proposed Plant Maximum Investment to Break-Even, ND, 1997.

	-----\$-----	
Total Sales		2,800,000
Lamb Purchase	2,340,000	
Gross Margin		460,000
Workers Comp.	18,133	
Insurance ¹	9,370	
Operating Interest	48,640	
Salaries	233,750	
Travel, Dues, Etc	1,200	
Office	9,000	
Advertising	1,200	
Water	4,620	
Electricity	6,500	
Propane	11,700	
Laundry	1,600	
Supplies	26,000	
Misc.	1,600	
Offal Disposal	33,500	
Total Other Variable	406,813	
Margin After Variable Exp. ²		53,187
\$100,000 Loan ³	6,721	
\$122,000 Loan ⁴	14,329	
40% Member Equity ⁵	0	
Insurance ⁶	1,575	
Repairs and Maintainance	5,550	
Facility Depreciation	12,500	
Equipment Depreciation	12,000	
Profit/Loss.		512

¹Liability and Directors Insurance.

²This is the amount available to pay for facilities, provide a return for investors and return a profit to the plant.

³This assumes the first source of borrowed funds would be the same low interest loan from the regional development council that was used in the original projection.

⁴This assumes the second source of borrowed funds is a commercial loan at 10% for 20 years.

⁵No provision is made for return to members equity in this analysis.

⁶Property insurance.

Using the same assumptions as the original budget in Table 3, an investment was calculated that would be near break-even returns. The assumptions were 1) that the first source of funding would be a \$100,000 loan at 3 percent interest for 20 years from the regional council, 2) that members would provide 40 percent equity, and 3) that the balance of the 60 percent that is borrowed would be a 20-year loan at 10 percent interest. Since either a renovated or new building would cost about \$250,000 after renovation, that figure was used for facility cost. Repairs and maintenance were calculated at 1.5 percent of the entire investment. Depreciation was figured as straight-line for 20 years on the building and 10 years on the equipment.

Calculation of an equipment purchase price that would allow the plant to break-even was made. Results indicated that an equipment purchase price of \$120,000 would allow the plant to achieve near break even results. To break-even and to pay a return to member equity, the plant would need to purchase equipment for less than the \$120,000 calculated here.

However, a word of caution is necessary. The projection was for break-even results, which allow no room for error. Slight variations in costs or returns put the plant in a negative cash flow with little chance for recovery. A slowdown in sales, a price drop in the lamb meat market, a small increase in one of the variable costs, or even a short closing due to bad weather or equipment failure could change the profit potential from break-even to a loss.

In addition, the break-even equipment purchase price of \$120,000 did not provide for a return on member equity. When a return on member's equity is calculated, the break-even equipment purchase price would be further reduced. Furthermore, lenders are likely to be reluctant to finance a project that is projected to at best break even.

Used equipment purchased at a small percentage of new price may turn out to be like the purchase of the building; renovation costs necessary to meet inspection standards may be equal to the purchase price for new equipment. There may be sources of used equipment, because used equipment has been used successfully in other plants. However, the cost of finding equipment and refurbishing it so that it meets the necessary standards may be high.

The assumption that all other costs will stay the same with used equipment is open to debate. If used equipment is purchased, it is fair to assume that downtime will increase due to a heavier equipment failure rate, and equipment costs would increase. It is also fair to assume that equipment meeting the exact specifications may not be available, which may lead to a less efficient plant and higher labor costs.

Finding an existing, but relatively new, plant with equipment that can be purchased within the break-even budget may be a possible solution to making this project happen. The dilemma is finding one with the necessary equipment in this geographic region.

SUMMARY

A reduced investment cost may make the proposed plant feasible. However, finding good used equipment or an alternative site with appropriate building and equipment may be difficult.

PROFIT SENSITIVITY TO CHANGE IN INPUT COSTS

There are many sales and expense categories for a slaughter plant manager to monitor. It is useful to know which categories have the greatest potential to change the profit potential as they change. This allows the manager of an operating plant to focus attention on the most critical factors for success. Knowing these factors also allows potential investors in a proposed plant to assess the potential impact of a change in the estimated operating or investment budget on the projected profit potential. Sensitivities to change in the individual income and expense categories were calculated for the proposed plant and are presented in Table 8.

Table 8. Profit Sensitivity in Proposed Slaughter Plant to Changes in Income or Expenses, ND, 1997.

	Percent Change in Net Profit Caused by 1% Change in Category
	-----%-----
Sales	12.07
Lamb Purchase	-10.08
Salaries	-1.01
Depreciation	-0.57
Investment Payment	-0.43
Operating Interest	-0.21
Insurance	-0.15
Offal Disposal	-0.14
Repairs and Maintenance	-0.12
Slaughter Supplies	-0.11
Fuel	-0.05
Office	-0.03
Electricity	-0.02
Water	-0.02

Table 8 illustrates the substantial effect on profits that changes in sales revenue or lamb purchase price have on the plant's projected profit. Other categories have far less potential to change profit. Thus management should allocate more effort in cost control of live animal purchases and efforts in revenue enhancement than in control of other cost categories.

For example, if the sales revenue is increased by 1 percent, the plant's projected profit is expected to rise by near 12 percent. Since a relatively optimistic price of \$2 per carcass pound was assumed for the lamb meat, it may be unrealistic to assume that category could be increased appreciably.

Therefore, an analysis of alternative lamb purchase prices which would enable the proposed plant to break-even was made.

The first computation, based on the original assumptions in Table 5, was to determine what price the plant could pay for lambs to break-even. The \$213,877 projected loss at 100 percent capacity was deducted from the \$2,340,000 total lamb purchase cost. Results indicated that about an eight cents per pound reduction in the lamb purchase price to \$0.8177 would allow the plant to break-even. The \$0.8177 price does not include a return to member's equity. Including an additional \$45,000 in the budget to provide a return to the equity capital invested in the plant reduces the break-even price of lamb purchases to \$0.8004. The impact of changing lamb purchase prices is shown in Table 9.

Table 9. Proposed Slaughter Plant Projected Profitability at Various Lamb Purchase Prices, ND, 1997.

	Lamb Purchase Prices (\$/lb.)			
	0.9000	0.8177	0.8004	0.7358
	-----\$-----			
	-			
Total Revenue	2,800,000	2,800,000	2,800,000	2,800,000
Total Costs	3,013,877	2,800,000	2,755,000	2,582,207
Cash Return	-213,877	0	45,000	217,793
Equity Cost	45,000	45,000	45,000	45,000
Economic Profit	-258,877	-45,000	0	168,000
Economic Profit With 25% Cost Increase ¹	-426,877	-213,000	-168,000	0

¹This would raise plant operating costs by approximately \$168,000.

Table 9 also demonstrates the effect of increasing costs on the plant's ability to pay for lamb purchases. In the original estimated budget, several categories have potential to increase the plant's cost of operation. For example, no allocation was made for property taxes or delivery in the original budget. Furthermore, the estimate for offal disposal was made using the assumption that composting would be a feasible solution. The potential exists for costs to exceed the original estimates. Thus, Table 9 shows the effect of a 25 percent increase in plant operating costs on lamb purchase price. A lamb purchase price of \$0.7358 per pound would cover a 25 percent increase in costs and a return on member equity.

The proposed plant's profits are sensitive to the market price for lamb carcasses, the primary product produced. Projections were made using \$2 per carcass pound for lamb, which is a premium over the wholesale trade price for lamb. If the plant was unable to achieve this price for

carcasses, the price paid for live animals would need to be adjusted. The impact of lower carcass sales prices on the break-even purchase price of lambs is documented in Table 10.

Table 10. Impact of Lower Carcass Prices on Break-Even Lamb Purchase Prices, ND, 1997.

	Carcass selling prices (\$/lb.)			
	2.00	1.90	1.80	1.70
	-----\$-----			
	--			
Total revenue	2,800,000	2,670,000	2,540,000	2,410,000
Operating Costs ¹	673,877	673,877	673,877	673,877
Gross Margin	2,126,123	1,996,123	1,866,123	1,736,123
Equity Costs	45,000	45,000	45,000	45,000
Live Purchase ²	2,081,123	1,951,123	1,821,123	1,691,123
Break-even Price ³	0.8004	0.7504	0.7004	0.6504

¹Costs before lamb purchase expense.

²Total amount available for live lamb purchase to break-even.

³Live lamb price per pound to break-even at various carcass selling prices.

SUMMARY AND CONCLUSIONS

A group of North Dakota lamb producers who are members of Valley Wool Growers Association identified several niche markets for high-quality North Dakota lambs. The potential availability of a closed, but formerly federally inspected, livestock slaughter and meat processing facility in Steele County heightened their interest in determining the feasibility of a cooperatively owned lamb slaughter and processing facility. The cooperative would be patterned after existing and proposed slaughter cooperatives, whereby cooperative members would own shares to supply lambs to the plant on a year-round basis.

Valley Wool Growers Association applied to the Agricultural Products Utilization Commission in North Dakota for a grant to cover the cost of a feasibility study of the proposed plant in Hope. Funding was granted, and the research was conducted by researchers at the Hettinger Research and Extension Center and the Institute of Natural Resources and Economic Development (INRED) in the Department of Agricultural Economics at North Dakota State University.

The analysis was conducted in several sections corresponding to critical factors which affect feasibility of the plant. The critical factors analyzed included federal inspection requirements, the potential of an adequate supply of lambs, the potential for a viable niche market, plant investment and operating costs, expected return, alternative lamb purchase prices, alternative lamb carcass sales prices, and several investment and expense scenarios.

The supervising veterinary medical officer for USDA, FSIS toured the existing plant and concluded that the plant should be renovated to a “like new” status before it would be approved for reopening under federal inspection. Since federal inspection is mandated by law, the USDA is obligated to provide inspection to a plant that meets specifications. Therefore, if the plant was renovated to a “like new” status and approved, federal inspection requirements would not prevent the plant from being operational.

Sheep numbers in North Dakota and the region, coupled with new technology in year-round lamb production, indicate that enough lambs could be available to meet the needs of the plant. However, recruiting sufficient members to supply the plant on a daily basis may be difficult. The cooperative would need high quality slaughter lambs with a consistent weight and grade. An educational program would be necessary to inform members of the additional feeding requirements necessary to meet the weight and quality goals of the cooperative.

Producers in the proposed cooperative identified several confidential niche markets for high quality North Dakota produced lambs. Some examples include marketing to ethnic and religious groups in more urban markets and production of hothouse lambs for that market. There is a niche market for the high quality specialty product this plant would produce. In addition, a premium price for the product can be expected because it meets the specifications of unique consumer groups.

The building and equipment investment was projected to be \$1,468,000 which was higher than originally expected due to the extensive refurbishing necessary to meet federal inspection and increased capacity requirements. Plant operating expenses at full capacity were projected to be \$3,013,877 per year which included \$673,877 in operating expenses and \$2,340,000 for lamb purchase. Income from lamb meat sales and pelts was estimated at \$2,800,000 per year.

The assumptions of purchasing lambs for \$0.90 per pound and selling the meat for \$2.00 per carcass pound resulted in an annual negative margin of \$213,877 at full capacity.

An economic profitability analysis to determine an internal rate of return for the proposed plant and a potential return to member equity was not computed because initial cost and return assumptions resulted in a net loss. However, an opportunity cost of equity capital of \$45,000 was computed to use in analysis of alternatives which may allow the plant to operate profitably.

An analysis of equipment investment costs concluded that only \$120,000 minus the cost of equity capital could be spent to allow the plant to break-even. Since used equipment may be difficult to

obtain, an analysis of alternative lamb purchase prices was conducted. Results indicated that a lamb purchase price of \$0.8004 per pound would be necessary to cover all original cost assumptions and provide a return to member investor equity. A 25 percent increase in non-lamb purchase costs would further reduce the lamb purchase price to \$0.7358 per pound.

RECOMMENDATIONS

The original idea for lamb producers to purchase the existing slaughter and processing facility in Hope, North Dakota, expand and remodel it to slaughter and process 20,000 lambs annually, refurbish it to meet federal inspection specifications, pay the producer members \$0.90 per pound for lambs, and sell the meat for \$2.00 per carcass pound was projected to operate at a loss.

Therefore, other scenarios were investigated which would enable the plant to operate profitably. The maximum price that could be paid for lambs to pay all investment and operating costs, including a 7.5 percent return to member equity, was \$0.8004 per pound. A 25 percent increase in projected costs would reduce the purchase price to \$0.7358 per pound, or a reduction in the lamb carcass sales price to \$1.80 per pound would reduce the lamb purchase price to \$0.7004.

The range in probable prices that could be paid for lambs is \$0.70 to \$0.80 with a likely price of \$0.75. The proposers of the cooperative will need to decide if prices in this range would be sufficient to lure enough member investors to provide the 20,000 lambs necessary to operate the plant.

The idea to add value to locally produced lambs and provide product to a niche market is a good one. It should not be lost even if the viable purchase prices are considered too low to generate sufficient interest. Other alternatives could be considered and include the following:

- 1) A viable niche market for high quality, specialty lamb products does exist; so producers may want to pursue slaughtering lambs on a custom basis in an existing slaughter facility. This would eliminate the initial investment costs in buildings and equipment and enable producers to concentrate on producing and marketing a high quality product. It would allow starting on a smaller scale with fewer lambs per year. The authors highly recommend this alternative.
- 2) Producers may pursue alternative packing plant sites which may be for sale. However, the likelihood of finding a suitable building with adequate equipment in the immediate geographic area for under \$400,000 may be small.
- 3) Other lamb producer groups in Minnesota, Wyoming and the Dakotas have also expressed an interest in building or purchasing a lamb slaughter facility. Producers may want to coordinate activities with one or all of these groups to see if a larger, regional plant would be feasible. Valley Wool Growers Association may even want to take leadership in attempting to bring all these

groups together to discuss alternatives for a regional lamb slaughter, processing, and marketing project. The authors also recommend this alternative.

4) Stringent federal inspection specifications along with the new HACCP requirements cause relatively high per unit costs for small slaughter plants. There are several other livestock producer groups (ratite, elk, deer, goat, specialty beef, etc.) who may like to have access to slaughter and processing facilities. Rural economic development funds may be available to assist producer groups in building a multi-species “incubator” type of slaughter facility in which groups could share in the costs and scheduling of the plant. It could be billed as a demonstration project for possible adoption in other geographic areas if it is viable. Furthermore, small slaughter plant operators may need to seek some sort of regulatory relief, particularly with HACCP, from Congress in order to remain a viable industry.

North Dakota State University looks forward to further assisting lamb producers in whichever alternative they decide to pursue.

NEED FOR FURTHER RESEARCH

The 1979 survey of small slaughter plants information is still the best source of costs and capacities in small slaughter plants. However, this study is dated. A repeat of the survey would provide valuable current information to the many groups looking to expand livestock slaughter in the Northern Plains.

A growing concern for all slaughter plants is the disposal of non-saleable offal products. A research and demonstration project of composting red meat offal products would allow a more accurate picture of the potential of this technology and its costs and returns.

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Appendix F

Small Business Kitchen Incubators

The Bonner Business Center

Sandpoint, Idaho

The Bonner Business Center (BBC) is a small business incubator created to encourage and assist the development of new businesses in North Idaho. The BBC will help by providing affordable, ready-to-go facilities and a place where new and/or early stage businesses can operate and be prepared for long-term success. The BBC consists of 10,700 square feet of light manufacturing and office space. It also includes a fully licensed, shared-use food production facility to assist entrepreneurs in the specialty foods industry.

Kitchen tenants have access to commercial ovens, steam kettle, hot water bath, jar filler, and other special equipment that is often unavailable to early stage businesses. An on-site registered dietician is available to provide assistance with recipe, labeling and packaging, and safety and sanitation needs. Kitchen users join North Idaho Specialty Foods Association, a non-profit kitchen cooperative established to assist in the development and preparation of specialty foods.

In addition to affordable space, the BBC also offers the following support services as part of the base rent: reception services, business counseling, business library, janitorial services, conference room, and lounge. Other professional services that are available on a fee-for-use basis include: secretarial services, copy and data-fax machines, computer, laser printer, business classes, and World Wide Web home pages.

The Bonner Business Center welcomes tenants who meet the Incubator's criteria and who feel they can benefit from services offered. Eligible businesses include, but are not limited to: light manufacturing, assembly, wholesale distribution, research and development, manufacturer's representatives, and service companies.

The Incubator is not designed for retail or firms requiring high walk-in traffic. Added encouragement is given to the specialty food producers. New businesses needing the resources of the BBC to support further growth are considered. Tenants are considered on a case-by-case basis using the following criteria: merit of business proposal, experience of principals, and growth and job creation potential.

You can have a more detailed description of the BBC's current tenants . And, you can go to the Kitchen for photos of the site and for information on how to order a book describing how Sandpoint launched and continues to manage this important asset -- an asset important to any community, rural or urban.

Bonner Business Center
804 Airport Way, Sandpoint, ID 83864
208/263-4073
Fax: 208/263-4609

The Kitchen Sandpoint, Idaho

Of all our resources at the Bonner Business Center in Sandpoint, Idaho, our commercial kitchen is the cornerstone.

It is not only the best commercial kitchen in the inland Northwest, but it has developed a reputation around the world. Recently, for instance, delegates from Poland and Indonesia visited the Kitchen. While specifically interested in the concept of shared use," they were overall interested in seeing how a relatively rural community can link local resources and business opportunities and how, by pooling community resources, a very costly training site can be available to people with ideas, will power and a creative spirit.

Speciality food entrepreneurs here at the Center have already won awards at region-wide speciality foods competitions--for example, for salsa and for Raspberry/huckleberry jam and syrup.

The tenants not only get the use of the up-to-date kitchen facilities, but they are guided in the steps of food labeling and packaging, in assessing and meeting safety and sanitation needs and in doing a nutritional analysis (with the help of the on-site, registered dietician).

If you are interested in finding out more about this resource, the Bonner Business Center has written a book about the process of developing a commercial kitchen in a rural area, as well as about its day to day functions. The book covers such topics as:

- ! How to plan and design a kitchen from conception to opening day.
- ! How to find funding resources.
- ! Recommendations from the various committees -- for example, architecture and public works -- that planned the kitchen.
- ! A detailed list of the equipment, costs and where to purchase the equipment.
- ! The forms used for daily operations.
- ! The bylaws and articles of incorporation for the Kitchen cooperative which were used to get insurance.
- ! How to give tenants the assistance they need.
- ! Media stories about 'success stories!'"

The Bonner Business Center Commercial Kitchen book costs \$25.00 (includes shipping and handling) and is available, through check or money order --no visa--from:

Bonner Business Center
804 Airport Way, Sandpoint, ID 83864
208/263-4073
Fax: 208/263-4609

The Market Link

Food Ventures

The Community Kitchen Incubator

The Community Kitchen Incubator is a new, 8,640 square food facility adjacent to ACEnet's Cooperative Business Center on Columbus Road in Athens, Ohio. This innovative, sector-based incubator assists new and expanding businesses by providing a centralized production and distribution site, processing equipment, and marketing assistance at affordable prices. ACEnet secured public and private funds and purchased and renovated the facility, which fosters job creation and rapid growth within the specialty foods sector of southeastern Ohio. The incubator is collaboratively designed with Community Food Initiatives a grassroots food producers' association, to meet the ongoing production specifications and businesses needs for a wide spectrum of specialty food firms and farms. The facility has worked with more than 100 small businesses in Athens, Gallia, Hocking, Jackson, Meigs, Monroe, Morgan, Noble, Peny, Ross, Vinton, and Washington Counties.

The facility currently offers the following features and services:

Delivery and Parking

- ! Two loading docks
- ! Shipping and receiving areas
- ! On-site parking for 65 vehicles Incubator Features

- ! Time-shared kitchen with module units (2,700 sq. ft.)
- ! Warehouse space for dry, refrigerated, and frozen items
- ! Ten offices, service center, and conference room

- ! Retail and reception area
- ! Customized lease agreements
- ! Flexible graduation policies Facility services
- ! Fully equipped service center including computers, laser printer, Internet access, fax, copier, and scanner
- ! Resource library and food industry database
- ! Reception and multi-line phone system
- ! In-house marketing specialists

An Incubator Tour

The production area is equipped primarily with stainless steel, commercial kitchen equipment including convection ovens, a ten-burner range, mixers, food processors, choppers, proofing cabinets, a pasta machine, electric warmers, tilting braisers, canning kettles, prep tables, three-compartment sinks, reach-in and walk-in coolers, and a labeling machine. Kitchen design includes movable, modular units such as tables, cabinetry, and shelving to accommodate diverse production, assembly, and packaging activities. The primary activities within the kitchen currently fall into five main categories: baking food preparation, pasta making, bottling of condiments, and packaging of dry mixes, with tenants producing such diverse items as breads, bagels, desserts, dry pastas, prepared salad mixes, jams and jellies, herbal vinegars, mustards, salad dressings, gourmet sauces, salsas, dry soup mixes, and snack mixes.

The kitchen is designed to allow a number of anchor tenants to lease the facility on an annual basis, as well as allow start-up or existing firms to rent space on a time-share basis. Many of these tenants are taking a home-based business to the next phase of growth. Access to a shared kitchen allows them to research the feasibility of their products by making small batches for test marketing with a minimal level of risk. Local produce and fruit growers use the kitchen on a seasonal basis to turn their crops into value-added products. Caterers and community organizations use the kitchen on a drop-in basis for special events and major catering or vending operations. Kitchen Manager Russell Chamberlain is responsible for scheduling, training, overseeing safety and sanitation, and ensuring that all food service preparation and FDA processing guidelines are met. Entrepreneurs who begin to require greater production capacity are assisted to set up their own facility, subcontract to a co-packer, or graduate to anchor tenant status.

The warehouse area includes space for storing dry, refrigerated, and frozen commodities, including walk-in refrigerator and freezer space. The two loading docks are adjacent to this area and provide shipping and receiving of raw materials and finished products. The warehouse area is separated from the business services portion of the facility by a fire wall, and includes a separate restroom area.

The business incubation area includes affordable office space, reception service, conference room, and a myriad of business support services. The computer center includes both PC and Mac machines; a laser printer; graphics software for producing labels and marketing materials; and access to online services, fax, and copier. These services are available at below market-rate fees to all food businesses participating in the Food Ventures network.

The Marketplace retail area enables tenants and other regional producers to showcase new and local products within the Athens market. Although limited, the retail space provides start-up businesses with an initial opportunity to test market their product lines.

Funding for the Community Kitchen Incubator has been received from the Charles Stewart Mott Foundation, Rural Economic and Community Development Services, Ohio Department of Agriculture Rural Rehabilitation Program, Ohio Department of Development, Hocking Valley Bank(Community Development Finance Fund, Partners for the Common Good Loan Fund, and the O'Bleness Foundation.

The Wine Country Farm Kitchen is a specialty food and beverage business incubator offering services to start-ups in food and value-added processing. Services include a lease-by-the-hour certified kitchen, counseling and marketing assistance. The WineCountry Farm Kitchen is located in Prosser, Washington.

The abundance of farm-fresh produce mixed with a little entrepreneurial spirit is nurturing an emerging new speciality food and beverage in the Yakima Valley region of Washington State.

The Wine Country Farm Kitchen was created to boost this industry by offering a fully equipped commercial kitchen available for lease by the hour. You can use the Farm Kitchen to perfect that old family recipe everybody loves.

The Wine Country Farm Kitchen is a partnership between the Prosser Economic Development Association, and the Port of Benton..

Assistance Available:

- ! One on one start-up checklist, marketing assistance, and access to on-site resource library
- ! Assistance analyzing the marketplace and developing business/marketing plans
- ! Lease-by-the-hour kitchen/processing space. Manufacturing bays also available
- ! Buyers and suppliers lists
- ! Referral to export assistance programs and resources
- ! Assistance in analyzing competitors and targeting customers. Cooperative trade show attendance
- ! Assistance developing press releases. Media relations training, annual workshop provided regarding the industry, trends, boothmanship, etc.
- ! Start-up checklist outlines, licenses, permits and insurance requirements
- ! Business Development Specialist on-site. Advisory committee and food testing focus group available

Contact:

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