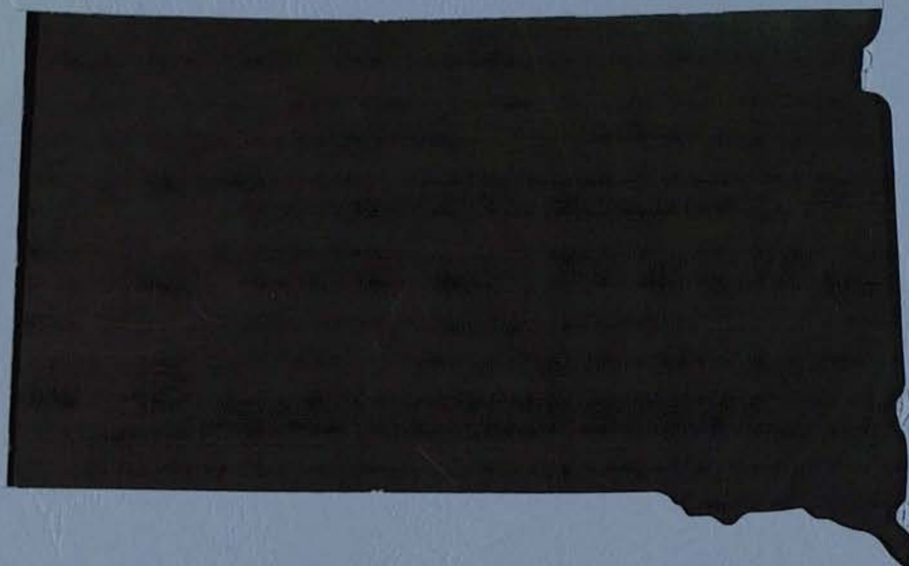

ECONOMICS DEPARTMENT

South Dakota State University
Brookings, South Dakota

"NEAR-ORGANIC" AND "MAINSTREAM" CROP-LIVESTOCK PRODUCTION: SOUTH DAKOTA CASE STUDY

by

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SUMMARY AND CONCLUSIONS

Introduction

In this report, results are presented of a case study on alternative strategies for producing crops and beef cattle in South Dakota. The alternative production strategies are termed "near-organic" and "mainstream." "Near-organic" producers were defined as farmers/ranchers[1] expected to substantially meet standards of private "organic" certification authorities in raising crops and livestock, whereas "mainstream" producers were defined as those who generally follow practices recommended by the S.D. Cooperative Extension Service.

Four matching pairs of near-organic and mainstream case study farmers from the following locations were selected for study: Morristown in the Northwest Region, Norris in the South Central Region, Roscoe-Eureka in the North Central Region, and Huron in the Central Region. Detailed data for 1993 on each case farm's resources, crop and livestock production management practices, and crop and livestock performance were collected through questionnaires that were initially mailed and then followed up with personal interviews.

Based on information provided by each case farmer, (1) crop and management practices were described and (2) budgets for individual crops, crop rotations, and livestock enterprises were developed. Data on various crop rotations and livestock enterprises were then integrated with each other through whole-farm analysis. Although the primary focal point of analysis in the study involves a comparison of near-organic with mainstream production, a secondary focal point--particularly in the beef cattle component of the study--involves comparisons between case farmers west and east of the Missouri River.

Contrasts in the nature of near-organic and mainstream case farms

Farm size. Farmland acreages for case farms are largest in the Northwest (3,021 and 3,989) and smallest in the Central Region (810 and 930). Herd sizes are largest in the North Central Region (172 and 201 cows per herd) and smallest in the Central Region (32 and 51 cows).

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[1]While beef cattle are produced on each case farm studied, I have chosen in this report to describe the production units simply as farms, rather than as farms/ranches.

The eight case farms--as a group--are above-average in size for South Dakota. Compared to state-wide averages, the average case farm has 71% more total farmland, 21% more cropland, and a 24% larger herd size. The ranges in farm size among case farms are sufficiently great, however, that two case farms are below the state-wide average in total farmland, four are below-average in cropland, and four are below-average in herd size. Intertwined with these differences are supplementary livestock enterprises on six of the eight case farms. Four case farmers background cattle, one finishes slaughter cattle, and two have hog farrow-finish operations.

Matching pairs of near-organic and mainstream case farms, while by no means identical, are generally similar in size and in overall crop-livestock balance. The most evenly matched pair of case farms is in the Northwest Region. Compared to his mainstream counterpart, the Northwest near-organic farmer has 6% more cropland, but 24% less overall farmland; has an 8% larger herd; and feeds 1 percentage point more of total digestible nutrients (TDN) in home-raised feedstuffs to his livestock. The most significant exception is in the South Central Region. Compared to his mainstream counterpart, the South Central near-organic farmer has 57% more cropland, 36% less total farmland, and a herd size only 30% as large. Related to this, only 20% of the TDN in his home-raised feed is fed to his livestock, whereas 57% of the TDN in the home-raised feed for his mainstream counterpart is fed to owned livestock.

Crop rotations. No clear patterns of difference are found in crop rotations followed by all four near-organic farms compared to their mainstream counterparts. By region, however, certain patterns of difference are present.

Both West River near-organic farmers underseed small grains with sweetclover, whereas neither mainstream counterpart does. The Northwest near-organic farmer incorporates his clover green manure crop with a noble blade and follows that with two additional passes during summer fallowing. The South Central near-organic farmer plows down his clover green manure crop early in the spring, and plants a crop soon thereafter. Because of his green manure cropping practices, he no longer summer fallows.

Both East River near-organic farms have larger percentages of legumes and grasses and smaller percentages of small grains than their respective mainstream counterparts. As a result, row crops, small grains, and legumes/grasses are much more evenly balanced on the East River near-organic case farms than on the matching mainstream farms.

Crop production practices. The near-organic case farmers use no synthetic chemical fertilizers and no agricultural (plant protection) chemicals. They rely exclusively on crop rotations, mechanical tillage, and a variety of other practices to augment soil fertility, control weeds and pests, and control soil erosion. Nevertheless, differences between near-organic and mainstream farmers in most crop production practices are relatively small. A summary flavor of the nature and extent of existing differences follows.[2]

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[2]In addition to the contrasts in crop production practices noted below, near-organic case farmers rely less on government commodity program payments than their mainstream counterparts.

Purchased fertilizers play a lesser role on near-organic than mainstream case farms. This conclusion is based on the following findings. Two near-organic farmers use modest amounts of purchased officially approved "organic" fertilizers on selected crops. Three mainstream farmers use purchased synthetic chemical fertilizers on small grains and corn. Compared to near-organic farmers, average purchased fertilizer expenditures for mainstream farmers are 1.7 times more per fertilized acre ($12.62 versus $7.63) and 2.43 times more per cropland acre ($3.76 versus $1.55) than for mainstream farmers. Amounts of elemental nitrogen (N) and phosphorus (P_2O_5) are modest relative to state-wide average use for all fertilizer-users except the Central Region mainstream farmer and his use of phosphorus.

Near-organic case farmers do not use herbicides, whereas two mainstream farmers do. Mainstream farmers apply herbicides to various row crops and small grains and, in one instance, on summer fallow. No case farmer uses either insecticides or fungicides.

With small grains, near-organic case farmers are less inclined than their mainstream counterparts to undertake fall plowing, and are more inclined to undertake multiple spring pre-plant tillage operations. With row crops, however, near-organic farmers tend to undertake fewer multiple spring pre-plant tillage operations. No patterned differences exist between near-organic and mainstream farms in cultural practices for alfalfa establishment, harvest, and incorporation break-up.

These contrasting findings generally conform to earlier findings from related research on sustainable agriculture in South Dakota (Taylor et al., 1992). However, the degree of differences between near-organic and mainstream practices in this study is somewhat less than that found in earlier studies, particularly in comparison to earlier studied farms located further east in the state. Further, contrasts in fall plowing and spring pre-plant land tillage operations were identified in this study, but not in earlier studies.

Cattle production practices. In general, differences between near-organic and mainstream farms in most cattle production practices are relatively small. Further, the "near-organic" case farms do not exhibit anything approaching a well-defined common, unique system of "organic" beef cattle production practices.

Instances in which differences in production practices do occur are as follows. Compared to mainstream farmers, the near-organic farmers studied:[3]

1. Do not use internal parasiticides, whereas three of four mainstream farmers do ("yes");

2. Use home-raised rather than purchased complete creep feeds ("n/a");

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[3]Of the following differences, those that are generally consistent with the distinctive standards of private certification authorities (Taylor et al., 1996) are denoted below as "yes," those that are unexpected are denoted as "no," and others are denoted as "n/a."

3. Are less inclined to (a) vaccinate for blackleg and IBR-BVD-PI_3 ("yes"); (b) use insecticides or fumigants ("yes"); (c) use external parasiticides ("yes"); (d) use antibiotics ("yes"); (e) provide special care and facilities for first-calf heifers ("no"); and (f) place groups of heavy springing cows in separate pastures to help ensure birth and survival of live baby calves ("no"); and

4. Are more inclined to (a) use non-conventional medical treatments (e.g., "holistic" methods, homeopathy) ("yes"); (b) select disease resistant breeds ("yes"); (c) initiate the breeding season for first-calf heifers at the same time as they do for mature brood cows ("no"); (d) place cows in fresh pastures to improve their cows' body condition prior to breeding ("yes"); (e) use mineral supplements to improve their cows' body condition at calving ("n/a"); (f) "immediately" cull cows whose calves die before weaning ("n/a"); (g) have longer calving seasons ("n/a"); (h) use methods other than hot irons for dehorning ("yes"); and (i) use elastrators, rather than cutting, for castration ("yes").

Ten of these 17 observed differences between near-organic and mainstream cattle production are generally consistent with the distinctive standards of private "organic" certification authorities. In three respects, however, the observed differences are somewhat unexpected. Four points of difference are not addressed by "organic" certification authorities. The first listed one, however, appears to be consistent with "sustainable" cattle production.

Contrasts in beef cattle management practices between East and West River case farms

Compared to the four East River case farmers, the four case farmers in the West:

1. Are more inclined to (a) accord greater importance to yearling weight, total maternal, and carcass "expected progeny differences" (EPDs) in selecting herd sires to mate to mature cows; (b) place cows in fresh pastures to improve body condition prior to breeding; (c) use vitamin and mineral supplements to improve body condition at calving; (d) replace calves that die prior to weaning with orphan calves; (e) have shorter calving seasons and wean calves at a slightly younger age; (f) initiate the breeding season for first-calf replacement heifers prior to that for mature brood cows; (g) use hot irons for dehorning calves; (h) brand their calves (not a legal requirement in the East); (i) administer antibiotics to groups of animals at special times of stress; (j) provide special care and/or facilities to second-calf heifers; and (k) transport water from its source to drinking points and use windmills to lift water; and

2. Are less inclined to (a) give major emphasis to birth weight/calving ease EPDs and efficient feedstuff utilization in selecting herd sires to mate to mature cows; (b) fertility test bulls; (c) feed cows grain and use antibiotics to improve body condition prior to breeding; (d) place cows in fresh pastures to improve body condition at calving; (e) immediately cull cows that lose their calves before weaning; (f) vaccinate for calf scours; (g) use parasiticides; (h) rely on artesian water sources; and (i) use the following measures to promote herd health and minimize cattle injury: take special care when handling cattle; provide plenty of room for cattle; provide dry, bedded loafing areas; have a strong vaccination program; have a strong program for controlling insects and parasites; continuously monitor the condition of cows and calves; and provide separate facilities for sick/injured cattle.

Comparative economics of near-organic and mainstream production

Crops. Net revenue per acre of cropland over total costs except management ranges among case farms from \$9.23 to \$63.73 and averages \$34.23.[4] It is highest in the North Central Region (average of \$56.95), followed respectively by the Central (\$42.89), South Central (\$26.53), and Northwest (\$10.55) Regions. Precipitation and temperature conditions in the Northwest are generally less favorable than in the other three regions.

Net revenue per acre of cropland[5] over total costs except management (NR/A) is higher for all four near-organic case farms than for their matching mainstream counterparts. On average, NR/A is 36% higher for near-organic than mainstream farms (\$39.47 versus \$29.00).

In the **Northwest**, NR/A for the near-organic farm (\$11.87) is 29% more than that for the mainstream farm (\$9.23). The primary reason is a higher per-acre net return for spring wheat, the main crop on the near-organic farm. The higher per-acre net return arises from a higher yield and lower machine costs for spring wheat on the near-organic farm. Secondary explanations involve (1) an analogous, but less strongly contrasting, situation for oats as for spring wheat on the two case farms and (2) a lower cost of summer fallowing on the near-organic farm.

In the **South Central Region**, NR/A for the near-organic farm (\$35.65) is more than double that for the mainstream farm (\$17.41). The primary reason is a larger acreage and more profitable production of alfalfa on the near-organic farm. Secondary reasons involve (1) the near-organic farmer having no summer fallow, whereas the mainstream farmer incurs expenses for 120 fallowed acres, and (2) non-alfalfa crops collectively being more profitable on the near-organic farm than on the mainstream farm.

In the **North Central Region**, NR/A for the near-organic farm (\$63.73) is 27% more than that for the mainstream farm (\$50.16). The primary reason is a much larger acreage of highly profitable alfalfa on the near-organic farm than on the mainstream farm. An additional factor is a greater per-acre profit from corn silage on the near-organic than mainstream farm.

In the Central Region, NR/A for the near-organic farm (\$46.61) is 19% more than that for the mainstream farm (\$39.17). The primary reason is a larger acreage and a higher yield of alfalfa for the near-organic farm than its matching mainstream counterpart. An additional factor is a lower production cost for near-organic than mainstream oats.

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[4]Here and throughout the manuscript, no attention is given to organic commodity price premiums.

[5]Here and elsewhere in the manuscript, the phrase "net revenue per acre of cropland (or rotation)" refers to a situation in which a weighted average per "hypothetical" acre of cropland (or rotation) for a particular farm is computed. While the data are derived from farmers' specific fields, they are "hypothetical" in that they apply to an abstract "average acre" of cropland on the farm. In calculating such a weighted average, per-acre net revenues for various crops comprising a farmer's total cropland (a crop rotation) were weighted by the respective acreages of crops on his farm (in his crop rotation).

In summary, no one explanation underlies near-organic farms having more profitable crop production than their mainstream counterparts. For three matching pairs of case farms, however, the single most important source of greater net revenue from near-organic production is a larger acreage of highly profitable alfalfa. For the other pair of case farms, the main source of greater net revenue is a large acreage of highly profitable spring wheat. Lower or non-existent summer fallow costs also contribute to more profitable near-organic crop production in the two West River locations.

The comparative performance of near-organic and mainstream farmland production was also evaluated in terms of total digestible nutrients (TDN) produced per average hypothetical acres of cropland and farmland. Pounds of TDN/acre produced on cropland range among case farms from 922 to 3,176 and average 1,876. Corresponding values for farmland range from 376 to 1,716 and average 946.

Average pounds of TDN/acre for case farms east of the Missouri is more than double that for those west of the Missouri. This higher TDN production arises from generally higher crop yields and a lack of summer fallowing in the east that result from the east's generally more fertile soils, higher growing season precipitation levels, and longer growing seasons. On average, pounds of TDN/acre for near-organic--compared to mainstream--farms are 18% greater for cropland and 22% greater for farmland. The advantage in TDN production for the near-organic farms arises from a combination of higher yields for some crops, smaller percentages of summer fallowed acres (except in the Northwest), and larger percentages of relatively TDN-intensive alfalfa (except in the Northwest) on the near-organic farms.

Livestock. Calf weaning percentages range among case farms from 88.3% to 97.5% and average 93.5%. Average weaning percentages are lower for the four case farms in the West (91.7%) than in the East (95.4%). Compared to respective mainstream weaning percentages, near-organic weaning percentages are greater in two instances and less in two instances. On average, the weaning percentage for near-organic case farms is slightly greater than that for their mainstream counterparts (94.4% versus 92.7%).

Average daily gain from birth to weaning for steers ranges among case farms from 1.83 lb to 2.61 lb and averages 2.35 lb. For heifers, the range is 1.79 lb to 2.50 lb and the average is 2.18 lb. In the West compared to the East, average daily gains to weaning are 21% and 20% greater for steers (2.57 versus 2.13 lb) and heifers (2.38 versus 1.98 lb), respectively. Rates of average daily gain from birth to weaning for both steers and heifers are greater for three near-organic farms than matching mainstream farms, but margins of average difference in favor of the four near-organic farms are small: 0.01 lb/day for steers and 0.10 lb/day for heifers.

Estimated expenses to cover mineral and salt; veterinary, medicine, supplies, and marketing; power and fuel; building repairs; and equipment repairs per cow-calf unit range among case farmers from $25.70 to $41.30 and average $36.57. In each paired comparison, the estimated total expense for the near-organic case farm is less than that for the matching mainstream farm. The average expense for near-organic farms ($33.19) is 17% less than that for the mainstream farms ($39.95).

Total costs of production except management per cow-calf unit range among case farms from \$450 to \$607 and average \$541. Average total costs per cow calf-unit are 15% less in the West (\$496) than in the East (\$585). Average per-head total costs are higher for two near-organic farms and lower for the other two. The average total cost for near-organic farms of \$549 is slightly (3.2%) more than the average for the mainstream farms (\$532).

Net revenue over total production costs except management per cow-calf unit ranges among case farms from - \$87 to + \$81 and averages - \$21. The average net revenue over total costs is \$78/cow-calf unit more in the West than in the East (+ \$18 versus - \$60). Average net revenue over total costs is higher for two near-organic farms and lower for the other two. The unweighted (by herd size) average for the near-organic farms is slightly less (\$4/cow-calf unit) than for the mainstream farms (- \$23 versus - \$ 19). Thus, the 3.2% greater average total production cost for the near-organic farms more than counterbalances their 2.4% greater average gross revenue.

Net revenue over total costs except management is \$72/cow-calf unit higher for the mainstream than near-organic farm in the **Northwest Region**. Of the \$72, \$51 arises from greater gross revenue (\$531 versus \$480) and \$21 from less total cost (\$450 versus \$471). The mainstream farm's greater gross revenue arises from its 12% higher calf weaning weights and a 4.1 percentage point higher calf weaning percentage. The mainstream farm's lower production costs arise primarily from lower costs per-pound-of-TDN for major feedstuffs comprising the respective cattle herds' aggregate diets.

Net revenue over total costs except management is \$23/cow-calf unit higher for the mainstream farm than for its near-organic counterpart in the **South Central Region**. The near-organic farm realizes \$71 more gross revenue per cow-calf unit (\$557 versus \$486), but doing so requires \$94 per-head greater total costs of production (\$578 versus \$484). The higher gross revenue for the near-organic farm arises from its having a higher weaning percentage (by 9.1 percentage points) and heavier calves at weaning. (8% greater for steers and 14% greater for heifers). The main form of cost-saving on the mainstream farm is a \$67/head lower cost of home-raised feedstuffs (\$262 versus \$339). Labor and interest costs per cow-calf unit for the mainstream farm are also \$25 and \$18 less than for the near-organic farm.

Net revenue over total costs except management is \$52/cow-calf unit higher for the near-organic than mainstream farm in the **North Central Region**. Of the \$52/head profit advantage, \$42 arises from more gross revenue per cow-calf unit (\$558 versus \$516) and \$10 from lower total costs of production (\$578 versus \$588). The higher gross revenue for the near-organic farm is a result of its having heavier calves at weaning (10% greater for steers and 11% greater for heifers) and a higher weaning percentage (by 4.5 percentage points). Production costs for individual items differ rather little between the near-organic and mainstream case farms. The two largest differences are \$6/head less for both livestock investment interest and bull replacement for the near-organic farm.

Net revenue over total costs except management is $27/cow-calf unit higher for the near-organic than for the mainstream farm in the **Central Region**. Whereas the near-organic farm realizes $12 less gross revenue per cow-calf unit ($508 versus $520), its total production costs are $39/head lower ($568 versus $607). Near-organic gross revenue is less because of that farm's slower calf average daily gains to weaning (12% less for steers and 3% for heifers) and a slightly lower weaning percentage (2.8% percentage points less). The three items for which near-organic costs/cow-calf unit differ most from mainstream costs are $16 less herd bull replacement cost; $13 less veterinary, medicine, supplies, and marketing expense; and $6 less livestock investment interest cost.

Evaluation of the cattle enterprises collectively on each farm--i.e., for cow-calf and supplementary cattle enterprises combined--is in terms of net revenues over all costs except (1) management; (2) labor and management; (3) interest, labor, and management; and (4) land, interest, labor, and management.

By all four net revenue criteria, case farm cattle herds in the West are more profitable than those in the East. The average margin of profit in favor of the West ranges among profit criteria from $5,752 to $8,898/herd. This profit advantage derives importantly from the West's (1) cheaper feed sources and (2) faster gaining calves from birth to weaning.

Similarly, by all four net revenue criteria, near-organic cattle herds on average are less profitable than mainstream cattle herds. The average margin of profit disadvantage for the near-organic farms ranges among profit criteria from $684 to $4,966/herd. In comparing the four pairs of farms with respect to the four net revenue criteria, the near-organic farm is less profitable than its matching mainstream counterpart in 10 of the 16 instances. In the other 6 instances (North Central farms by all four net revenue criteria, Central farms by third and fourth criteria), however, the near-organic farms are more profitable.

Whole-farm. For the eight case farms as a group, livestock (1) contribute slightly more than crops to whole-farm gross revenue; (2) consume about one-half of total crop TDN produced; and (3) contribute much less than crops to whole-farm net revenue. Based on joint consideration of the various livestock-crop balance criteria, the two North Central Region farms and the South Central Region mainstream farm have predominantly livestock; the two Northwest Region farms have roughly an equal balance between livestock and crops; and especially the South Central near-organic farm, but also the two Central Region farms, have predominantly crops.

Gross revenue per case farm ranges from $84,188 to $165,827 and averages $121,198. This average is 11% greater than the 1993 average of $108,758 for all farms in South Dakota. Average gross revenue for West River farms ($114,687) is 10% less than that for East River farms. Gross revenue for three near-organic farms is greater than that for mainstream counterparts and less for the other near-organic farm. Average gross revenue for near-organic farms ($123,754) is 4% more than that for mainstream farms.

Total costs of production except management per case farm range from $65,560 to $128,499 and average $96,418. Average total production costs for West River farms ($92,474) are 8% less than those for East River farms. Total production costs for two near-organic farms are greater than those for mainstream counterparts and less for the other two near-organic farms. Average total production costs for near-organic farms ($96,297) are essentially the same as those for mainstream farms.

Net revenue over all costs except management per case farm ranges from $10,799 to $37,328 and averages $24,780. Average net revenue for West River farms ($22,213) is 19% less than that for East River farms. Whereas crop net revenue is $13,903 less in the West than in the East, livestock net revenue is $8,769 greater. Net revenue for two near-organic farms is greater than that for mainstream counterparts and less for the other two near-organic farms. Average net revenue for near-organic farms ($27,457) is 24% more than that for mainstream farms $22,103). Whereas crop net revenue is $6,905 greater for near-organic than for mainstream farms, livestock net revenue is $1,551 less.

Thus, results of this case farm study show that production practices oriented toward meeting organic certification standards can contribute to profitable farm production. In this study, the greater profitability of near-organic production arises from crops rather than livestock. In interpreting these findings, one should bear in mind that (1) results of the study are based on only a very small number of farms, (2) the extent of contrasts in production practices between the near-organic and mainstream producers studied is relatively limited, and (3) the selected case study farmers are not necessarily representative of near-organic and mainstream farmers more generally in the state.

"NEAR-ORGANIC" AND "MAINSTREAM" CROP-LIVESTOCK PRODUCTION:

SOUTH DAKOTA CASE STUDY

Donald C. Taylor

INTRODUCTION

In this report, results are presented of a case study on alternative strategies for producing crops and beef cattle in South Dakota. The alternative production strategies are termed "near-organic" and "mainstream." In identifying producers for study, we intended that "near-organic" producers would be those who substantially/fully meet standards of private "organic" certification authorities in raising crops and livestock, whereas "mainstream" producers would be those who generally follow practices recommended by the S.D. Cooperative Extension Service.

This report is one in a series published by SDSU covering research undertaken during the past 12 years on "sustainable/alternative" agriculture in South Dakota [e.g., Dobbs et al., 1992; Smolik (ed), 1993]. The central focus of this research has been exploration of technical and economic possibilities for agricultural production strategies explicitly designed to be both productive and environmentally benign. Compared to earlier reported research results, greater emphasis is placed in this study on contrasting beef cattle production management strategies.[6]

The research covered in this report was carried out through collection and analysis of data from four pairs of matching near-organic and mainstream case farm cow-calf operators, each pair of which is from a different part of South Dakota. Data analysis involved development of (1) detailed budgets showing inputs and outputs for each crop and livestock enterprise on each farm and (2) integrated whole-farm representations of the various enterprises found on the respective case farms. Examination of the budgeting and whole-farm results reveal comparisons and contrasts in the physical and economic performance of crops and livestock produced via near-organic and mainstream production technologies. Although the primary focal point of analysis in the study involves near-organic and mainstream production comparisons, a secondary focal point--particularly in the beef cattle component of the study--involves comparisons between case farmers west and east of the Missouri River.

[6]For a discussion of the nature of "organic" and "sustainable" fed cattle production, see Taylor et al. (1996).

CASE FARMS

Case farm selection procedure

In selecting matching pairs of near-organic and mainstream case farms for study, attention was first given to identifying near-organic farms. This identification was initially based on results of the conceptual development of a Producer Organic Index (POI) for cow-calf production (Taylor and Feuz, 1993) and the empirical estimation of POI values for 70 cow-calf operators in South Dakota (Guan, 1994). A presupposition of these studies is that organic production practices are multifaceted and, therefore, producers' practices must be evaluated on a continuum rather than in a discrete "yes-no" format. Further, it was presupposed that producers who follow rather closely "organic" production practices in producing beef cattle would also do so in producing crops.

In identifying "candidates" for near-organic case farms, top priority was given to the 17 of 70 cow-calf operators with the highest POI values. Those with the following characteristics were dropped from consideration (numbers of farmers failing to meet the various criteria are shown in parentheses):

* Producer's name and address not available (6);[7]

* Producer had no cropland (3);[8] and

* Producer not willing to participate in proposed case study research (7).

In August 1992, Diane Rickerl (SDSU agro-ecologist) and I personally visited the seven farmers who were not eliminated through application of these criteria. The purposes of these visits were to gain additional insight on each producer's production philosophy and practices and to assess the apparent representativeness of the nature and size of each producer's farming operation. In the final identification of the four near-organic case farms for study, attention was also given to the geographic dispersion of the case farm candidates. Further, farmers not feeding livestock 100% "organically"-produced feed were dropped from consideration.

The four finally selected near-organic case farms were from Corson County in the Northwest, Mellette County in the South Central Region, Edmunds and McPherson Counties in the North Central Region, and Beadle County in the Central Region (Figure 1). The type-of-practice scores and overall POI values for each selected near-organic case farm and analogous average scores for the 70 cow-calf operations are shown in Table 1. The average POI value of 85.8 for the four near-organic case farms is 17.3 percentage points above-average.

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[7]POI values were estimated for producers responding to a 1991-92 cow-calf mail survey (Taylor and Feuz, 1992). Not all respondents chose to provide names and addresses on their questionnaires.

[8]The intention in this research was to study crop-livestock farms.

FIGURE 1. LOCATIONS, BY REGION, FOUR MATCHING PAIRS OF NEAR-ORGANIC AND MAINSTREAM CASE FARMERS

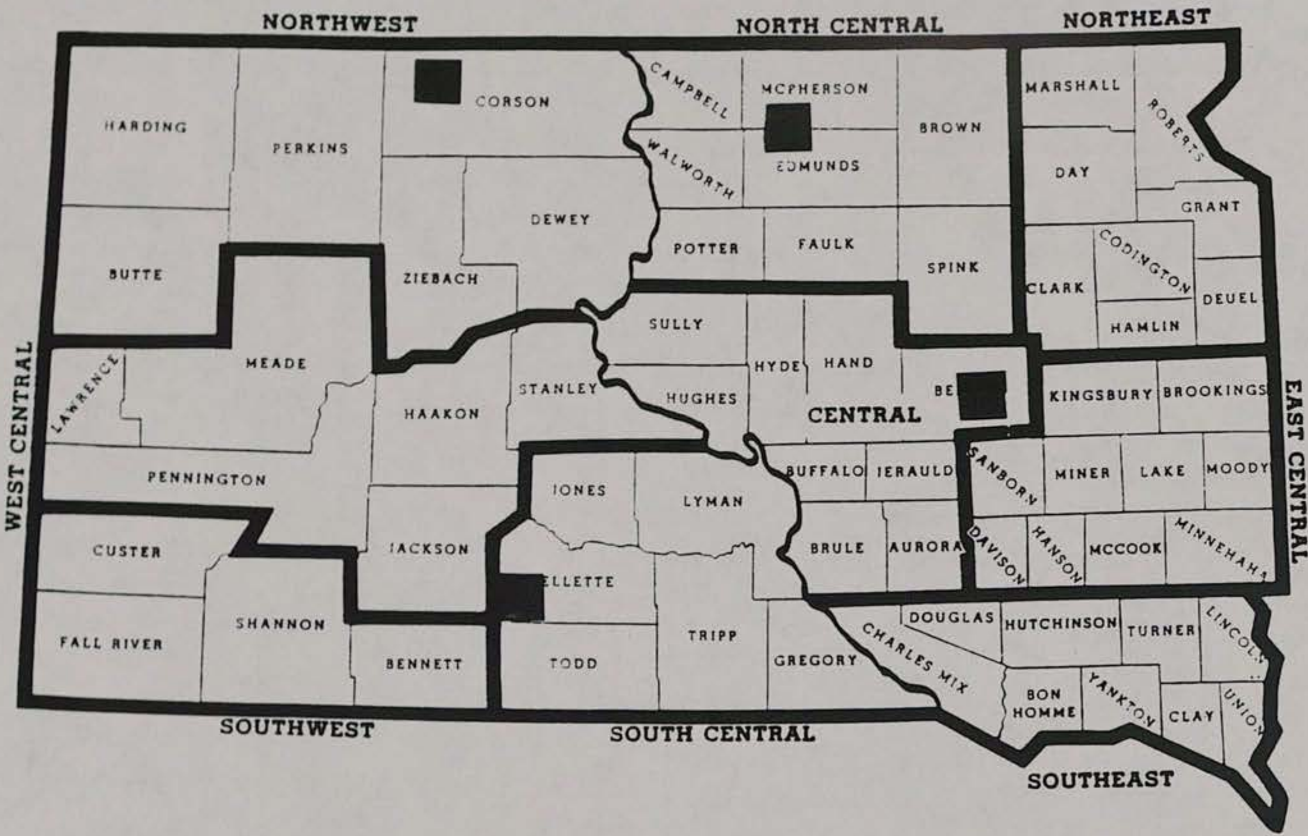

Table 1. Producer organic index (POI) scores: Near-organic case farms and average for 70 cow-calf operators.

	Type-of-practice score[a]				
	Near-organic case farm				Average for 70 cow-calf operators
Type of management practice	Northwest	South Central	North Central	Central	
Grazing and feeding	72.3	93.1	87.9	87.9	40.0
Herd health	89.7	82.8	84.5	87.9	77.6
Cow-calf	92.3	84.6	84.6	84.6	81.4
Breeding	79.2	100.0	100.0	64.6	78.7
Drinking water	93.8	100.0	75.0	68.8	90.7
Total POI	84.6	90.5	86.1	82.1	68.5

[a]The type-of-practice scores shown below reflect the score for each type of management practice for each producer expressed as a percentage of the maximum attainable score. The "total POI" value for each producer is the percentage of the maximum possible total attainable score earned by that producer.

In searching for a mainstream cow-calf operation to match each near-organic case farm, effort was made to find operations as similar as possible in the following respects: (1) area and quality of cropland and pasture; (2) size of herd and type of cattle; and (3) overall farm business management ability. Local S.D. Cooperative Extension agents, U.S. Natural Resource

Conservation Service (formerly SCS) and Farm Service Agency (formerly ASCS) personnel, and selected community leaders were invited to serve as resource personnel in selection of matching mainstream case farms. The SDSU research team proposed meeting with local resource personnel to select, from alternative suggested possible mainstream case farms, the one in each region that seemed most appropriate. In two regions, this proposed approach was adopted. In the other two, the initial screening of possible matching case farms was undertaken by local resource personnel; the SDSU research team participated in the final selection of the matching mainstream case farms.[9]

Data collected

A questionnaire was developed to obtain information on case farm managers' resources, crop and livestock production management practices, and crop and livestock performance. In general, the time frame of reference for data was 1993. For case farms experiencing extremely abnormal production conditions in 1993 (e.g., unusual wetness in certain areas), adjustments were made toward more normal conditions.[10]

Concerning the **farm manager and his family**, information was collected on size of family, age, education, experience, off-farm employment, and custom work.

Concerning **crop production and marketing**, the following areas were covered:

1. Component crops and area for each crop rotation; total acreage of each crop raised and of summer fallow; and acres of pasture, native hay, and CRP (Conservation Reserve Program) land.

2. Cultural practices followed in raising each crop in each rotation.

3. Type and size of tractors and farm machinery used in raising crops.

4. Participation in federal government farm programs.

5. Soil fertilization and crop insurance practices.

6. Crop yields.

7. Which crops are usually sold, to whom crops are usually sold (local elevator, grain company agent, neighbors, other); and whether price premiums or discounts are typically received and why.

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[9]Because some questions used in determining POI values were not included in the case study questionnaires, POI values could not be computed after-the-fact for the mainstream case farmers.

[10]Because the questionnaire consisted of 43 pages, I have chosen to summarize most important points covered in it rather than to include it as an annex to this research report. If you would like a copy of the questionnaire, please let me know.

Concerning **cow-calf production and marketing**, the following areas were covered.

1. Breeding management practices and performance, e.g., breeds of cattle in herd; number of cows exposed during breeding season; use of bull fertility testing, cow pregnancy testing, cow production testing, and artificial insemination; when selecting herd sires to mate to cows, relative importance to various possible criteria; number of herd sires maintained and typical number of years individual sires are retained in herd; target weights for mature herd sires, mature brood cows, and replacement heifers at breeding and calving; length of breeding season; pregnancy percentage.

2. Cow and calf management and performance, e.g., practices to improve the body condition of cows prior to breeding and at calving; practices to help insure the birth and survival of live baby calves; cull cow handling practices; calf creep feeding practices; calf dehorning, castration, and branding practices; feedstuffs normally purchased; months cattle graze pasture and aftermath, consume hay on pasture, and consume harvested feed in drylot; length of calving season; weaning percentage; calf weaning ages and weights.

3. Herd health management, e.g., vaccination practices, insect and parasite control practices, antibiotic use, practices to promote herd health and minimize cattle injury.

4. Drinking water access, e.g., source of water; means of lifting, transporting, and providing cattle access to water; possible inadequacies in quantity and/or quality of drinking water.

5. Manure management, e.g., form of manure applied to cropland, possible differences in manure application rates on different types of farmland, manager attitudes toward the existence and use of livestock manure.

6. Grazing management, e.g., types of grazing management systems followed, bases for determining pasture stocking rates.

7. Whether individual producers' labor requirements and selected variable and fixed costs are generally less than, similar to, or more than baseline figures; if different, by approximately what percentages.

8. Marketing or feeding practices for weaned calves and whether, for those sold, price premiums or discounts are typically received and why.

Concerning **supplementary cattle enterprises**, the following areas were covered:

1. Numbers of head, target weights, and ages for cattle sold after backgrounding and after being finished for slaughter.

2. Type of feeding system and feeding practices followed.

3. Health management, e.g., use of antibiotics, growth promotants, rumen stimulants, coccidiosis controls, parasiticides, and vaccinations.

4. Means of selling backgrounded and finished slaughter cattle, and whether price premiums or discounts are typically received and why.

Concerning **hog farrow-finish operations**, the following areas were covered:

1. Numbers of sows farrowed, boars maintained, and finished pigs marketed.

2. Farrowing operation practices, e.g., type of system, facilities used, health management practices, percentages of different types of feedstuffs in sow rations, number of litters/sow/year, average size of weaned litter, age and weight of pigs at weaning.

3. Finishing operation practices, e.g., type of system, facilities used, health management practices, percentages of different types of feedstuffs in finishing rations, death loss, finishing age and weight, whether price premiums or discounts are typically received and why.

4. Length of times sows and boars are retained in herd; typical weights at culling.

Data collection and analysis procedures

The questionnaire was developed and pre-tested during summer and early fall 1993. After making revisions, the final questionnaire was mailed to each case farmer during winter 1993-94.

Farmers were invited to consider completing parts of the questionnaire by themselves, prior to being visited by a SDSU Graduate Research Assistant. The personal interviews were then focused on (1) reviewing and clarifying completed parts of the questionnaires and (2) raising for response by farmers those questions not yet completed by the farmers. After editing of questionnaires, clarifications concerning confusing and missing information were sought from each case farmer--by phone, written communication, and return visits--as necessary.

Based on information provided by each case farmer, crop management practices were described and budgets for individual crops, crop rotations, and livestock enterprises were developed. Individual crop budgets were estimated using the Cost and Return Estimator (CARE, 1993) budget generator and data base jointly developed by the South Dakota NRCS office in Huron and the SDSU Economics Department in Brookings. Special spreadsheets were developed for crop rotation and livestock budgets. Data on various crop rotations and livestock enterprises were then integrated with each other via specially-developed spreadsheet whole-farm analysis.

Drafts of the crop and livestock budgets and whole-farm analysis for each case farmer were then sent to the case farmers for review and reaction. During June-September 1995, I visited the seven of eight case farmers for which scheduling arrangements could be made. Those visits commonly led to identification of 2-3 changes that could be made so that the budgets and whole-farm analysis would more closely reflect the real-world production situation for each case farmer. The revised "final" budgets and whole-farm analysis are included as annexes (A and E through G) to this report. They provide the basis for the summary tables and figures presented in the main text of the report.

Case farm overview

Climate. Data on selected precipitation and temperature variables, based on 1961-90 local weather station observations, are displayed in Table 2. Of the four regions involved in the study, average annual precipitation is most ample in the Central Region (20.1 in) and lowest in the Northwest (16.5 in). The "growing season," defined as the number of days between spring and fall "50% chance-28 degree" frost hazards is longest in the South Central Region (170 days) and shortest in the North Central Region (153 days). Average growing degree days are also greatest in the South Central Region (3,251) and least in the Northwest (2,599). In sum, precipitation is greatest in the Central Region; temperature data are most favorable in the South Central Region. At the other extreme, precipitation and temperature data are generally least favorable in the Northwest.

Table 2. Selected climatic data based on 1961-90, regions in which case farms are located.

	Region			
Climatic variable	Northwest	South Central	North Central	Central
Annual precipitation				
Weather station	McIntosh	Cedar Butte	Ipswich	Huron
1961-90 average inches	16.5	18.1	18.7	20.1
Spring frost hazard				
Weather station	McIntosh	Cedar Butte	Eureka	Huron
50% chance if 28 degree killing frost after this date	May 3	Apr 26	May 5	May 1
Fall frost hazard				
Weather station	McIntosh	Cedar Butte	Eureka	Huron
50% chance if 28 degree killing frost before this date	Oct 6	Oct 13	Oct 5	Oct 8
Growing season length: days between above spring and fall frost hazards	156	170	153	160
Average growing degree days above 50 degrees F				
Weather station	Lemmon	Martin	Aberdeen	Huron
1961-90 average	2,599	3,251	2,857	3,024

Source: Precipitation data: Office of Climate and Weather Information in the Agricultural Engineering Department at SDSU, Brookings. Other data: Spring Frost Hazard Map and Table, Fall Frost Hazard Map and Table, Growing Degree Days and the 1995 Growing Season, all published by S.D. Agricultural Statistics Service, Sioux Falls.

Farm families. The numbers of people comprising the case farm family households range from two to five (Table 3). Seven case farm managers are male; on the eighth farm, the wife is manager of the cattle and the husband of the crops. Managers' ages range from 37 to 57 years and average 48 years. Their average age is 3 years less than the average for the state (USDC, 1994, p 8).

Table 3. Personal characteristics of farm manager and family, matching pairs of near-organic and mainstream case farms.

	Northwest		South Central		North Central		Central	
Personal characteristic	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Total number of people comprising household	5	4	5	4	3	2	2	3
Manager								
Age in 1993	37	44	51	43	52	57	54	44
Years of education	12	12	18	12	12	8	17	12
Years of farming experience	19	25	13	25	30	40	32	21
Pursue off-farm employment?	No	Yes	No	Yes	No	No	Yes	No
Undertake custom work for others?	No	Yes	Yes	No	No	No	No	No
Share work with neighboring farmers?	Yes	Yes	Yes	Yes	No	No	No	Yes
Spouse								
Pursue off-farm employment?	No	Yes	Yes	Yes	No	No	Yes	Yes
If so, part-time or full-time?	n/a	Part	Part	Part	n/a	n/a	Part	Part
Percent of total labor required on farm hired	5	5	33	1	0	0	0	20

Years of farming experience for the case farmers range from 13 to 40 and average 26. Three of the case farm managers pursue off-farm employment (sale barn, SCS technician, photojournalist). The 38% incidence of off-farm employment with case farmers is about the same as the 41% state-wide incidence (USDC, 1994, p 8). Two case farmers perform custom work for others (hay baling and swathing, small grain and alfalfa seed combining) and five share various crop and livestock tasks with neighboring farmers.

All eight case farm managers are married. Five spouses work part-time. Three case farmers use no hired labor. The other five hire between 1% and 33% of the total labor required on their respective farms. None of the differences in farm family personal characteristics is systematically related to whether case farmers are near-organic or mainstream.

Farmland. Total acres of farmland for the eight case farms range from 810 to 3,989 and average 2,248 (Table 4). This average acreage is 71% above the state-wide average of 1,316 acres (USDC, 1994, p 8). The two Central Region case farms are smaller than average for the state and the other six are larger. Cropland acreages for the eight case farms range from 520 to 1,218 and average 786. This average cropland acreage is 21% above the state-wide average of 650 (USDC, 1994, p 8). Four of the case farm cropland areas are below-average and four are above-average for the state.

Table 4. Overview of nature and scale of matching pairs of near-organic and mainstream case farms.

	Northwest		South Central		North Central		Central	
Farm resource	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Farmland (acres)								
Cropland	1,218	1,150	957	610	540	685	520	615
Native hay	100	0	0	0	200	80	70	0
Pasture	1,703	2,839	1,007	2,480	1,460	1,215	220	315
Total	3,021	3,989	1,964	3,090	2,200	1,980	810	930
Cattle (head)								
Cows and calves	129	120	39	128	201	172	51	32
Backgrounded cattle	14	17	4	0	76	0	0	0
Slaughter cattle	0	0	0	0	0	0	13	0
Hog farrow-finish								
Sows	6	0	0	0	0	0	0	18
Litters	12	0	0	0	0	0	0	27
Percent of total TDN produced on farm fed to farmer's livestock	53	52	20	57	68	67	33	24

Relative to respective average county per-farm acreages of farmland (FL) and cropland (CL) in South Dakota (USDC, 1994, pp 162-168), the case farmers are below-average (-) and above-average (+) as follows:

* Northwest near-organic: - 20% FL, + 34% CL;
* Northwest mainstream: + 5% FL, + 27% CL;
* South Central near-organic: - 26% FL, + 25% CL;
* South Central mainstream: + 17% FL, - 21% CL;
* North Central near-organic: + 69% FL; - 45% CL;
* North Central mainstream: + 52% FL; - 30% CL;
* Central near-organic: - 9% FL, - 26% CL; and
* Central mainstream: + 4% FL, - 12% CL.

Total farmland for the two West River near-organic case farms is 24% (Northwest) and 36% (South Central) less than for their mainstream counterparts (Figure 2). The West River near-organic farms have more cropland (6% and 57% more), but less pasture (40% and 59% less) than their mainstream counterparts (Figures 3 and 4).

FIGURE 2. ACRES OF FARMLAND:
matching pairs of case farms

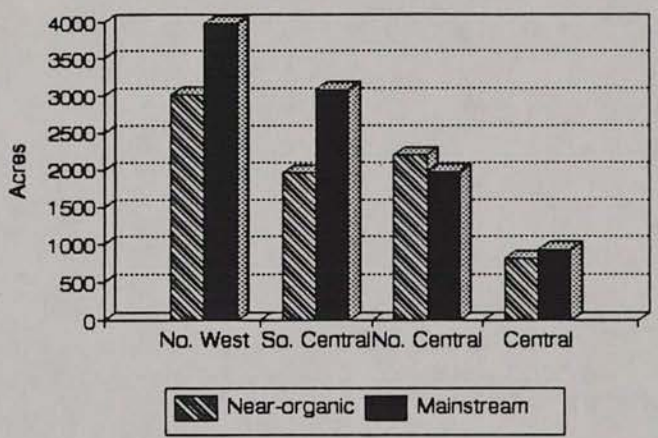


FIGURE 3. ACRES OF CROPLAND:
matching pairs of case farms

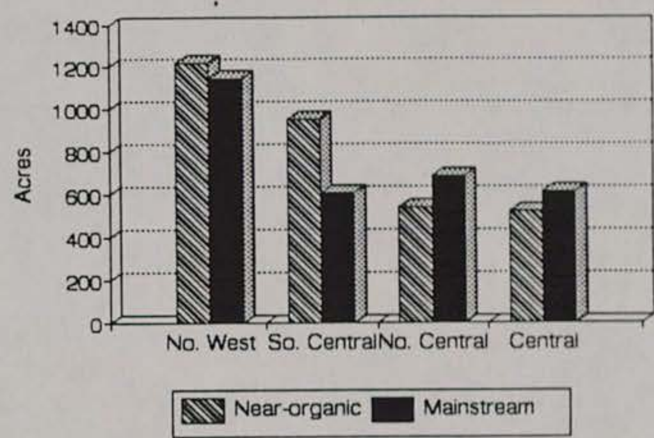
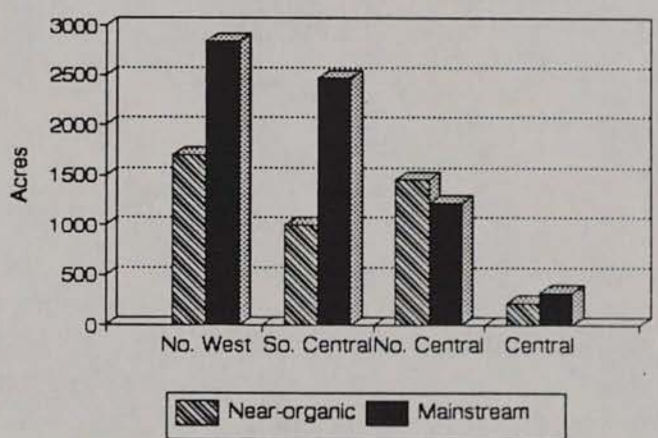


FIGURE 4. ACRES OF PASTURE LAND:
matching pairs of case farms

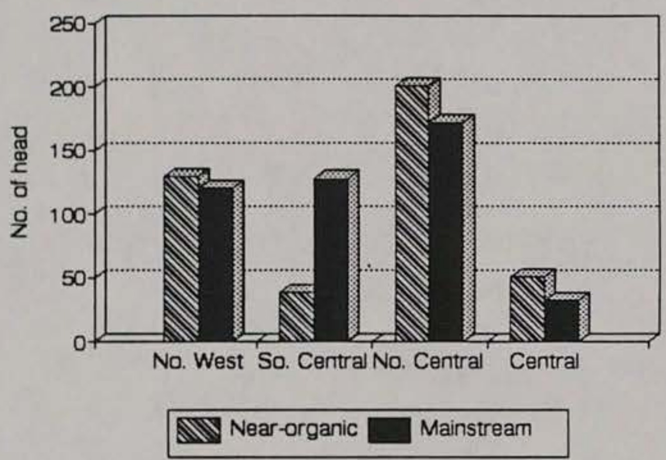


Total farmland for the North Central near-organic case farm is 11% greater than for its mainstream counterpart (Figure 2). However, total farmland for the Central Region near-organic farm is 13% less than for the matching mainstream farm. The East River near-organic farms have less cropland (15% and 21% less) than their mainstream counterparts (Figure 3). The North Central near-organic farm has 20% more pasture and the Central near-organic farm 30% less pasture than their respective mainstream counterparts (Figure 4).

Livestock. Beef cow herd sizes for the eight case farms range from 32 to 201 and average 109 (Table 4). This average herd size is 24% above the state-wide average of 88 head (USDC, 1994, p 30).

Herd sizes for matching pairs of near-organic and mainstream farms are roughly comparable in the Northwest (120 and 129 head) and North Central (201 and 172 head) Regions (Figure 5). The near-organic herd in the South Central Region (39 head) is considerably smaller than its mainstream counterpart (128 cows), whereas in the Central Region the near-organic herd (51 head) is larger than its mainstream counterpart (32 head).

FIGURE 5. NUMBER OF COW-CALF UNITS: matching pairs of case farms



Breeds on the two Northwest case farms are roughly comparable, being primarily commercial exotic European, with Gelbvieh dominant. In the South Central Region, the predominant breed on the near-organic farm is Gelbvieh, whereas on the mainstream farm it is Angus. The two North Central Region case farmers utilize exotic European breeds. The near-organic farmer has both commercial exotic European breeds and exotic European-English crosses, whereas the mainstream farmer's herd consists primarily of exotic European crosses, with Simmental dominant and some Charolais. In the Central Region, the near-organic farm has commercial European exotic breeds, with the dominant breed Gelbvieh and some Belgian Blue. The Central Region mainstream herd is primarily Angus, with some Salers.[11]

Supplementary cattle enterprises are roughly similar on the matching pairs of case farms in the Northwest (14 and 17 backgrounded cattle) and South Central (4 and 0 backgrounded cattle) Regions (Table 4). In the other two regions, however, only the near-organic farms have supplementary cattle enterprises; 76 cattle are backgrounded on the North Central case farm and 13 cattle are finished for slaughter on the Central case farm. The Northwest near-organic and Central mainstream case farms have hog farrow-finish operations involving the marketing of 12 and 27 litters per year, respectively. These hog operations are much smaller than the state-wide average of 73 litters per farm (USDC, 1994, p 33).

Livestock-crop balance. The farm livestock-crop balance, reflected by the estimated percent of total digestible nutrients (TDN) produced on a farm fed to the farmer's own livestock, is nearly identical for the matching pairs of near-organic and mainstream farms in the Northwest (53% and 52%) and North Central (68% and 67%) Regions. The livestock-crop balance on the Central Region near-organic and mainstream farms is roughly the same, but with livestock relatively much less important (33% and 24%, respectively). The South Central case farms are not evenly balanced in livestock and crops; only 20% of the total home-raised TDN on the near-organic farm is fed to its livestock, whereas 57% of the home-raised TDN on the mainstream farm is fed to its livestock.

CROP COMPONENT OF CASE FARMS

Common assumptions

Farming involves a multitude of variables. To avoid "overload" in collecting data from case farmers, information on several aspects of production and marketing was omitted in the questionnaire. Most of the omitted aspects involve issues only incidental to the primary analytic focal point in this study, namely, a comparison between near-organic and mainstream crop and livestock production management. For these omitted aspects, common assumptions were made for all eight case farms.

For crop production, common prices were assumed for all case farmers for all production inputs, including wage and interest rates (Table 5). These prices were the 1993 default prices associated with the CARE (1993) budget generator. The assumed per-acre costs of various types of farmland for the case farms were reflected by regional farmland cash rental rates for 1993 reported by Janssen and Pflueger (1993, p 15) (Table 6). Baseline prices assumed for crops were based on Hoyt et al. (1993), CARE (1993), and the judgment of concerned scientists (Table 7).

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[11]In reviewing an earlier draft of this manuscript, Dr. Donald L. Boggs, SDSU Extension Beef Specialist drew attention to some lack of comparability in breed types for the "matching pairs" of herds in each of the South Central and Central Regions.

Table 5. Assumed prices for production inputs, 1993.

Input	Price	Input	Price
Seeds		Fertilizer (lb)[a]	
Alfalfa (lb)	$ 1.55	Anhydrous ammonia	$ 0.09
Barley (bu)	5.00	Nitrogen in compound fertilizer	0.22
Buckwheat (bu)	12.00	Phosphorus in compound fertilizer	0.22
Corn (1,000 kernels)	0.90		
Forage sorghum (lb)	0.56	Lasso (gal)	25.90
Grain sorghum (lb)	0.70	Diesel fuel (gal)	0.85
Millet (bu)	10.00		
Oats (bu)	3.00	Wage (hour)	
Soybean (bu)	12.00	Machinery and livestock	6.50
Sweetclover (lb)	0.40	Other	5.00
Wheat (bu)	5.50		
		Interest rate (% per year)	9.00

Source: CARE (1993).

[a]Actual reported prices were used for the two farmers using purchased "organic" fertilizers.

Table 6. Assumed farmland cash rental rates, 1993, by region in South Dakota.

	Region			
Type of farmland	Northwest	South Central	North Central	Central
Cropland	$ 14.60	$ 22.80	$ 26.60	$ 24.20
Native hayland	9.50	16.00	14.70	16.40
Pasture/range land	5.10	10.10	12.70	15.20

Source: Janssen and Pflueger (1993, p 15)

Table 7. Baseline prices assumed for crops produced, 1993.

Grains and oilseeds	Price/bu	Forages	Price/ton
Barley	$ 2.00	Alfalfa hay	$ 55.00[a]
Buckwheat	3.87	Alfalfa/grass hay	50.00[a]
Corn	2.25	Corn silage	17.00
Millet	4.15	Millet hay	30.00
Oats	1.35	Native hay	40.00
Sorghum	1.85	Oat hay	35.00
Soybeans	5.70	Sorghum silage	15.00
Spring wheat	3.15		
Winter wheat	3.00		

Source: Hoyt et al. (1993), CARE (1993), and the judgment of concerned scientists.

[a]Because the South Central Region is located generally farther from hay markets, the per-ton prices assumed for alfalfa and alfalfa/grass hay there were $40.00 and $36.50, respectively (based on personal communication with a case farmer, July 1995).

With two exceptions, the prices shown in the bodies of Tables 5-7 were assumed to be the same for all case farms. One exception involves use of the actual prices paid by two farmers for specialty "organic" fertilizers. The other involves a 27% lower price for alfalfa and alfalfa/grass hay in the South Central Region, because of its relative geographic remoteness from primary hay markets.

In certain respects, assumptions concerning machinery costs were farmer- specific and in others they were common among farmers. The only information on machinery obtained from individual case farmers involves (1) horsepower of tractors and (2) nature and width of pieces of machinery used in raising each crop. Apart from this farmer-specific information, all other factors impacting the determination of fixed and variable costs for tractors and machinery for various crops for the eight case farms reflect common CARE (1993) default values. In following this procedure, we did not accord attention to individual differences among case farmers in machinery ownership, repair, and maintenance philosophies and practices.

A final area of commonality among case farmers in assumptions involves crop insurance. We assumed the same type of insurance, costing $5.00 per acre, for all case farmers who indicated they insure particular crops. This insurance rate was applied to the various case farms as follows:

* Northwest near-organic: small grains and corn;
* Northwest mainstream: spring wheat and oats;
* South Central near-organic: spring wheat;
* South Central mainstream: winter wheat;
* North Central near-organic: corn;
* North Central mainstream: no crop;
* Central near-organic: no crop; and
* Central mainstream: spring wheat and corn.

Crop rotations

None of the case farmers studied follows simple, fixed crop rotations (i.e., fixed patterned sequences of crops) from year to year. Depending on natural resource conditions (e.g., soil moisture, weeds, pests), government commodity program provisions, and prospective crop prices at the time of planting, farmers may chose to deviate from the crops represented in simple patterned rotation sequences. Further, in their search for most effective resource use, most case farmers more or less continuously experiment with different possible crops to include in rotations.

In visiting with case farmers about their cropping programs, it became apparent that some follow something approaching patterned crop sequences from year to year, whereas others grow a variety of crops with little or no semblance of patterned cropping sequences. Ascertaining the precise degree to which various farmers grow various groups of crops in clear sequences was difficult. Therefore, the term "crop rotation" is used to characterize cropping situations for all farmers, irrespective of the degree to which component crops follow clear patterned sequences. Further, some farmers follow certain crop rotations on certain "quarter-sections" and other rotations on other quarter-sections, whereas others indicated no differentiation in crop rotations within their respective overall cropland areas.

Before examining the specific configurations of case farm crop rotations, total acreages of particular crops and crop-types raised on the case farms are first noted (Table 8). The most commonly grown small grains are spring wheat and oats. The only row crop grown by more than one of the eight farms is corn. Alfalfa is grown on all case farms, although volunteer grasses are also present in mature alfalfa stands on two case farms; to simplify, I do not distinguish between alfalfa and alfalfa/grass in the text and in subsequent tables.

Table 8. Farmland use, matching pairs of near-organic and mainstream case farms.

Farmland use	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
	(------------------				acres			------------------)
Cropland								
Row crops and small grains								
Spring wheat	390	295	100	0	140	235	0	230
Oat grain	143	40	122	0	40	70	115	67
Corn silage	105	0	0	0	110	160	25	0
Sorghum sudan silage	0	0	0	0	0	0	35	0
Oat hay	0	70	0	0	0	0	0	0
Millet hay	0	0	0	30	0	0	0	0
Millet grain	0	0	185	0	0	0	0	0
Buckwheat	0	0	160	0	0	0	0	0
Sorghum grain	0	0	0	110	0	0	0	0
Winter wheat	0	0	0	90	0	0	0	100
Corn grain	0	0	0	0	30	0	100	120
Barley	0	0	0	0	0	136	0	0
Soybeans	0	0	0	0	0	0	0	25
Summer fallow	390	225	0	120	0	0	0	0
Sub-total	1,028	630	567	350	320	601	275	542
Legumes and grass								
Alfalfa	190	0	390	0	220	84	135	73
Alfalfa/grass	0	350	0	260	0	0	0	0
CRP grassland	0	170	0	0	0	0	110	0
Sub-total	190	520	390	260	220	84	245	73
Cropland total	1,218	1,150	957	610	540	685	520	615
Native hay	100	0	0	0	200	80	70	0
Pasture	1,703	2,839	1,007	2,480	1,460	1,215	220	315
TOTAL	3,021	3,989	1,964	3,090	2,200	1,980	810	930

The role of row crops and small grains relative to legumes and grasses for matching pairs of case farms differs greatly. Legumes and grasses represent far greater percentages of total cropland for the two near-organic farms in the East than for their mainstream counterparts (29-35 percentage points more). In the South Central Region, the relative importance of legumes and grasses in total cropland for the near-organic and mainstream case farms is essentially the same. Contrary to expectations, the relative role of harvested legumes and grasses for the near-organic farm in the Northwest is considerably less than for its mainstream counterpart (30 percentage points less). However, this farmer does underseed all small grains with either sweet clover or alfalfa.

With 7 of the 16 rotations, small grains are the main crop-type (Table 9).[12] Alfalfa or alfalfa grass is dominant with 6 rotations, row crops with 1, and a 50-50 small grain-summer fallow split with the other 2. For 3 of the 7 near-organic rotations, alfalfa is the most common crop type. For 5 of the 9 mainstream rotations, small grains are the most common crop type.

The main difference between West River near-organic and mainstream crop rotations involves the near-organic farmers underseeding small grains with sweetclover, and the mainstream farmers not following this practice (Table 9). The South Central near-organic farmer chisel plows down sweetclover green manure in the early spring when it is about one foot tall. He immediately follows the green manure with another crop rather then with tilled fallow. The added organic matter resulting from use of green manure crops adds to the soil's moisture retention capacity. By plowing down the green manure crop before spring rains come, the moisture from the rains is available to facilitate establishment and growth of a subsequent crop. Thus, this farmer views the traditional practice of "summer fallowing to save moisture" as no longer pertinent to him. The Northwest Region near-organic farmer also underseeds his small grains with legumes. If the small grain is to be followed with summer fallow, he incorporates his sweetclover green manure crop in the spring when it is about 2.5 feet tall.

The main difference between East River near-organic and mainstream crop rotations involves a more even balance among row crops, small grains, and alfalfa for the near-organic case farms than for their mainstream counterparts (Table 9, Figures 6-9). The contrast involves relatively more alfalfa on near-organic (33% and 41% of cropland) than matching mainstream farms (12%) and less small grains on near-organic (28% and 33%) than matching mainstream farms (64% and 65%).

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[12]See the column headings of Annex A for an indication of acreages of each crop comprising each crop rotation.

Table 9. Nature and composition of crop rotations, matching pairs of near-organic and mainstream case farms.

Case farm and rotation	Acres in rotation	Percent of cropland in:			
		Row crops	Small grains	Alfalfa or alf/grass	Fallow
Northwest					
Near-organic					
Spring wheat$_{clover}$-summer fallow	570	0	50	0	50
Corn silage-oat grain$_{clover}$-spring wheat$_{clover}$-summer fallow	420	25	50	0	25
Oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa break-up	228	0	17	83	0
Whole farm	1,218	9	44	15	32
Mainstream					
Oat grain (alfalfa establishment)-alfalfa/grass (5 yr)-alfalfa/grass break-up	420	0	17	83	0
Spring wheat-spring wheat/oat grain-summer fallow	330	0	67	0	33
Spring wheat-summer fallow	230	0	50	0	50
Whole farm	980	0	41	36	23
South Central					
Near organic					
Millet$_{clover}$-spring wheat$_{clover}$-buckwheat$_{clover}$-oat grain/oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa break-up whole farm	957	0	59	41	0
Mainstream					
Winter wheat-summer fallow-grain sorghum-hay millet (alfalfa establishment)-alfalfa/grass (6 yr)-alfalfa/grass break-up whole farm	610	18	20	42	20
North Central					
Near organic					
Spring wheat-corn silage/corn grain-oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa break-up	540	26	33	41	0
Mainstream					
Corn silage-oat grain-barley-spring wheat	515	31	69	0	0
Spring wheat-barley (alfalfa establishment)-alfalfa (4 yr)-alfalfa break-up	170	0	51	49	0
Whole farm	685	23	65	12	0
Central					
Near-organic					
Corn grain-corn silage-oat grain-sorghum silage	275	58	42	0	0
Continuous alfalfa	135	0	0	100	0
Whole farm	410	39	28	33	0
Mainstream					
Spring wheat-corn grain-soybean rotation	340	32	68	0	0
Winter wheat-corn grain-oat grain	190	18	82	0	0
Oat grain (alfalfa establishment)-alfalfa (5 yr)-alfalfa break-up	85	0	14	86	0
Whole farm	615	24	64	12	0

FIG. 6. CROPLAND USE, BY TYPE OF CROP: matching pair Northwest Reg. case farms

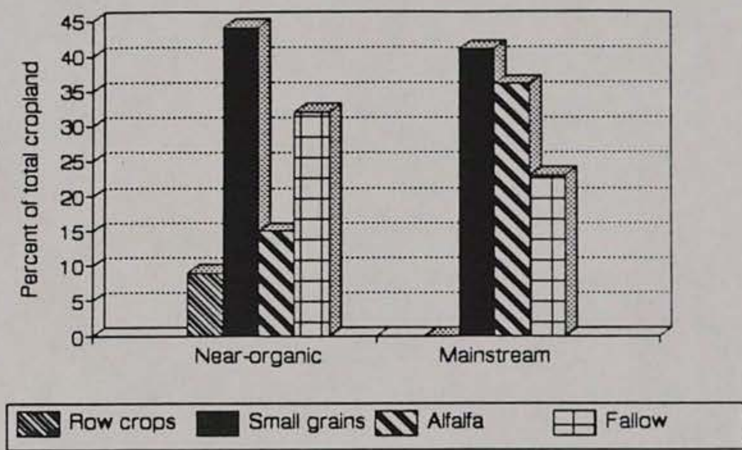


FIG. 7. CROPLAND USE, BY TYPE OF CROP: matching pair So. Cent. Reg. case farms

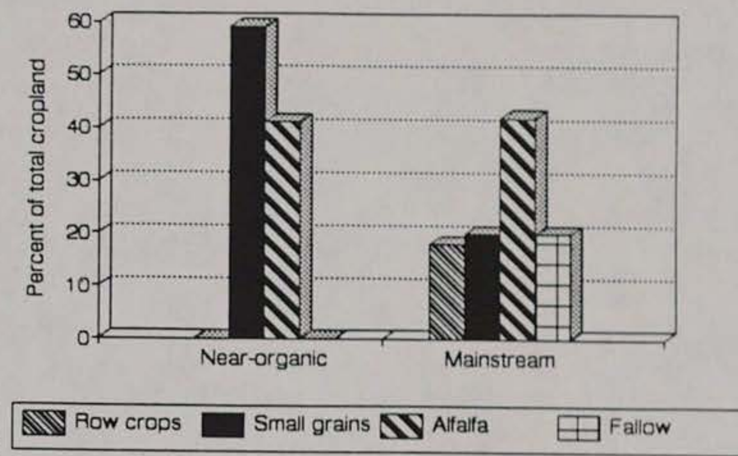


FIG. 8. CROPLAND USE, BY TYPE OF FARM: matching pair No. Cent. Reg. case farms

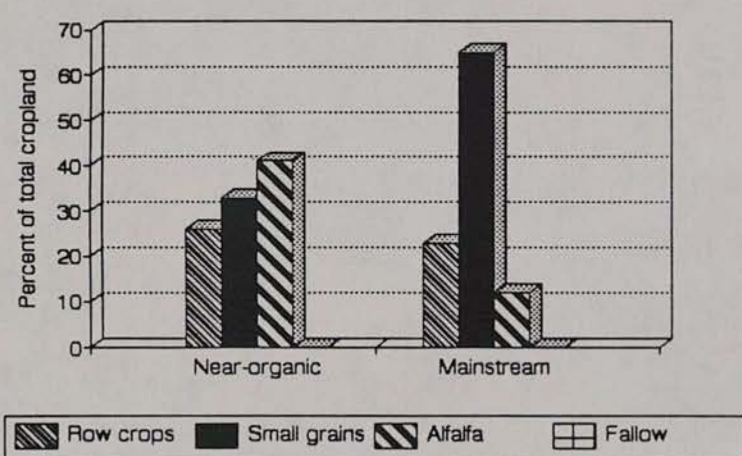
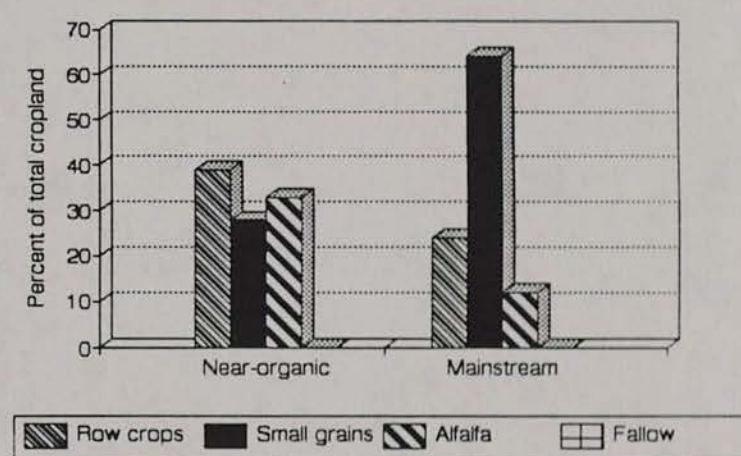


FIG. 9. CROPLAND USE, BY TYPE OF CROP: matching pair Central Reg. case farms:



Crop production practices

Fertilizer and agricultural chemical use. Three of the four mainstream case farmers apply purchased synthetic chemical fertilizers; the South Central mainstream farmer does not (Table 10). Per-acre fertilization [elemental nitrogen (N) and phosphorus P_2O_5] rates are as follows:

* 9 lb N and 23 lb P_2O_5 for spring wheat and oats in the Northwest;

* 41 lb N and 19 lb P_2O_5 for corn and no fertilizer for small grains in the North Central Region; and

* 23 lb N and 60 lb P_2O_5 for spring wheat and corn and 12 lb N and 30 lb P_2O_5 for oats in the Central Region.

Except for P_2O_5 in the Central Region, however, these rates are modest when judged against 1993 state-wide mean application rates for South Dakota: 70 lb N and 38 lb P_2O_5 for corn grain and 36 lb N and 29 lb P_2O_5 for spring wheat (USDA, 1994b, pp 3-4).[13] For mainstream farmers, average expenditures are $12.62 per fertilized acre and $3.76 per cropland acre.

Table 10. Purchased fertilizer and agricultural chemical practices, case farms.

Case farm	Crop	Purchased fertilizer: Type	Purchased fertilizer: $/acre	Weed spray ($/acre)[a]
Northwest				
Near-organic	Spring wheat	100 lb/acre trace mineral phosphate (0-27-0)[a]	8.25	n/a
	Oats	100 lb/acre trace mineral phosphate (0-27-0)[a]	8.25	n/a
Mainstream	Spring wheat	50 lb/acre of 18-46-0	7.04	3.50
	Oats	50 lb/acre of 18-46-0	7.04	5.50
	Fallow	None	n/a	11.00
North Central				
Mainstream	Corn	87 lb/acre of anhydrous ammonia	7.83	n/a
	Corn	57 lb/acre of 10-34-0	5.50	n/a
Central				
Near-organic	Corn	Liquid fish and seaweed with molasses[b]	5.00	n/a
Mainstream	Spring wheat	130 lb/acre of 18-46-0	18.31	5.50
	Oats	65 lb/acre of 18-46-0	9.15	5.50[c]
	Corn	130 lb/acre of 18-46-0	18.31	19.42
	Soybeans	None	n/a	8.50

[a]In all instances except for corn for the Central Region mainstream farm, the "weed spray" costs shown cover both material and application costs.

[b]This fertilizer is approved for use by "organic" certification authorities.

[c]However, oats used as a nurse crop for establishment of alfalfa are not sprayed.

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[13]Because environmental and soil conditions favor heavier fertilizer use in southeastern South Dakota than elsewhere in the state, state-wide average fertilization rates can almost certainly be expected to be greater than average fertilization rates in central and western South Dakota. Thus, average state-wide levels of fertilization are an imperfect point of comparison for fertilizer rates in this study.

State-wide mean application rates for South Dakota in 1994 were 90 lb N and 39 lb P_2O_5 for corn grain and 52 lb N and 23 lb P_2O_5 for spring wheat (USDA, 1995, pp 3, 5).

Two mainstream farmers use herbicides on various small grains and row crops; one uses herbicides on summer fallow. Expenditures per sprayed acre range from $3.50 to $19.42. No case farmer uses either insecticides or fungicides.

Two near-organic case farmers also apply modest amounts of purchased fertilizer, with average expenditures per fertilized acre of $7.63 and per cropland acre of $1.55. Both fertilizers are approved by official "organic" certification authorities. None of the near-organic case farmers uses agricultural chemicals to control either weeds or plant pests.

Five case farmers "occasionally" test their soil for fertility and pH (at intervals ranging from once every 3 years to once every 8 years), one does so "regularly" each year, and two do not undertake soil tests (Table 11). Four farmers base their fertilizer rates on yield goals relative to average yields. None of the differences in soil testing and yield goals is systematically related to whether case farmers are near-organic or mainstream.

Table 11. Basis for crop fertilization practices, matching pairs of near-organic and mainstream case farms.

	Northwest		South Central		North Central		Central	
Fertilization practice	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Use of soil tests for soil fertility and pH (Reg = regularly, Occ = occasionally, None)	Occ	Occ	Occ	None	None	Occ	Occ	Reg
Frequency of soil testing particular fields (once every ___ years)	3	4-5	3-5	n/a	n/a	4-5	8	1
Soil samples collected by self (S), farm input supplier/elevator (F), or crop consultant (C)	S	S,F	S	n/a	n/a	C	S	F
Fertilizer rates based on certain yield goals relative to average yields (no). If yes, in what way?[a]	No	< 15%	No	n/a	n/a	> 15%	< 15%	Equal

[a]Yield goals greater than average yields by more than 15% = "> 15%;" greater than average yield goals by less than 15% = "< 15%;" equal to average yields = "equal."

Small grain and row crop cultural practices. Contrasts in both the nature and overall incidence of cultural practices followed by near-organic and mainstream farmers in raising small grains are relatively minor (Tables 12-14).[14] The greatest difference is in tillage, with fall plowing being performed for more than one-half of the small grains raised by mainstream farmers and only one-third of the small grains raised by near-organic farmers. Counterbalanced against this is a greater incidence of spring pre-plant tillage for near-organic farmers. More than one-half of the small grains raised by near-organic farmers involve more than one pre-plant tillage operation, whereas multiple pre-plant tillage operations are undertaken for only 2 of 11 mainstream small grains. In addition, swathing is performed for 89% of near-organic small grains and only 64% of mainstream small grains.

Table 12. Cultural practices, small grains, matching pairs of near-organic and mainstream case farms.

	Northwest				North Central				Central	
	Spring wheat		Oat grain		Spring wheat		Oat grain		Oat grain	
Cultural practice	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Offset disk	1		1							
Field cultivate		1		1					1	
Moldboard plow					1		1			
Tandem disk					1		1		1	2
Chisel plow						1		1		
Fertilizer applied	1	1	1	1						1
Plant	1	1	1	1	1	1	1	1	1	1
Spray		1		1						1
Swath	1	1	1	1	1		1		1	1
Combine	1	1	1	1	1	1	1	1	1	1
Truck grain	1	1	1	1	1	1	1	1	1	1
V-ripper					1					
Chisel plow						1		1		
Moldboard plow										1

Table 13. Cultural practices for small grains, near-organic case farms.[a]

	Spring wheat			Oats				Millet	Buckwheat
Cultural practice	NW	SC	NC	NW	SC	NC[b]	C	SC	SC
Offset disk	1			1	1			1	1
Chisel plow		1			1				2
Moldboard plow			1			1			
Tandem disk			1			1	1		
Field cultivate							1		
Noble blade								2	
Fertilizer applied	1			1					
Plant	1	1	1	1	1	1	1	1	1
Swath	1		1	1	1	1	1	1	1
Combine	1	1	1	1	1	1	1	1	1
Truck grain	1	1	1	1	1	1	1	1	1
Chisel plow		2			1				1
V-ripper			1						

[a]Regional abbreviations shown below are as follows: NW = Northwest, SC = South Central, NC = North Central, and C = Central.

[b]Used as a nurse crop in establishing alfalfa.

[14]In Tables 11-15, cultural operations are listed in the approximate sequence during the year when they are undertaken. Thus, the first-listed tillage operations are undertaken during the spring and the last-listed tillage operations are undertaken during the fall.

No patterns of difference appear to exist in the types and sizes of farm machinery used by matching pairs of near-organic and mainstream case farmers (Annex B).

Table 14. Cultural practices for small grains, mainstream case farms.[a]

Cultural practice	Spring wheat			Oat grain			Oat hay[b]	Winter wheat		Barley	Millet hay
	NW	NC	C	NW	NC	C	NW	SC	C	NC	SC
Field cultivate	1			1			1		1		
Chisel plow		1			1			1		1	3
Tandem disk			1			2					
Fertilizer applied	1		1	1		1	1		1		
Plant	1	1	1	1	1	1	1	1	1	1	1
Spray	1		1	1		1					
Swath	1		1	1		1	1		1		1
Combine	1	1	1	1	1	1		1	1	1	
Truck grain	1	1	1	1	1	1		1	1	1	
Rake hay											1
Round bale							1				1
Haul bales							1				1
Chisel plow		1	1		1				1	1	
Moldboard plow						1					

[a]Regional abbreviations shown below are as follows: NW = Northwest, SC = South Central, NC = North Central, and C = Central.

[b]Used as a nurse crop in establishing alfalfa.

Contrasts in cultural practices for row crops between near-organic and mainstream farmers are also rather limited (Tables 15-16). To the extent that differences do exist, they are of an opposite nature as for small grains. For example, one near-organic farmer fall plows his corn fields, whereas none of the other near-organic farmers and no mainstream farmer undertakes fall tillage. Multiple spring pre-plant tillage is undertaken for all four mainstream row crops, but for only three of the six near-organic row crops.

Table 15. Cultural practices, row crops, matching pairs of near-organic and mainstream case farms.

Cultural practice	North Central Corn silage		Central Corn grain	
	Near-organic	Main-stream	Near-organic	Main-stream
Moldboard plow	1			1
Chisel plow		1		
Tandem disk			1	1
Field cultivate			1	
Springtooth drag				1
Fertilizer applied		2	1	1
Plant	1	1	1	1
Cultivate	3	2	1	1
Rotary hoe			2	
Forage harvest	1	1		
Spray				1
Truck and pack silage	1	1		
Corn pick			1	1
Combine				1
Truck grain			1	1
V-ripper	1			

Table 16. Cultural practices for row crops, near-organic and mainstream case farms.[a]

	Near-organic						Mainstream			
	Corn grain		Corn silage			Sorghum Silage	Corn grain	Corn silage	Sorghum grain	Soybeans
Cultural practice	NC	C	NW	NC	C	C	C	NC	SC	C
Moldboard plow	1		1	1			1			
Tandem disk		1			1	1	1		1	1
Field cultivate		1			1	1				1
Springtooth drag							1			
Chisel plow								1	2	
Fertilizer applied		1			1		1	2		
Plant	1	1	1	1	1	1	1	1	1	1
Cultivate	3	1	2	3	1	1	1	2	2	1
Rotary hoe		2			2	2				
Spray							1			1
Forage harvest			1	1	1	·1		1		
Truck and pack silage			1	1	1	1		1		
Combine	1						1		1	1
Corn pick		1					1			
Truck grain	1	1					1		1	1
V-ripper	1			1						

[a]Regional abbreviations shown below are as follows: NW = Northwest, SC = South Central, NC = North Central, and C = Central.

Alfalfa establishment, harvest, and incorporation cultural practices. No patterned differences exist between near-organic and mainstream case farmers in regard to any of (1) method of land preparation, fertilizer application, and use of a nurse crop versus direct seeding when alfalfa is established (Table 17); (2) number of cuttings, hay swathing, hay conditioning, hay raking, and type of baling when alfalfa hay is harvested (Table 18); (3) whether farmers harvest alfalfa seed; and (4) method of tillage for incorporating alfalfa.

Table 17. Cultural practices, alfalfa establishment, matching pairs of near-organic and mainstream case farms.

Case farm	Land preparation	Fertilizer applied	Nurse crop	Direct seed
Northwest				
Near-organic	Offset disk	Yes	Oat grain	n/a
Mainstream	Field cultivate	Yes	Oat hay	n/a
South Central				
Near-organic	Chisel plow Offset disk	No	Oat grain	n/a
Mainstream	No-till plant	No	n/a	Yes
North Central				
Near-organic	Moldboard plow Tandem disk	No	Oat grain	n/a
Mainstream	Chisel plow	No	Barley	n/a
Central				
Near-organic	Tandem disk Field cultivator	No	n/a	Yes
Mainstream	Tandem disk (2)	Yes	Oat grain	n/a

Table 18. Cultural practices, alfalfa harvest and incorporation break-up, matching pairs of near-organic and mainstream case farms.[a]

Case farm	Harvest: No. of cuttings	Harvest: Hay conditioned	Harvest: Hay raked	Harvest: Seed harvested	Alfalfa incorporation break-up
Northwest					
Near-organic	1	Yes	No	No	Moldboard plow
Mainstream	1	No	No	No	Offset disk
South Central					
Near-organic	1	No	Yes	Yes	Chisel plow
Mainstream	1	Yes	Yes	Yes	Noble blade
North Central					
Near-organic	2	No	No	No	Moldboard plow
Mainstream	2	No	No	No	Moldboard plow
Central					
Near-organic	3	Yes	Yes	No	Chisel plow (2) Field cultivator
Mainstream	3	No	No	No	Moldboard plow

[a]All case farmers swath, round bale, and haul their alfalfa; other harvesting practices are shown in the table.

Summer fallow cultural practices. Summer fallowing is limited to 3 of the 4 case farmers located in the West. Both West River near-organic case farmers have a general policy of underseeding all small grains with sweetclover, unless they use the small grain as a nurse crop for establishing alfalfa. The Northwest Region farmer uses a noble blade to incorporate his sweetclover during the year of summer fallowing, and follows that tillage operation with two additional passes (Table 19). As mentioned earlier, the South Central Region near-organic farmer no longer perceives a need to summer fallow. The Northwest mainstream farmer chisel plows once and sprays for weeds once during his summer fallowing, whereas the South Central mainstream farmer chisel plows three times on summer fallow.

Table 19. Cultural practices, summer fallow, case farms.

Cultural practice	Northwest: Near-organic	Northwest: Mainstream	South Central: Mainstream
Preceding crop	Spring wheat	Spring wheat Oat grain	Winter wheat
Cover crop used	Clover	None	None
Tillage operation	Noble blade(3)	Chisel plow	Chisel plow(3)
Weed spray	No	Once	No

Government program participation

All case farmers have various government commodity program base acres (Table 20). Total base acreages range from 215 acres for the Central Region near-organic case farm to 669 acres for the South Central Region near-organic case farm. The average base acreage for the eight case farms is 456. Three of the four near-organic farms have fewer base acres than their mainstream counterparts, with percentage differences ranging from 31 in the Northwest Region to 62 in the Central Region.

Table 20. Government program participation, matching pairs of near-organic and mainstream case farms.

Government program participation	Northwest Near-organic	Northwest Main-stream[a]	South Central Near-organic[b]	South Central Main-stream[c]	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
Crop 1	Spr wh	Spr wh	Spr wh	Spr wh	Spr wh	Spr wh	n/a	Wheat
Base acres	400	140[d]	355	277	61	264	n/a	376
Base yield (bu/acre)	16	20	28	27	18	18	n/a	30
Crop 2	n/a	Oats	Oats	Oats	Oats	Oats	Oats	Oats
Base acres	n/a	14[e]	86	26	115	26	78	22
Base yield (bu/acre)	n/a	42	31	35	41	40	42	43
Crop 3	n/a	Corn	Sorghum	n/a	Corn	Corn	Corn	Corn
Base acres	n/a	53[f]	205	n/a	173	179	137	135
Base yield (bu/acre)	n/a	31	31	n/a	38	30	43	48
Crop 4	n/a	Barley	Barley	Barley	n/a	Barley	n/a	Barley
Base acres	n/a	20	23	42	n/a	58	n/a	30
Base yield (bu/acre)	n/a	29[g]	26	25	n/a	35	n/a	40
Total base acres	400	579	669	345	349	527	215	563
CRP acres	0	170	0	0	0	0	110	0
Government payments received in 1993 ($)	6,633	12,128	2,699	2,758	2,232	5,969	5,450	9,970

[a]In 1993, this producer enrolled 86 acres in the 0/92 program.

[b]In 1993, this producer enrolled 340 acres in the Integrated Farm Management Program.

[c]In 1993, this producer enrolled 345 acres in the 0/92 program.

[d]Additional acres of spring wheat have base yields as follows: 23 acres at 14 bu/acre; 79 acres at 15 bu/acre; and 120 acres at 19 bu/acre.

[e]Additional acres of oats have a base yield as follows: 28 acres at 32 bu/acre.

[f]Additional acres of corn have a base yield as follows: 96 acres at 29 bu/acre.

[g]Additional acres of barley have a base yield as follows: 6 acres at 30 bu/acre.

Two of the eight case farms have land enrolled in CRP: the Northwest Region mainstream farm with 170 acres and the Central Region near-organic farm with 110 acres.

Total government payments in 1993 per case farm range from $2,232 to $12,128 and average $5,980. This average is 29% less than the $8,439 state-wide average in 1992 in South Dakota (USDC, 1994, p 14). The average government payment per near-organic case farm of $4,254 is 45% less than the average payment of $7,706 per mainstream farm.

Crop rotation budget format

Individual crop budget data generated by the CARE (1993) program, organized by crop rotation and case farmer, are presented in Annex A. For each rotation crop component, gross revenue, direct production costs, fixed production costs, and various measures of profitability are shown. Except for break-even prices, the crop budget data are expressed per-acre.

"Gross revenue" consists of three components: market value of primary product (calculated as yield times unit selling price), government deficiency payment, and market value of secondary product (denoted as "other income"). The only instance of other income reported is sale of alfalfa seed by the two South Central Region case farmers.

"Direct" production costs are those which vary according to level of production. These consist of expenditures on materials (e.g., seeds, fertilizer, herbicide, twine), machinery operation, trucking of grains and oilseeds from field to storage/selling place (15 cents/bu), silage handling ($1.00/ton for hauling and packing in a trench silo), crop insurance, labor, custom hiring, and interest (calculated according to the length of time that credit is required for the purchase of each production input).[15]

"Fixed" production costs are those which will be incurred regardless if production is undertaken. In this study, they cover ownership costs of machinery (depreciation, interest, insurance) and land. As indicated above, annual cash rental rates are used to represent land costs. "Total" production costs, defined as the sum of direct and fixed production costs, cover all costs of production except management.

The profitability of crop production is expressed with respect to both direct costs and total costs of production in three forms: (1) per-acre net revenue and (2) break-even prices for each crop, and (3) net revenue per acre in rotation. "Per-acre net revenue" is calculated as the difference between per-acre total gross revenue and per-acre direct/total production costs for each crop.

Crop "break-even prices" are calculated as per-acre direct/total production costs divided by per-acre yield. By comparing a crop's break-even price with its market price, one can

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[15]Although the vast majority of labor on the case farms is family rather than hired labor, we followed the common practice in farm management budgeting of treating labor as a direct production cost.

determine whether the crop is the source of profit or loss. In fact, this statement is an over-simplification because the presence of and cultural practices undertaken for certain crops in a rotation often impact the performance of other crops included in the rotation. Thus, a fuller and more accurate way of appraising the economic soundness of a rotation is in terms of the average net return per acre of the rotation, rather than in terms of the individual crops' break-even prices relative to their respective market values.

"Net revenue per acre in rotation" is calculated by weighting the per-acre profit for each crop comprising a rotation by the acres of the crop in the rotation. This measure reflects the combined effect on profit of all individual rotation components--ranging from those that are highest value to those that are lowest value (included those that may be the source of losses).

Comparative economics of near-organic and mainstream crop production

Because of interdependencies among various components of individual crop rotations, the primary focal point of the comparative economic analysis undertaken on crop production for near-organic and mainstream case farms is at the level of crop rotations and whole-farm cropland rather than at the level of individual crops. The unit of analysis, in this component of the study, is an "average acre" of rotation/cropland. While such a unit has definite analytic meaning, it is abstract. Therefore, some attention is also given to the comparative economics of different individual crops grown by matching pairs of near-organic and mainstream case farmers.

"Average acre" of rotation/cropland. Summary data--taken from Annex A--for an average acre of each rotation for each case farmer are displayed in Table 21. Data are aggregated to the level of an average acre of cropland for each whole farm. The aggregation process involves a simple weighting of the profitability of individual rotations for given case farmers by the acres in the respective rotations.

Net revenue per acre of cropland over total costs except management ranges among case farms from \$9.23 to \$63.73 and averages \$34.23 (Figure 10). It is highest in the North Central Region (average of \$56.95), followed respectively by the Central (\$42.89), South Central (\$26.53), and Northwest (\$10.55) Regions. Regions with higher cropland profitability also have

FIGURE 10. NET REV. OVER TOTAL COSTS:
matching pairs of case farms

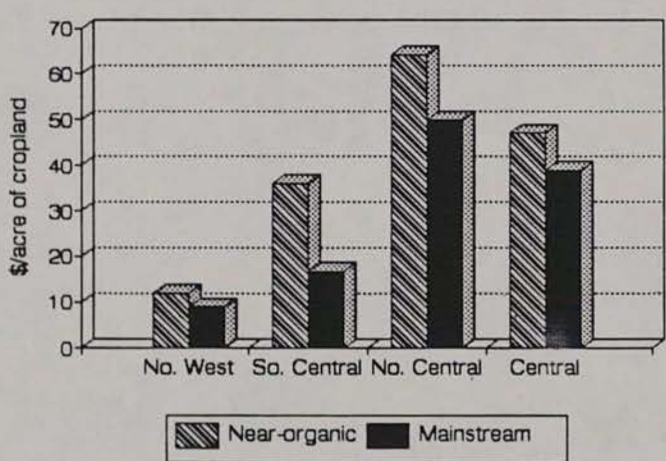

Table 21. Net revenue per acre of rotation, matching pairs of near-organic and mainstream case farms.

Case farm and rotation[a]	Acres in rotation	Net revenue per average hypothetical acre of rotation over: Direct Costs	Total costs except management
Northwest			
Near-organic			
SpWh (50%) - SumFa (50%)	570	$ 34.90	$ 10.29
CorSi (25%) - OatGr (25%) - SprWh (25%) - SumFa (25%)	420	44.01	6.45
OatGr (17%) - Alf (83%)	228	58.97	25.78
CorSi (9%) - SprWh (32%) - OatGr (12%) - Alf (15%) - SumFa (32%) whole farm	1,218	42.55	11.87
Mainstream			
OatHa (17%) - Alf/Gr (83%)	420	57.73	26.90
SprWh (55%) - OatGr (12%) - SumFa (33%)	330	20.83	- 2.01
SprWh (50%) - SumFa (50%)	230	14.87	- 6.91
SprWh (30%) - OatHa (7%) - OatGr (4%) - Alf/Gr (36%) - SumFa (23%) whole farm	980	35.25	9.23
South Central			
Near-organic MilGr (19%) - SprWh (10%) - BucWh (17%) - OatGr (13%)-Alf (41%) whole farm	957	75.96	35.65
Mainstream WinWh (15%) - SumFa (20%) - SorGr (18%) - MilHa (5%) - Alf/Gr (42%) whole farm	610	54.03	17.41
North Central			
Near-organic SprWh (26%) - CorSi (20%) - CorGr (6%) - OatGr (7%) - Alf (41%) whole farm	540	124.21	63.73
Mainstream			
CorSi (31%) - OatGr (14%) - Bar (23%) - SprWh (32%)	515	81.32	35.54
SprWh (41%) - Bar (10%) - Alf (49%)	170	138.75	94.45
CorSi (24%) - SprWh (34%) - Bar (20%) - OatGr (10%) - Alf (12%) whole farm	685	95.57	50.16
Central			
Near-organic			
CorGr (36%) - CorSi (9%) - OatGr (42%) - SorSi (13%)	275	71.20	14.98
Continuous alfalfa (10 years)	135	174.94	111.05
CorGr (24%) - CorSi (6%) - OatGr (28%) - SorSi (9%) - Alf (33%) whole farm	410	105.36	46.61
Mainstream			
SprWh (68%) - CorGr (25%) - SoyBe (7%)	340	71.25	26.61
WinWh (53%) - CorGr (18%) - OatGr (29%)	190	89.28	45.30
OatGr (14%) - Alf (86%)	85	147.75	75.71
SprWh (37%) - CorGr (20%) - SoyBe (4%) - WinWh (16%) - OatGr (11%) - Alf (12%) whole farm	615	87.39	39.17

[a]The following crop abbreviations are used below: Alf = alfalfa, Alf/Gr = alfalfa/grass, Bar = barley, BucWh = buckwheat, CorGr=corn grain, CorSi = Corn silage, MilGr = Millet grain, MilHa = millet hay, OatGr = oat grain, OatHa = oat hay, SorGr = sorghum grain, SorSi = sorghum sudan silage, SoyBe = soybeans, SprWh = spring wheat, SumFa = summer fallow, and WinWh = winter wheat.

The percentages shown in parentheses reflect acreages of individual crops as percentages of total acres in (a) particular rotations and (b) cropland for whole farms.

higher cropland rental rates. For case farms with multiple crop rotations, the rotations with alfalfa as the main component are considerably more profitable.

Net revenue per acre of cropland over total costs except management (NR/A) is higher for all four near-organic case farms than for their matching mainstream counterparts. Discussion of the nature and some apparent underlying causes for such differences is region-by-region. The phrase "apparent underlying causes" is used because each production outcome is determined by a host of interrelated causal factors. Limitations in human and financial research resources precluded collection of detailed information on all such causal factors and interrelationships. Explanations offered in text are inevitably superficial. They are in terms of the few physical and economic indicators of comparative crop performance for which measurements were obtained or calculated in the study.

In identifying causes for differences between near-organic and mainstream production, Table 22 was prepared. The following discussion is based most directly on examination of it and Tables 8 and 21; some additional details are drawn directly from Annex A.

In the **Northwest**, NR/A for the near-organic farm ($11.87) is 29% more than that for the mainstream farm ($9.23). The primary reason is a higher per-acre net return for spring wheat (near-organic $44 and mainstream $16), the main crop on the near-organic farm (32% of its cropland acreage). The higher per-acre net return arises from a higher spring wheat yield (30 versus 22 bu/acre) and lower machine costs ($12/acre lower) on the near-organic farm. Secondary explanations involve (1) an analogous, but less strongly contrasting, situation for oats as for spring wheat on the two case farms and (2) a $10/acre lower cost of summer fallowing on the near-organic farm.

In the **South Central Region**, NR/A for the near-organic farm ($35.65) is more than double that for the mainstream farm ($17.41). The primary reason is a larger area (390 versus 260 acres) and more profitable production ($66 versus $49/acre net revenue) of alfalfa on the near-organic farm. Secondary reasons involve (1) the near-organic farmer having no summer fallow, whereas the mainstream farmer incurs expenses for 120 fallowed acres, and (2) non-alfalfa crops collectively being more profitable on the near-organic farm than on the mainstream farm. While winter wheat is highly profitable ($66/acre net revenue) on the mainstream farm, that farm's other two crops (grain sorghum and millet hay) generate negative net revenue. In contrast, each of the four small grains on the near-organic farm is profitable, especially the 100 acres of spring wheat which generates $49/acre of net revenue.

In the **North Central Region**, NR/A for the near-organic farm ($63.73) is 27% more than that for the mainstream farm ($50.16). The primary reason is a much larger acreage of highly profitable alfalfa on the near-organic farm than on the mainstream farm (220 versus 84 acres). A small additional factor is a greater per-acre profit from corn silage for the near-organic than for the mainstream farm ($23 versus $16). On the other hand, compared to the near-organic farm, the mainstream farmer's spring wheat per-acre (1) net revenue is more than 2.5 times greater, (2) machine costs are only one-half as great, and (3) deficiency payment is $9 more. The mainstream farmer's per-acre profit from producing alfalfa is also 9% higher than that for the near-organic farm; the greater profit results primarily from lower machine costs.

Table 22. Per-acre net returns, gross returns, and total costs of production except management, matching pairs of near-organic and mainstream case farms.

Revenues and costs	Northwest Near-organic	Northwest Main-stream	South Central Near-organic	South Central Main-stream	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
Per-acre net revenue over all costs except management ($)								
Spring wheat	44	16	49		20	52		16
Oat grain	16	- 6	5		13*	27	- 7	- 27
Millet grain			20					
Buckwheat			10					
Grain sorghum				- 7				
Winter wheat				66				86
Corn grain					30		30	41
Barley						44		
Soybeans								72
Alfalfa (alfalfa/grass)	39	39	66	49	141	154	129	99
Corn silage	- 11				23	16	29	
Sorghum sudan silage							33	
Oat hay		20						
Millet hay				- 7				
Summer fallow	- 23	- 30		- 24				
Per-acre gross revenue ($)								
Spring wheat	109	87	119		101	110		127
Oat grain	85	69	83		92	89	77	76
Millet grain			83					
Buckwheat			95					
Grain sorghum				67				
Winter wheat				120				161
Corn grain					143		144	190
Barley						109		
Soybeans								160
Alfalfa	83	75	111	97	220	220	248	220
Corn silage	117				169	134	154	
Sorghum sudan silage							150	
Oat hay		106						
Millet hay				60				
Summer fallow		4		5				
Per acre total costs except management ($)								
Spring wheat	65	71	70		81	59		111
Oat grain	68	75	78		79*	62	84	103
Millet grain			63					
Buckwheat			85					
Grain sorghum				74				
Winter wheat				54				75
Corn grain					113		114	149
Barley						64		
Soybeans								88
Alfalfa	44	36	45	48	79	66	119	121
Corn silage	128				146	118	125	
Sorghum sudan silage							117	
Oat hay		86						
Millet hay				67				
Summer fallow	23	33		29				

*Since the data for oat grain shown in this table for other producers do not involve oats as a nurse crop for establishment of alfalfa, the cost for alfalfa seed has been deducted from this producer's overall oat grain (alfalfa establishment) budget.

In the **Central Region**, NR/A for the near-organic farm ($46.61) is 19% more than that for the mainstream farm ($39.17). The primary reason is a larger acreage (135 versus 73 acres) and a higher yield (4.5 versus 4.0 tons/acre) of alfalfa for the near-organic farm than its matching mainstream counterpart. A small additional factor is a $19/acre lower production cost for near-organic than mainstream oats; the near-organic farmer uses no purchased fertilizer, whereas the mainstream farmer's purchased fertilizer expenditure is $9/acre. While the per-acre corn grain production cost for the mainstream farmer is $35/acre higher than for the near-organic farmer, his 20 bu/acre higher yield enables him to earn $9/acre greater net revenue. Winter wheat and soybeans are also highly profitable crops for the mainstream farmer ($86 and $72/acre net revenue, respectively).

The comparative performance of near-organic and mainstream farmland production was also evaluated in terms of total digestible nutrients (TDN) produced per acre of cropland and farmland, with "farmland" inclusive of cropland, pasture, and native hay land. The basic methodology followed in this study--presupposing that crops are fed to livestock--is similar to that used by Smolik (1993, p 15) in his study of organic, conventional, and reduced-till farming systems in South Dakota.

Pounds of TDN/acre of cropland for each case farmer were calculated as the sum of the following cross-product for each crop grown by the farmer:

Acres * yield/acre * lb TDN/unit of yield.

"TDN/unit of yield" values were determined by multiplying pounds per unit of yield (e.g., bushel, ton) times percent dry matter and percent TDN, with the latter two values expressed in decimal form and taken from NRC (1984, pp 48-58).

Pounds of TDN/acre produced on cropland range among case farms from 922 to 3,176 and average 1,876 (Table 23). Corresponding values for farmland range from 376 to 1,716 and average 946. Since TDN production per acre of pasture and native hay land is generally less than that from cropland, margins of difference between TDN production on cropland and total farmland for particular case farms are importantly influenced by proportions of cropland to total farmland. Since cropland acreages in the Central Region exceed pasture and native hay acreages, differences between cropland and farmland TDN production for these farms are considerably less than for the other farms in which cropland area is "small" relative to total farmland area.

Average TDN production per acre for case farms east of the Missouri is more than double that for those west of the Missouri (2,536 versus 1,215 lb TDN/cropland acre and 1,353 versus 539 lb TDN/farmland acre). This higher production arises from generally higher crop yields and a lack of summer fallowing in the east that result from the east's generally more fertile soils, higher growing season precipitation, and longer growing season.

Except for TDN/acre of cropland in the Central Region, which is essentially identical for the two case farms, TDN production per acre for the near-organic farms exceeds that for matching mainstream farms. Margins of difference between other matching pairs of case farms are as great as 38% for cropland in the North Central Region and as great as 90% for farmland in the South Central Region. On average, pounds of TDN/acre for near-organic compared to main-stream farms are 18% greater for cropland and 22% greater for farmland. The advantage in TDN production for the near-organic farms arises from a combination of higher yields for some crops, smaller percentages of summer fallowed acres (except for the Northwest), and larger percentages of relatively TDN-intensive alfalfa (except for the Northwest) on the near-organic farms.

Table 23. Total digestible nutrients (TDN) produced per acre of cropland and farmland, matching pairs of near-organic and mainstream case farms.

Case farm[a]	Pounds of TDN/acre produced Cropland	Farmland
Northwest		
Near-organic	1,197	569
Mainstream	922	376
Ratio	1.30	1.51
South Central		
Near-organic	1,422	793
Mainstream	1,318	417
Ratio	1.08	1.90
North Central		
Near-organic	3,176	1,078
Mainstream	2,307	994
Ratio	1.38	1.08
Central		
Near-organic	2,327	1,716
Mainstream	2,335	1,622
Ratio	1.00	1.06

[a]The ratios shown below are pounds/acre of TDN for near-organic farms divided by pounds/acre of TDN for matching mainstream farms.

Individual crops. Cost and return data for spring wheat and oat grain, corn silage and corn grain, and alfalfa for matching pairs of near-organic and mainstream case farmers are presented in Tables 24-26 and Figures 11-19. Data are available for 11 crop-region comparisons--two involving spring wheat, three oat grain, one corn silage, one corn grain, and four alfalfa.

Table 27 summarizes, for each crop, instances in which the values for the following economic criteria for near-organic production exceed, are equal to, and are less than those for mainstream production: (1) per-acre yields, gross revenue, total production costs except management, and net revenue and (2) per-unit break-even prices. Results are mixed in that, for each criterion, some near-organic values exceed mainstream values and for some they are less. The incidence of crop-region instances in which near-organic values exceed--versus are less than--mainstream values is greater for the following criteria: per-acre yields, gross revenue, and net revenue. Similarly, the incidence of crop-region instances in which near-organic values are less than--versus exceed--mainstream values is greater for the following criteria: per-acre total production cost and per-unit break-even prices.

Summer fallow. Per-acre summer fallow costs, with land included, range among the three case farmers from $23 to $33 and average $29 (Table 28). With the land cost excluded, costs range from $7 to $19 and average $11. Costs for the case farmer who sprays for weeds are substantially more than for the other two who rely exclusively on tillage for weed control.

Table 24. Costs and returns from production, small grains, matching pairs of near-organic and mainstream case farms.

Cost and return category	Northwest Spring wheat Near-organic[a]	Northwest Spring wheat Main-stream	Northwest Oat grain Near-organic[a]	Northwest Oat grain Main-stream	North Central Spring wheat Near-organic	North Central Spring wheat Main-stream	North Central Oat grain Near-organic[b]	North Central Oat grain Main-stream	Central Oat grain Near-organic	Central Oat grain Main-stream
Yield (bu/acre)	30	22	60	50	30	30	65	65	55	55
Gross revenue ($/acre)	108	87	85	69	101	110	92	89	77	76
Direct costs of production ($/acre)										
Materials	18	14	14	12	11	8	7	7	5	15
Machinery operation	3	2	3	2	6	3	5	3	5	5
Trucking grain	4	3	9	7	4	4	10	10	8	8
Labor	3	2	3	2	6	3	5	2	6	7
Insurance	5	5	5	5	0	0	0	0	0	0
Machine custom hire	0	18	0	20	0	0	0	0	14	20
Interest	1	2	2	2	1	1	2	1	1	2
Sub-total	34	46	36	50	28	19	29	23	39	57
Fixed costs of production ($/acre)										
Machinery ownership	15	10	18	10	26	13	23	12	21	22
Land	15	15	15	15	27	27	27	27	24	24
Sub-total	30	25	33	25	53	40	50	39	45	46
Total costs of production except management ($/acre)	64	71	69	75	81	59	79	62	84	103
Net revenue ($/acre) over:										
Direct costs	74	41	49	19	73	91	63	66	38	19
Total costs except management	44	16	16	- 6	20	51	13	27	- 7	-27
Break-even price ($/bu), with respect to:[c]										
Direct costs	1.14	2.10	0.60	1.00	0.96	0.63	0.45	0.36	0.71	1.02
Total costs except management	2.15	3.23	1.14	1.50	2.70	1.95	1.22	0.96	1.52	1.86

[a] A "joint-cost" of $3.80/acre for sweetclover seed is included with the costs shown below for this crop.

[b] Since this producer uses oats as a nurse crop for establishment of alfalfa and his counterpart does not, his $15.50/acre cost of alfalfa seed is not included in this table.

[c] Break-even prices were calculated before data were rounded for display in this table.

Table 25. Costs and returns from production, row crops, matching pairs of near-organic and mainstream case farms.

Cost and return category	North Central Corn silage Near-organic	North Central Corn silage Main-stream	Central Corn grain Near-organic	Central Corn grain Main-stream
Yield (tons or bu/acre)	9.5	7.5	60	80
Gross revenue ($/acre)	169	134	144	190
Direct costs of production ($/acre)				
Materials	15	28	20	53
Machinery operation	16	12	9	7
Silage handling	10	8	0	0
Trucking grain	0	0	9	10
Labor	15	9	13	12
Insurance	5	0	0	5
Machine custom hire	0	0	0	0
Interest	2	2	1	4
Sub-total	63	59	52	91
Fixed costs of production ($/acre)				
Machinery ownership	56	32	38	34
Land	27	27	24	24
Sub-total	83	59	62	58
Total costs of production except management ($/acre)	146	118	114	149
Net revenue ($/acre) over:				
Direct costs	106	75	92	99
Total costs except management	23	16	30	41
Break-even price ($/unit), with respect to:[a]				
Direct costs	6.67	7.81	0.87	1.14
Total costs except management	15.42	15.67	1.90	1.86

[a] Break-even prices were calculated before data were rounded for display in this table.

Table 26. Costs and returns from harvesting alfalfa, matching pairs of near-organic and mainstream case farms.[a]

Cost and return category	Northwest Near-organic	Northwest Main-stream	South Central Near-organic	South Central Main-stream	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
Yield (tons/acre)	1.5	1.5	2.0	2.0	4.0	4.0	4.5	4.0
Gross revenue ($/acre)	83	75	111[b]	97[b]	220	220	248	220
Direct costs of production ($/acre)								
Labor	6	5	5	6	10	9	14	24
Machinery operation	5	3	3	4	10	6	13	16
Custom baling	0	0	0	0	0	0	22	0
Other	1	1	2	1	2	3	1	2
Sub-total	12	9	10	11	22	18	50	42
Fixed costs of production ($/acre)								
Machinery ownership	17	12	12	14	30	21	45	55
Land	15	15	23	23	27	27	24	24
Sub-total	32	27	35	37	57	48	69	79
Total costs of production except management ($/acre)	44	36	45	48	79	66	119	121
Net revenue ($/acre) over:								
Direct costs	71	66	101	86	198	202	198	178
Total costs except management	39	39	66	49	141	154	129	99
Break-even price ($/ton), with respect to:								
Direct costs	9.57	8.57	5.27	5.67	6.06	4.95	10.99	10.70
Total costs except management	33.23	29.83	24.17	25.55	21.19	17.88	27.32	30.83

[a]With one exception, the costs and returns shown below pertain to alfalfa during years when it is neither being established nor broken up for reseeding. The exception involves break-even prices. Break-even prices reflect weighted average costs per ton of alfalfa produced during the complete cycle of production, excluding the year of establishment (for 6 of the 8 case farms, alfalfa is established with a nurse crop) but including the final year when alfalfa sod is broken-up in preparation for reseeding.

[b]Includes the sale of alfalfa seed harvested from part of the producer's alfalfa acreage.

Table 27. Summary of relative yields, costs, and returns for small grains, row crops, and alfalfa produced by matching pairs of near-organic and mainstream case farmers.

Economic criterion and crop	Instances in which near-organic values exceed, are equal to, or are less than mainstream values: Exceed	Equal	Less
Per-acre yield			
Spring wheat	1	1	0
Oat grain	1	2	0
Corn silage	1	0	0
Corn grain	0	0	1
Alfalfa	1	3	0
Total	4	6	1
Per-acre gross revenue			
Spring wheat	1	0	1
Oat grain	3 (2)	0	0
Corn silage	1	0	0
Corn grain	0	0	1
Alfalfa	3	1	0
Total	8 (2)	1	2
Per-acre total production cost			
Spring wheat	1	0	1
Oat grain	1	0	2
Corn silage	1	0	0
Corn grain	0	0	1
Alfalfa	2 (1)	0	2
Total	5 (1)	0	6

Economic criterion and crop	Instances in which near-organic values exceed, are equal to, or are less than mainstream values: Exceed	Equal	Less
Per-acre net revenue over total production costs			
Spring wheat	1	0	1
Oat grain	2	0	1
Corn silage	1 (1)	0	0
Corn grain	0	0	1 (1)
Alfalfa	2	1	1
Total	6 (1)	1	4 (1)
Break-even prices with respect to total production costs			
Spring wheat	1	0	1
Oat grain	1	0	2
Corn silage	0	0	1
Corn grain	1	0	0
Alfalfa	2	0	2
Total	5	0	6

[a]Numbers of instances in which differences are less than 5% are shown in parentheses.

FIG. 11. YIELDS OF SMALL GRAINS:
matching pairs of case farms

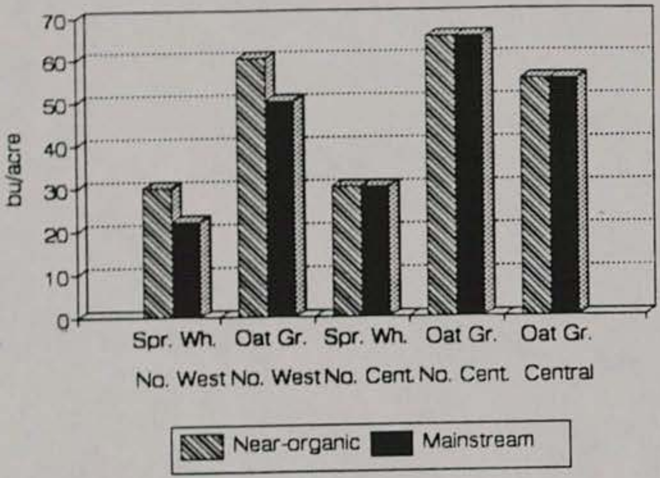

FIG. 12. TOT. PROD. COSTS, SMALL GRAINS
matching pairs of case farms

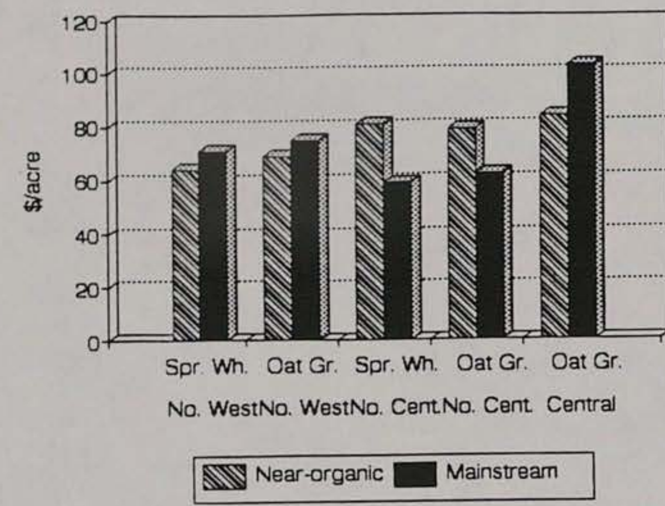

FIG. 13. NET REV. OVER COSTS, SM. GRAIN
matching pairs of case farms

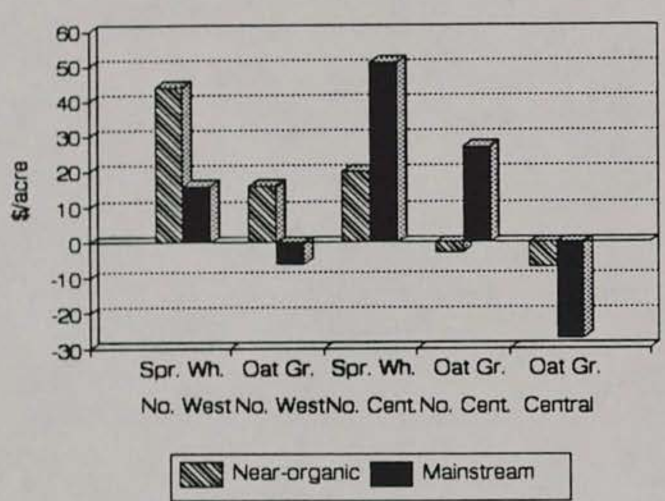

FIG. 14. BREAK-EVEN PRICES, SM. GRAINS:
matching pairs of case farms

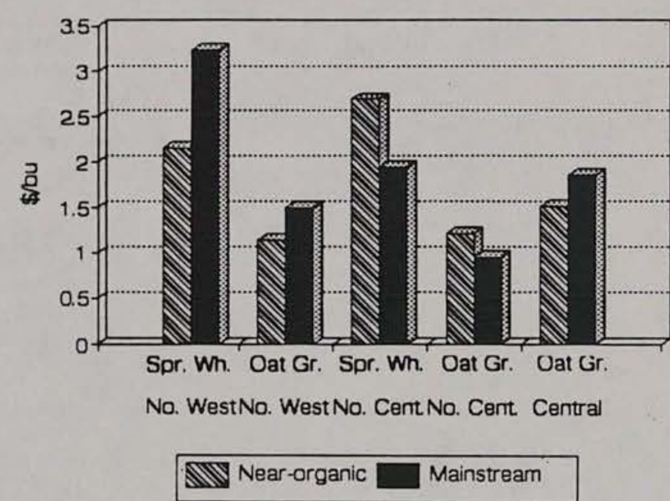

FIGURE 15. YIELDS OF ROW CROPS:
matching pairs of case farms

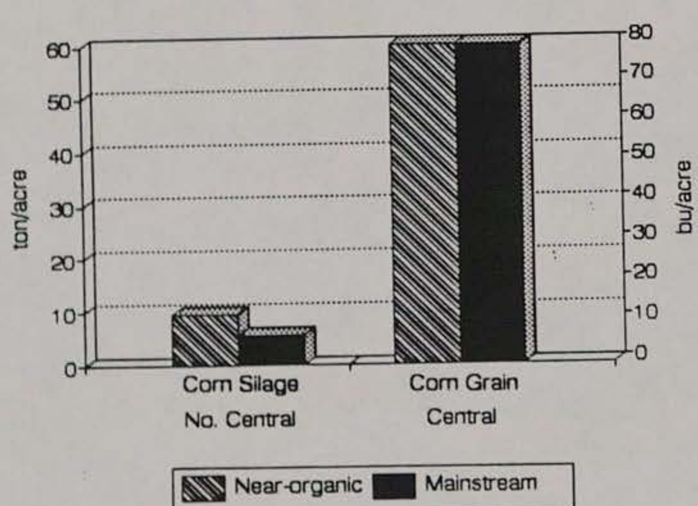

FIG. 16. TOT. PROD. COSTS, ROW CROPS:
matching pairs of case farms

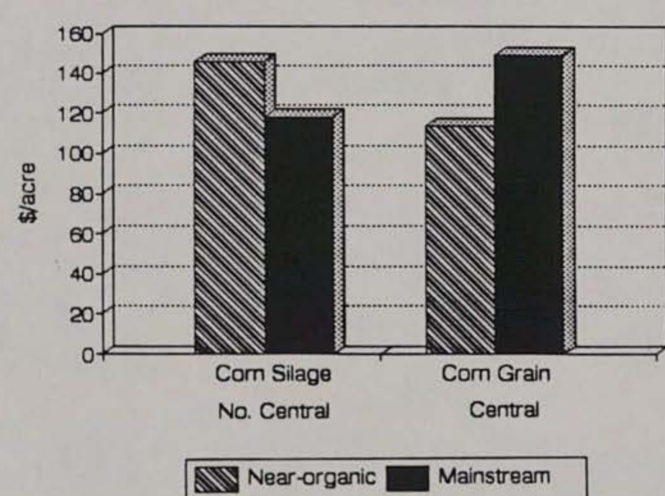

FIG. 17. NET REV. OVER COSTS, ROW CROPS
matching pairs of case farms

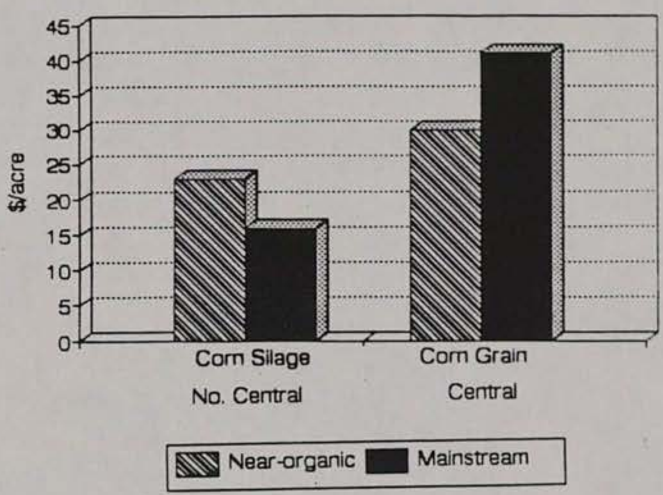

FIG. 18. BREAK-EVEN PRICES, ROW CROPS:
matching pairs of case farms

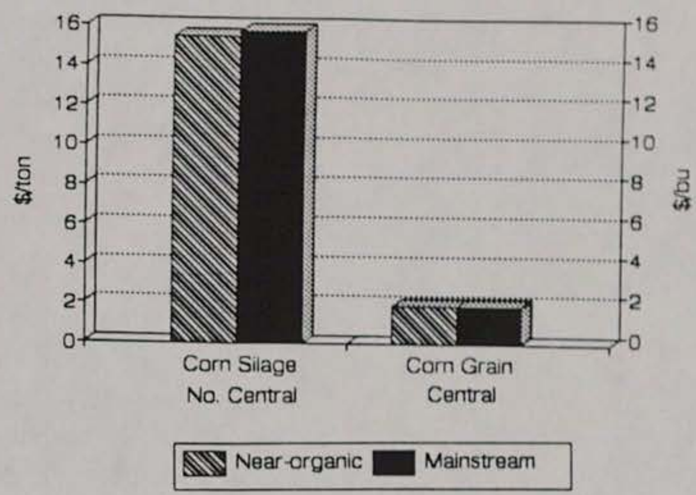

FIG. 19. BREAK-EVEN PRICES, ALFALFA:
matching pairs of case farms

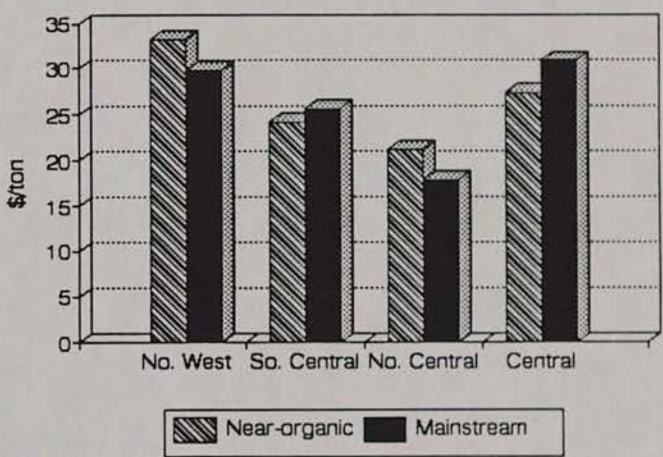

Table 28. Per-acre summer fallow costs, case farms.

Cost item	Northwest Near-organic	Northwest Mainstream	South Central Mainstream
Land	$ 14.60	$ 14.60	$ 22.80
Custom spray	0	11.00	.0
Machinery ownership	4.31	3.97	3.22
Labor	2.47	1.56	1.54
Machinery operation	1.92	1.65	1.73
Interest	0.10	0.59	0.11
Total with land	$ 23.40	$ 33.37	$ 29.40
Total without land	$ 8.80	$ 18.77	$ 6.60

BEEF CATTLE COMPONENT OF CASE FARMS

The cow-calf enterprise unit of analysis was defined to cover the brood cow, her calf until weaning, that part of the heifer that replaces her, and that part of the herd sire required to serve her. In defining the unit, farmer-specific information on calf weaning ages, heifer replacement rates, number of cows served per herd sire, and herd sire replacement rates was used. Common units of analysis were used with supplementary cattle enterprises on the various case farms, with backgrounded animals being on feed for 90 days and slaughter steers for 515 days[16].

Common assumptions

Replacement heifers were assumed to be raised by all case farmers, whereas herd sires were assumed to be purchased.

To determine interest on livestock investment capital, common assumptions were made on (1) the average value of each type of animal, between beginning and end of breeding/feeding period, and (2) proportions of the year that different types of cattle are in herds (Table 29). Data sources for the common assumed values are indicated in footnotes to the table. The 9%/yr interest rate and $6.50/hr wage rate used with the crop production analysis (Table 5) were also used with the livestock budgeting analysis.

Table 29. Assumed average 1993 values of cattle and proportions of year cattle are in herd.

Type of cattle	Average value ($)[a]	Proportion of year[b]
Breeding cattle		
Herd sire	1,650	1.00
Brood cow	825	1.00
Replacement heifer	685	1.41
Market cattle		
Backgrounded steer calf	620	0.25
Backgrounded heifer calf	570	0.25
Slaughter steer	750	1.41

[a]Prices of various categories of slaughter steers, bulls, and cows in Sioux Falls increased in the range of 8-14% between 1985-89 and 1990-94 (Feuz, 1995, p 2). Thus, average values of bulls, brood cows, and replacement heifers are based on assumed 1988 values reported in Taylor et al. (1990, p 32), with an approximate 10% upward adjustment.

Average values of other types of cattle are based on typical 1993 "beginning" and "ending" market values for concerned case farmers.

[b]Proportions of the year that cattle are in herds are based on typical periods reported by case farmers.

[16]Compared to common cattle feeding practices, this period of feeding is long.

Since herd sires and brood cows are in the herd the entire year, the capital utilization period for them is the full year. Since the most common period between weaning and calving for replacement heifers is 515 days, capital was assumed to be tied up in replacement heifers for 1.41 years in the cow-calf budget analysis. A similar length of time was reported by the case farmer who finishes cattle. The 90-day backgrounding period was represented by a capital utilization period of 0.25 of a year. Operating capital to finance direct cash expenses for livestock enterprises was assumed to be tied-up on average for 0.50 of a year.

Baseline prices assumed for different categories of cattle for 1993 are displayed in Table 30. These prices are based on (1) "Livestock detailed annual quotations for 1993 for the Sioux Falls, South Dakota market," published by the Livestock and Seed Division, Agricultural Marketing Service, U.S. Department of Agriculture and (2) judgment of concerned scientists. With one exception, common prices were assumed for the various case farmers for weaned and backgrounded calves of common weights. The exception involved a case farmer who sells backgrounded heifers for breeding stock; his actual price was used in analysis.

Table 30. Assumed baseline cattle market prices, 1993.[a]

Type of cattle	Price ($/cwt)	Type of cattle	Price ($/cwt)
Steer feeder calves		Finished steers (1,100-1,300 lb)[b]	
500-550 lb	$ 101.50		
550-600 lb	98.60	Choice 2-4	$ 75.15
600-650 lb	93.50	Select 2-3	71.65
Heifer feeder calves		Cull cows[c]	
450-500 lb	94.30	Cutter 1-2	46.35
500-550 lb	93.20	Canner 1-2	42.45
550-600 lb	89.10		
Backgrounded steers		Cull bulls (1,500-2,100 lb)[d]	
700-750 lb	87.50		
750-800 lb	86.15	Yield grade 1	62.90
800-850 lb	84.35	Yield grade 2	60.25
Backgrounded heifers		Cull replacement heifers	
750-800 lb	81.25[e]	1,000-1,200 lb	60.00

[a]Except for cull replacement heifers, the cattle market prices shown in this table are taken from "Livestock detailed annual quotations for 1993 for the Sioux Falls, S.D. market," published by the Livestock and Seed Div, Agric Mktg Serv, U.S. Dept of Agric. The cull replacement heifer price is about mid-way between finished steers and cull cows (personal communication, Dr. Dillon Feuz, May 1995).

[b]In this study, we assumed a price of $74.00/cwt.

[c]In this study, we assumed a price of $45.00/cwt.

[d]In this study, we assumed a price of $62.00/cwt.

[e]One producer sold backgrounded heifers for breeding at $88.11/cwt.

Feed requirements for different types (medium- versus large-frame) and weights (both absolute weight and daily rates of gain) of cattle in the herds maintained by various case farmers were assessed in terms of TDN and protein consumption needs. While information on types and weights of cattle and length of feeding period for various types of cattle was farmer-specific, common values were assumed for all case farmers in respect to the TDN and protein composition of various feedstuffs and the TDN and protein requirements for various types and weights of cattle. These common TDN and protein values were taken from the National Research Council's most recent edition of Nutrient Requirements of Beef Cattle (NRC, 1984, pp 47-58 and 77-85). While some producers may believe their cattle perform "better" with their home-produced feedstuffs, resource limitations precluded attention to this point of possible difference among case farmers in this study.

Feedstuff storage, shrinkage, and feeding losses of 25% for alfalfa and native hay, 20% for corn and sorghum sudan silage, and 5% for grains were assumed to be common among case farms (Taylor et al., 1990, p 7).

An explanation is provided in Annex C of the detailed procedures taken to match (1) the TDN and protein requirements of individual case farm herds with (2) the TDN and protein contained in various feedstuffs raised on the case farms, including both crop and pasture resources. In the baseline livestock analysis, home-raised feeds were charged to livestock at the prices assumed for crops sold (Table 7) and for pasture at regional rental rates (Table 6). In supplementary livestock budgeting analysis, home-raised feeds were also charged at each case farmer's actual costs of production. Livestock protein needs that could not be met through home-raised feeds were assumed to be met through purchased soybean oil meal with an assumed 1993 value of $250/ton (USDA, 1994a, p B-32).[17]

The annual herd sire replacement value for a cow-calf unit was computed as follows: (bull value/years herd sires retained in herd) * (number of bulls in herd/number of exposed females). A common bull value of $1,650 was assumed for all case farmers (Table 29); farmer-specific information was used for the other herd sire replacement factors.

A final area of commonality among case farms in assumptions involves cattle building and equipment depreciation, taxes, interest, and insurance (DTII). Average new cost investments assumed for buildings and equipment per cow-calf unit were $50 and $30, respectively (Pflueger et al, 1991, pp 4-5). The annual assumed DTII charges for buildings and equipment represent 15% and 20% of the lifetime-average values of the respective investments, or $3.75 + $3.00 = $6.75 per cow-calf unit. Similar procedures led to the calculation of per-head DTII charges for backgrounded and finished cattle of $0.60 and $11.65, respectively.

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[17]One case farmer was also assumed to buy 474 bu of barley, at $2.00/bu, for his hog farrow-to-finish operation.

Nature of cattle enterprises

All case farms have cow-calf operations (Tables 31 and 32). All sell at least some of their calves at weaning. In addition, four case farmers background cattle and another finishes cattle for slaughter.

Table 31. Cattle in inventory and sold each year, matching pairs of near-organic and mainstream case farms.

	Northwest		South Central		North Central		Central	
Type of cattle	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
In inventory								
Mature brood cows	129	120	39	128	201	172	51	32
Mature herd sires	4	5	1	6	9	10	2	2
Replacement heifers	25	25	15	18	42	43	11	8
Sold[a]								
Weaned steers	43	55	15	57	39	80	11	16
Weaned heifers	32	14	4	38	39	37	13	7
Backgrounded steers	14	0	4	0	38	0	0	0
Backgrounded heifers	0	17	0	0	38	0	0	0
Slaughter steers	0	0	0	0	0	0	13	0
Total sold	89	86	23	95	154	117	37	23

[a]In addition to the cattle shown below, each producer sells cull cows, bulls, and replacement heifers.

Table 32. Cattle weight, matching pairs of near-organic and mainstream case farms.

	Northwest		South Central		North Central		Central	
Type of cattle	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
	(pounds per head)							
Mature brood cows	1,200	1,200	1,200	1,200	1,400	1,300	1,200	1,200
Mature herd sires	1,800	1,800	1,800	2,000	2,000	1,950	1,900	1,900
Replacement heifers								
At breeding	800	825	800	800	800	750	750	750
At culling	1,000	1,000	1,050	950	1,050	1,000	950	950
At calving	1,050	1,050	1,100	1,000	1,100	1,050	1,000	1,000
Weaned steers	555	620	630	585	580	525	540	525
Weaned heifers	525	590	575	505	560	505	500	450
Backgrounded steers	735	n/a	810	n/a	805	n/a	n/a	n/a
Backgrounded heifers	n/a	715	n/a	n/a	785	n/a	n/a	n/a
Slaughter steers	n/a	n/a	n/a	n/a	n/a	n/a	1,290	n/a

The **Northwest Region** near-organic and mainstream case farms have herds of 129 and 120 brood cows, respectively. The near-organic farmer also backgrounds 14 steers, while the mainstream farmer backgrounds 17 heifers for sale as breeding stock. The near-organic farm maintains 4 herd sires and the mainstream farm 5 herd sires. Both typically retain herd sires for 3 years each, and both retain 25 heifer calves each year as replacements. Most common calf weaning ages are 6 months for the near-organic farm and 7 months for the mainstream farm.

The herds for both Northwest Region case farmers consist primarily of commercial exotic European breeds, with the dominant breed Gelbvieh. A secondary breed in the near-organic herd is Tarentaise. Average target weights for mature brood cows and herd sires for both case farmers are 1,200 lb and 1,800 lb, respectively. Target weights for replacement heifers at breeding are 800 lb for the near-organic farmer and 825 lb for the mainstream farmer. Target weights for replacement heifers at calving for both farmers are 1,050 lb.

The **South Central Region** near-organic and mainstream case farms have herds of 39 and 128 brood cows, respectively.[18] The near-organic farmer typically backgrounds 4 steers each year, whereas the mainstream farmer sells all his calves at weaning. In 1993, the near-organic farmer had 1 herd sire, whereas the mainstream farmer had 6 herd sires. The near-organic farmer typically retains herd sires for 4 years, while the mainstream farmer does so for 4-5 years. During the current period of herd size build-up, the near-organic farmer annually retains 15 heifer calves for replacement, while the mainstream farmer retains 18 replacement heifers. Most common calf weaning ages for the near-organic and mainstream farmers are 7 months and 6-7 months, respectively.

The near-organic herd consists primarily of exotic European-English crosses, with Gelbvieh the dominant breed and Red Angus the secondary breed. The mainstream herd, on the other hand, consists of commercial English beef breeds--with Angus predominant and Hereford secondary. Average target weights for mature brood cows and replacement heifers at time of breeding for both case farmers are 1,200 lb and 800 lb, respectively. Target weights for mature herd sires and replacement heifers at calving for the near-organic herd are 1,800 lb and 1,100 lb, respectively; for the mainstream ranch, the respective weights are 2,000 lb and 1,000 lb.

The **North Central Region** case farms have the largest herds in the study. The near-organic herd consists of 201 cows and the mainstream herd of 172 cows. The near-organic farmer typically backgrounds 76 steers and heifers each year, whereas the mainstream farmer sells all his calves at weaning. The near-organic farmer maintains 9 herd sires and the mainstream farmer 10 herd sires. Both typically retain herd sires for 3-4 years each. The near-organic farmer annually retains 42 heifer calves as replacements and the mainstream farmer 43 heifer calves. The most common calf weaning age for both farmers is 8 months.

The near-organic herd consists of commercial exotic European breeds and exotic European-English crosses. The mainstream herd consists primarily of exotic European crosses, with Simmental dominant and some Charolais. Average target weights for mature brood cows, herd sires, replacement heifers at breeding, and replacement heifers at calving for the near-organic farm are 1,400 lb, 2,000 lb, 800 lb, and 1,100 lb, respectively. Corresponding weights for the mainstream farm are 50-100 lb less.

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[18]The near-organic herd is in the process of being expanded. In July 1995, the herd was comprised of 65 cows.

The **Central Region** near-organic and mainstream case farms have herds of 51 and 32 brood cows, respectively. The near-organic farmer also typically finishes 13 steers, while the mainstream farmer sells all his calves at weaning. Both farmers maintain 2 herd sires. The near-organic farmer typically retains herd sires for 3-4 years each and the mainstream farmer for 3 years. The near-organic farmer annually retains 11 heifer calves as replacements and the mainstream farmer 8 heifer calves. Most common calf weaning ages are 7 months for the near-organic farm and 6 months for the mainstream farm.

The near-organic herd consists primarily of commercial exotic European breeds, with the dominant breed Gelbvieh and some Belgian Blue. The mainstream herd is primarily Angus, with some Salers. Average target weights for mature brood cows, herd sires, replacement heifers at breeding, and replacement heifers at calving for both farmers are 1,200 lb, 1,900 lb, 750 lb, and 1,000 lb, respectively. The near-organic farmer feeds his slaughter steers until 24 months, when they typically weigh 1,290 lb.

Cattle management practices [See Annex D for a complete listing of the management practices followed by each case farmer.]

Breeding. In **selecting herd sires** to mate to individual mature cows, case farmers generally give greatest attention to weaning weights, transmission of milk production to daughters, and birth weight/calving ease. Of the 14 suggested criteria, they generally give the least weight to EPD carcass criteria, EPD yearling weights, and efficient feedstuff utilization. Compared to East River case farmers, West River case farmers generally accord (1) greater importance to yearling weight, total maternal, and carcass EPDs and (2) less importance to birth weight/calving ease EPDs and efficient feedstuff utilization in selecting herd sires to mate to mature cows. Near-organic farmers do not consistently accord either greater or lesser importance to any of the suggested 14 criteria than their mainstream counterparts.

Of the eight case farmers, six **fertility test bulls**; five **pregnancy test cows**; two use **hormones to control breeding seasons** for first-calf replacement heifers; two **production test cows**; and one **checks pelvic measurements** on first-calf replacement heifers. None uses **hormones to control breeding seasons** for mature brood cows. West River case farmers are less inclined to fertility test bulls than East River farmers. Near-organic farmers do not more consistently follow or fail to follow any of the six practices compared to their mainstream counterparts.

Three case farmers use **artificial insemination** to help ensure calving ease with first-calf heifers. One of them uses artificial insemination in connection with early synchronization of first-calf heifers. Another artificially inseminates not only first-calf heifers but also part of his most productive mature cows. Use of artificial insemination does not vary with region. Near-organic farmers are no more or less prone to use artificial insemination than their mainstream counterparts.

Four case farmers initiate the **breeding season** for first-calf replacement heifers before they do for more mature brood cows. Three of the four are West River; only one is near-organic. Initial breeding dates for first-calf heifers range from May 15th for the Northwest mainstream and Central near-organic farmers to June 20th for the North Central near-organic farmer. Breeding seasons for mature brood cows range from 44 days for the South Central mainstream farmer to 197 days for the Central mainstream farmer. While breeding seasons for three of the four near-organic farmers are shorter than for their mainstream counterparts, this situation doesn't necessarily reflect any greater effort on their part to hasten conclusion of the breeding season. For example, one mainstream farmer indicated a policy to "house" his bulls with his cows until January 1st--quite apart from a need or a particular desire to prolong his breeding season.

Cows and calves. To improve the **body condition of cows prior to breeding**, seven of the eight case farmers use mineral supplements, five use vitamin supplements, five use protein supplements, four place cows in fresh pastures, four feed cows grain, two use antibiotics, and one controls for worms.[19] West River case farmers are more inclined than those in the East to place cows in fresh pastures and are less inclined to feed cows grain and use antibiotics. Three of the four farmers who place cows in fresh pastures are near-organic. Otherwise, near-organic farmers do not more consistently follow or fail to follow any of these practices compared to their mainstream counterparts.

To improve the **body condition of cows at calving**, six of the eight case farmers use mineral supplements, five use protein supplements, four use vitamin supplements, three feed cows grain, two place cows in fresh pastures, one uses antibiotics, and none controls for worms. West River case farmers are less inclined than those in the East to place cows in fresh pastures and are more inclined to use vitamin and mineral supplements. Four of the six farmers who use mineral supplements are near-organic. Otherwise, near-organic farmers do not more consistently follow or fail to follow any of these practices compared to their mainstream counterparts.

To help ensure **birth and survival of live baby calves**, all eight case farmers observe heavy springing cows several times each day, five place groups of heavy springing cows in separate pastures, one places "problem prone" cows in individual maternity pens, and none place groups of heavy springing cows under covered maternity areas. Practices to help ensure birth and survival of live baby calves do not vary with region. Only one of the five farmers who place groups of heavy springing cows in separate pastures is near-organic.

To handle **cows whose calves die before weaning**, seven of the eight case farmers sometimes cull such cows after conditioning; six sometimes replace the dead calf with an orphan calf; five retain the cow in their herd with no calf until next season--providing the cow is relatively young, the calf dies after June 15th, or the calf's dying wasn't "the cow's fault;" and

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[19]In reviewing an earlier draft of this manuscript, Dr. Donald L. Boggs, SDSU Extension Beef Specialist indicated that generally he does not believe that mineral supplements, vitamin supplements, and antibiotics can be expected to be effective in improving the body condition of cows prior to breeding.

four sometimes cull the cow immediately. Compared to East River case farmers, those in the West are more likely to replace dead calves with orphan calves and less likely to cull cows immediately. Three of the four farmers who sometimes cull the cow immediately are near-organic.

The percentages of **calves born during the first 21 days** of the calving season range from 18% for the Central near-organic farm to 83% for the South Central mainstream farm. Analogous percentages for the first 63 days of the calving season are from 72% for the Central near-organic farm to 100% for the Northwest mainstream, South Central near-organic, and Central mainstream farms. West River producers tend to have shorter calving seasons than East River farmers. There is some tendency for near-organic farmers to have more prolonged calving seasons than their mainstream counterparts.

All eight case farmers individually **identify** their **calves** with ear tags. One also does so with ear tatoos.

Four case farmers sometimes **creep feed** their calves and four never do. Three of the four who sometimes creep feed do so when pastures are short. One also sometimes creep feeds to prepare calves for post-weaning transition. The fourth farmer creep feeds when the market price of home-grown possible creep feed is unusually low. Creep feeding practices do not vary by region; a belief that creep feeding does not pay applies to those in the West who do not creep feed, but not to those in the East. Two of the four farmers (both near-organic) who creep feed use home-raised feeds and two (both mainstream) purchased complete creep feeds. Two of the case farmers who never creep feed believe that creep feeding does not pay; one finds it too time-consuming to move creep feeders from pasture to pasture; and one doesn't have the necessary equipment to creep feed.

All eight case farmers **dehorn** their non-polled calves. The age of dehorning varies much among farmers, ranging from "birth" to 8 months. Four farmers dehorn with a hot iron, and one each with paste, puddex, dehorning spoon, and saw. Case farmers in the West are more inclined than those in the East to use hot irons for dehorning calves. Only one of the farmers who dehorns with a hot iron is near-organic. Except for this, there are no patterned differences between near-organic and mainstream case farmers in dehorning practices.

All eight case farmers **castrate** male calves not retained for breeding purposes. Except for the North Central mainstream farmer who dehorns at 1 day and castrates at 2-3 months, the case farmers castrate their calves at the same time as they dehorn them. Six farmers cut to castrate, and two use elastrators. Castration practices do not vary by region. Both farmers who use elastrators are near-organic. Except for use of elastrators, there are no patterned differences between near-organic and mainstream case farmers in castration practices.

Six case farmers use hot irons to **brand** their entire calf crops. Two of the six also freeze brand replacement heifers. One of the other two case farmers freeze brands his replacement heifers. The age of hot iron branding is widely variant, ranging among farmers from 2-4 weeks to 6 months. All four West River case farmers brand their calves, whereas only two of the East River farmers do (branding is not legally required in the East). There are no patterned differences between near-organic and mainstream case farmers in branding practices.

Herd health. All eight case farmers "regularly" **vaccinate** for **Brucellosis**. The Central Region near-organic farmer vaccinates some but not all cattle in particular years for **Blackleg.** All other case farmers regularly vaccinate for Blackleg. The Northwest Region near-organic farmer vaccinates for **IBR-BVD-PI$_3$** in some years but not in others. All other case farmers regularly vaccinate for IBR-BVD-PI$_3$. The North Central Region mainstream and Central Region near-organic case farmers regularly vaccinate for **calf scours**; the Northwest Region mainstream farmer vaccinates some but not all cattle in particular years for calf scours. The other four case farmers "never" vaccinate for calf scours. Except for one near-organic producer who only sometimes, rather than regularly, vaccinates for blackleg and IBR-BVD-PI$_3$, vaccination practices do not appear to systematically differ between the near-organic and mainstream case farmers.

Four of the eight case farmers "regularly" use at least one type of **insecticide or fumigant**, with ear tags being most common. An additional farmer uses insecticides or fumigants in some years but not in others. Three, two of whom are near-organic, report "never" using insecticides or fumigants. With this relatively minor exception, insect control practices do not appear to differ between the near-organic and mainstream case farmers. West River case farmers are no more or less inclined than East River farmers to control for insects.

Two mainstream case farmers use **internal parasiticides** "regularly;" another does in some years but not in others. All four of the near-organic (and one mainstream) case farmers "never" use internal parasiticides. Four case farmers, only 1 of whom is near-organic, "regularly" use **external parasiticides**; one near-organic farmer also uses external parasiticides in some years but not in others. Of the three farmers who "never" use external parasiticides, two are near-organic and one is mainstream. West River case farmers are slightly less inclined than those in the East to use parasiticides.

All eight case farmers use **antibiotics** to treat specific sicknesses and injuries that arise with individual animals. One of the mainstream farmers uses antibiotics regularly with groups of his calves at weaning; one near-organic and one mainstream farmer use antibiotics with groups of cattle showing signs of infection. Only one of the case farmers uses antibiotics subtherapeutically (routinely at low levels) in creep feed; this farmer is mainstream. Thus, while near-organic farmers on occasion use antibiotics, they are somewhat less inclined to do so than the mainstream farmers. West River case farmers are more likely than East River farmers to use antibiotics with groups of animals at particular times.

To promote **herd health** and minimize **cattle injury**, case farmers generally give greatest attention to providing their cattle with sound nutrition, plenty of good quality water, and winter wind protection. They also emphasize staying away from high birth-weight bulls and continuously monitoring the condition of their cows. Of the 15 suggested practices, case farmers generally give the least weight to using non-conventional medical treatments (e.g., "holistic" methods, homeopathy), providing shade for protection of cattle from summer heat, and selecting disease resistant breeds. West River case farmers indicate that they give less attention than those in the East to the following measures to promote herd health and minimize cattle injury: take special care when handling cattle; provide plenty of room for cattle; provide dry, bedded loafing areas; have a strong vaccination program; have a strong program for controlling insects and parasites; continuously monitor the condition of cows and calves; and provide separate facilities for sick/injured cattle.

Near-organic case farmers give more attention than their mainstream counterparts to using non-conventional medical treatments and selecting disease resistant breeds. On the other hand, they give less attention than their mainstream counterparts to having a strong vaccination program, having a strong program for controlling insects and parasites, and regularly rotating pens and pastures.

Five case farmers, only one of whom is near-organic, provide **special care and facilities to first-calf heifers**. Two, one near-organic and one mainstream, sometimes provide special care and facilities to second-calf heifers. Both of the latter are from the West.

Drinking water. Six of the eight case farmers depend on **groundwater** to meet their herd's drinking water needs. Five depend on natural or man-made **ponds**; four, three of whom are from the East, depend on **natural springs** or **artesian wells**. One depends in part on rivers or creeks and another in part on lakes.

Pumping is required by six case farmers to **lift and/or transport water** from its source to drinking points. The five case farmers who lift water from its source to a drinking point at a higher elevation lift the water an average of 94 ft each; the least lift is 30 ft and the greatest lift is 200 ft. Two transport water a "short distance" from its source to a drinking point and two a "long distance" (an average of 1,150 ft). The only farmers to transport drinking water are those in the West. Five case farmers use conventional **energy** (e.g., diesel, electricity) to lift and transport water; one of the five also uses windmills and another is also able to take advantage of artesian pressure. A sixth rancher makes joint use of windmills and artesian pressure. The other two ranchers rely exclusively on artesian pressure. Case farmers in the West are more inclined than those in the East to use windmills to pump water; in contrast, East River producers more commonly rely on artesian pressure.

Cattle of seven case farmers **drink water** directly from natural water supplies (e.g., drink directly from a pond, river, artesian water source). Cattle drinking from fountains or tanks supplied with water is equally common for the case farmers. Differences among case farms in drinking water access are not related to region.

Only one case farmer experiences **drinking water quantity problems** during years of below-average (e.g., worst 2 of 10 years) precipitation and water run-off; none does during years of average precipitation and water run-off. Only one case farmer is currently experiencing drinking water quality problems; the problem involves high levels of sodium and sulfate.

None of the differences in drinking water accessibility is systematically related to whether case farmers are near-organic or mainstream.

Manure. Manure from seven case cow-calf operations accumulates during part of the year--for later scraping, collection, and spreading on farmland. Five case farmers spread the manure in **solid raw** form, after it has been stacked for several weeks or months. One of the five also sometimes spreads solid raw manure immediately after it has been scraped. A sixth farmer usually spreads his manure immediately after it has been scraped. The seventh farmer (near-organic) **composts** his manure before spreading.

Three case farmers report using **different manure application rates** with different types of farmland. Two report heavier applications on fields closer to manure sources; the third reports heavier applications to fields whose soil fertility needs can be more fully met with livestock manure than purchased fertilizer.

One farmer (near-organic) sometimes forms ridges with his manure which serve as cattle windbreaks during wet fall seasons. Six case farmers view **manure** to be a **resource with benefits** which more than offset the effort and expense required to handle it. Two believe manure is something with a value roughly commensurate with the effort and expense required to handle it.

Manure application rates and farmer attitudes toward manure do not vary by region. None of the differences in manure management practices and attitudes is systematically related to whether case farmers are near-organic or mainstream.

Grazing. Four of the eight case farmers, two of whom are near-organic and two of whom are mainstream, follow a **"continuous grazing"** management system in which particular pastures are continuously grazed throughout the grazing season. Three other case farmers, two near-organic and 1 mainstream, follow a **"deferred rotation"** system in which the rotation is among 3-5 pastures over 3-5 years, each year allowing a different pasture to rest idle during a critical time period (e.g., early summer to allow warm season grasses to become well established). The eighth case farmer (mainstream) follows exclusively a **"complimentary rotation"** system in which he rotates grazing between improved pasture and native range.

The two near-organic farmers who follow deferred rotation also follow other forms of rotation: one complimentary rotation and the other complimentary rotation, **"rotational deferment"** (one pasture divided into several sub-parts, with grazing rotated 1-3 times during the grazing season), and **"short-duration"** grazing (single grazing units divided into several small parcels, with rotational periods of 3-8 days).

Six case farmers base **pasture stocking rates** primarily on personal experience over time. Four also rely on periodic assessment of grazing materials present in pastures. One relies exclusively on personal experience; the other bases his stocking rate on "standard" rates for his area in addition to his personal experience. The seventh and eighth case farmers base their stocking rates on NRCS rates; one of them also relies on "standard" rates for his area.

None of the differences in grazing management practices is systematically related to whether case farmers are near-organic or mainstream or whether they are from the West or the East.

Selected measures of cow-calf performance

Pregnancy, calving, and weaning percentages were defined in accordance with National Cattlemen's Association Standardized Performance Analysis (SPA) procedures (McGrann et al., 1992, pp SPA-1-7 to SPA-1-10). Because birth and weaning dates and weights on individual calves in each herd were not available/collected, 205-adjusted calf weaning weights could not be calculated. Instead, "average daily gains to weaning" were determined, taking into account reported herd average steer and heifer weaning ages and weights and assuming birth weights of 80 lb for steers and 70 lb for heifers.

Only three of the eight case farmers reported percentages of exposed females diagnosed to be pregnant (Table 33). Pregnancy percentages for these producers are in the range of 95% to 97%.

Table 33. Selected measures of cow-calf performance, matching pairs of near-organic and mainstream case farms.

Performance measure	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Pregnancy percentage	n/a	96.7	97.4	95.3	n/a	n/a	n/a	n/a
Pregnancy loss percentage	n/a	2.5	0	0.8	n/a	n/a	n/a	n/a
Calving percentage	96.9	94.2	97.4	94.5	99.0	95.9	98.0	100.0
Calf death loss (%)	8.5	1.7	0	6.2	1.5	2.9	3.9	3.1
Weaning percentage	88.4	92.5	97.4	88.3	97.5	93.0	94.1	96.9
Weaning								
Age (mo)	6	7	7	6-7	8	8	7	6
Actual weaning weight (lb)								
Steers	555	620	630	585	580	525	540	525
Heifers	525	590	575	505	560	505	500	450
Average daily gain to weaning (lb)[a]								
Steers	2.61	2.54	2.58	2.55	2.06	1.83	2.16	2.45
Heifers	2.50	2.44	2.37	2.20	2.02	1.79	2.02	2.09
Replacement heifer percentage	19	21	39[b]	14	21	25	22	25

[a]The "average daily gains to weaning" were calculated with the above data on herd average weaning ages and weaning weights, with assumed birth weights of 80 lb for steers and 70 lb for heifers.

[b]This producer is in the process of building up the size of his herd.

Calving percentages--defined in terms of the numbers of cows exposed that calved (including calves born dead, but not aborted)--range among case farms from 94.2% to 100% and average 97.0% (Figure 20). Average calving percentages are lower for the four the case farms in the West (95.8%) compared to those in the East (98.2%). The calving percentage for three near-organic farmers is greater than that for their respective mainstream counterparts. The average calving percentage for the near-organic case farmers is slightly higher than that for the mainstream farmers (97.8% versus 96.2%).

FIGURE 20. CALVING PERCENTAGE: matching pairs of case farms

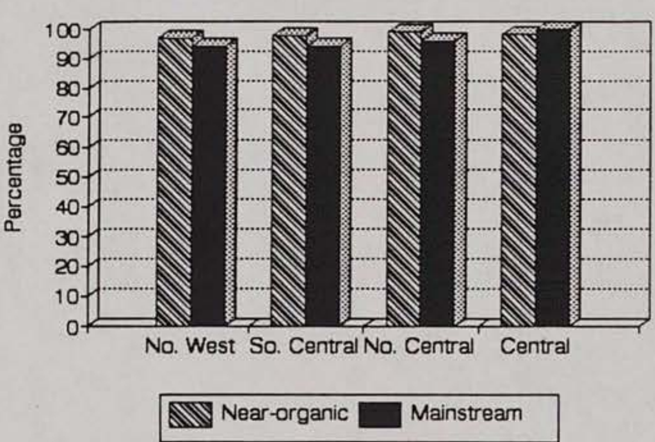
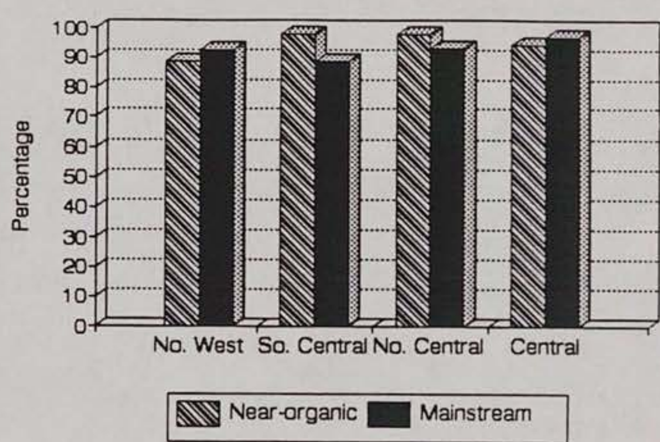


FIGURE 21. WEANING PERCENTAGE: matching pairs of case farms



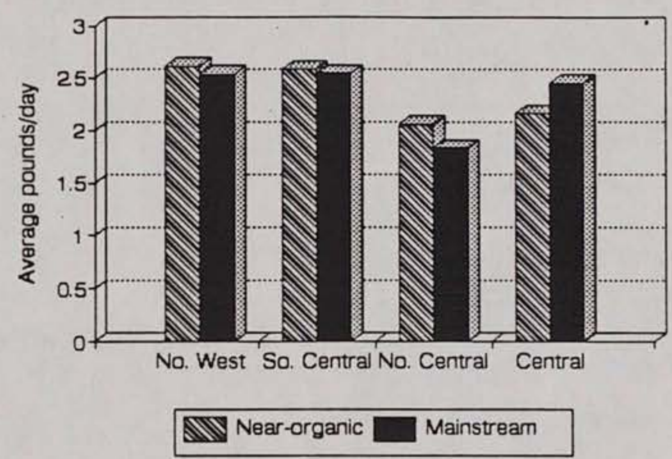
Calf death losses (relative to numbers of exposed females) for the four near-organic and four mainstream case farms each average 3.5%. Average death losses are higher for the four case farms in the West (4.1%) compared to those in the East (2.9%).

The calf weaning percentage (weaned calves as a percentage of cows exposed) ranges among case farms from 88.3% to 97.5% and averages 93.5% (Figure 21). Average weaning percentages are lower for the four case farms in the West (91.7%) than in the East (95.4%). Compared to respective mainstream weaning percentages, the near-organic weaning percentage is greater in two instances and less in two instances. On average, the weaning percentage for near-organic case farms is slightly greater than that for their mainstream counterparts (94.4% versus 92.7%).

Typical weaning ages range from 6 mo to 8 mo and average 6.94 mo. Average weaning ages are younger for the four case farms in the West (6.63 mo) compared to those in the East (7.25 mo). The average weaning age for the near-organic farms (7.00 mo) is just slightly more (1.7%) than that for mainstream farms (6.88 mo).

Average daily gain from birth to weaning for steers ranges among case farms from 1.83 lb to 2.61 lb and averages 2.35 lb (Figure 22). For heifers, the range is 1.79 lb to 2.50 and the average is 2.18 lb. In the West compared to the East, average daily gains to weaning are 21% and 20% greater for steers (2.57 versus 2.13 lb) and heifers (2.38 versus 1.98 lb), respectively. Average daily gains from birth to weaning for both steers and heifers are greater for three near-organic farms than matching mainstream farms, but margins of average difference in favor of the four near-organic farms are small: 0.01 lb/day for steers and 0.10 lb/day for heifers.

FIG. 22. STEER RATE OF GAIN TO WEANING: matching pairs of case farms



For steer calves, average weaning weights range from 525 lb to 630 lb and average 570 lb. For heifer calves, the range is 450 lb to 590 lb and the average is 526 lb. Thus, on average, steer calves are 8% heavier than heifer calves. In the West compared to the East, average weaning weights for steers are 10% greater (598 versus 543 lb) and for heifers they are 9% greater (549 versus 504 lb). Thus, the calves' more rapid daily rates of gain to weaning in the West more than counterbalance the slightly earlier weaning age in the West.

For steer calves, the average near-organic weaning weight (576 lb) is slightly (2.1%) more than the average mainstream weaning weight (564 lb). For heifer calves, the same pattern exists, but with a greater margin of difference (average weaning weight of 540 lb for near-organic case farms is 5.3% more than 513 lb for mainstream farms). Thus, the slight advantage in near-organic calf weaning weights is the result of those calves being slightly older at weaning and gaining slightly faster from birth to weaning.

Omitting attention to an unusually high heifer replacement rate for the near-organic South Central Region herd that is in the process of being built up, heifer replacement rates range among case farms from 14% to 25% and average 21%. In the other three regions, the replacement rate for near-organic farms is slightly less (from 2 to 4 percentage points) than that for mainstream counterparts.

Beef cattle budget format

From the standpoint of attention being given to gross revenue, three types of production costs (direct, fixed, and total), and various profitability measures, the basic format for the livestock budgets is the same as that for the crop budgets. Cost and revenue budget data are shown in Annex E for each farmer's cow-calf and supplementary cattle enterprise at both a total enterprise and per-animal level.

Sources of revenue for the cow-calf enterprise budgets include sale of (1) weaned calves and (2) cull cows, bulls, and yearling heifers. Revenue in the cow-calf enterprise budget is shown for all calves weaned, irrespective of whether the calves are sold at weaning or retained for backgrounding or finishing. Gross revenue in the supplementary cattle enterprises reflect income received from the sale of backgrounded and finished cattle. The initial value of weaned calves retained for backgrounding and finishing is shown as a cost to the backgrounding and finishing budgets. This procedure enabled a complete accounting of costs and returns for the individual cow-calf and supplementary cattle enterprises.

The two major categories of direct production costs are raised feed and "cash expenses." Raised feed consists of pasture and harvested roughages and grains. Cash expenses cover labor; veterinary, medicine, supplies, and marketing;[20] purchased feed; building and equipment repairs, power, and fuel; interest on operating capital; and initial value of feeder cattle (for the supplementary cattle enterprises). Fixed costs cover interest on livestock investment, replacement of herd sire (for the cow-calf enterprises), and building and equipment depreciation, taxes, interest, and insurance (DTII).

For each beef cattle enterprise for each case farmer, net revenue is calculated as the surplus of gross revenue over each of direct production costs and all costs except management. For each producer's beef cattle enterprises collectively, net revenue is also shown over all costs except (1) management; (2) labor and management; (3) interest, labor, and management; and (4) land, interest, labor, and management.

While net revenue over all costs except management has the strongest inherent economic meaning for comparisons between different types of case farms, this profitability measure does not convey a sense of annual cash-flow except for the hypothetical situation in which a farmer would hire all his labor and rely on borrowed capital to finance the purchase of all his multi-period assets (e.g., land, cattle, machinery, buildings, equipment) and direct production cost items. Since most individual producers intuitively identify more readily with "annual cash-flow" than "economic profit," the second, third, and fourth above measures of profit were also calculated.

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[20]The "veterinary" and "medicine" categories are intended to cover veterinary and diagnostic services and medical supplies excluding purchased semen (e.g., vaccinations, antibiotics, vitamins, parasiticides, insecticides, fumigants, growth promotants).

The interpretation of each of these measures is again hypothetical relative to most individual farmers. The second measure would reflect the annual cash-flow for a farmer who hires no labor but uses borrowed money to finance all assets (including land, or who cash rents all land) and operating expenses. The third measure would reflect the annual cash-flow for a farmer who hires no labor and borrows no money except to finance the purchase of all land operated. The fourth measure would reflect the annual cash-flow for a farmer who hires no labor and has no debt. Individual producers' annual cash-flows will be most closely approximated by the measure of profit which most closely parallels the family-versus-hired labor and owned-versus-borrowed capital circumstances represented in the respective measures.

Comparative economics of near-organic and mainstream beef production

Cash expenses and labor requirements. Case farmers were asked to indicate how their various expenses for cattle production and labor requirements compared with the per-head baseline values shown in Tables 34 and 35. In instances in which their expenses and/or labor requirements differed from the baseline values, farmers were asked to indicate the approximate percentages by which their values were more or less than the respective baseline values.[21] Because of inherent difficulty in farmers' being able to carefully envision many of these expense and labor items, the data in Tables 34 and 35 reflecting the outcome of this exercise are acknowledged to be "soft."

Estimated expenses to cover mineral and salt, veterinary and medicine, supplies, marketing, power and fuel, building repairs, and equipment repairs per cow-calf unit range among case farmers from $25.70 to $41.30 and average $36.57 (Table 33, Figure 23). In each paired comparison, the estimated total expense for the near-organic case farm is less than that for the matching mainstream farm. The average expense for near-organic farms ($33.19) is 17% less than that for the mainstream farms ($39.95).

Estimated labor requirements per cow-calf unit range from 7 hr to 11 hr. Differences among farmers are more closely related to herd size than to whether farmers are near-organic or mainstream.

Estimated cash expenses for the four backgrounding enterprises range from $7.00 to $8.30/head and average $7.54/head (Table 35). Labor requirements range from 2.1 hr to 2.3 hr/head. The $39.35/head estimated cash expense for the Central Region near-organic slaughter steer enterprise is 26% less than the baseline value, primarily because of lower expenditures for veterinary services, medications, and general supplies.

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[21]In reviewing a draft copy of this report, Dr. Donald L. Boggs, SDSU Extension Beef Specialist indicated that he generally finds much variation among South Dakota ranchers in their mineral and salt expenditures. In this study, however, no case farmer indicated his mineral and salt expenditure to differ from the baseline figure of $9.90 per cow-calf unit.

Table 34. Cash expenses and labor requirements, cow-calf enterprise, matching pairs of near-organic and mainstream case farms.

Cash expenses and labor requirements	Base-line	Northwest Near-organic	Northwest Main-stream	South Central Near-organic	South Central Main-stream	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
	Costs (hours) per cow-calf unit								
Cash expenses ($)[a]									
Mineral and salt	9.90	9.90	9.90	9.90	9.90	9.90	9.90	9.90	9.90
Veterinary and medicine	10.00	5.00	10.00	3.00	5.00	8.00	10.00	2.00	11.00
Supplies	6.00	6.00	6.00	5.00	6.00	6.00	6.00	2.00	6.00
Marketing	6.00	9.00	6.00	8.70	11.00	6.00	6.00	6.00	6.00
Power and fuel	5.20	6.25	5.20	5.20	7.80	5.20	5.20	5.00	5.20
Building repairs	0.95	0.75	0.70	0.95	0.95	0.95	0.95	0.50	1.80
Equipment repairs	0.65	0.35	0.80	0.35	0.65	0.65	0.65	0.30	1.30
Sub-total	38.70	37.25	38.60	33.10	41.30	36.70	38.70	25.70	41.20
Labor requirements									
Number of cows	n/a	129	120	39	128	201	172	51	32
Hours per cow	[b]	7.5	7	11	7	6.5	7	11	11

[a]The baseline cash expenses are based on Pflueger et al. (1991, pp 4, 6).

[b]The baseline per-cow labor requirements for the various case farms are based on Madsen et al. (1989, p 50), who show requirements for herds of different sizes, as follows:

- Cows handled under "farm conditions:" 25-50 cows 11 hr; 50-75 cows 10 hr; and 75+ cows 8 hr; and
- Cows handled under "ranch conditions:" 100-200 cows 7 hr and 200-300 cows 6 hr.

FIG. 23. CASH EXPENSES/COW-CALF UNIT: matching pairs of case farms

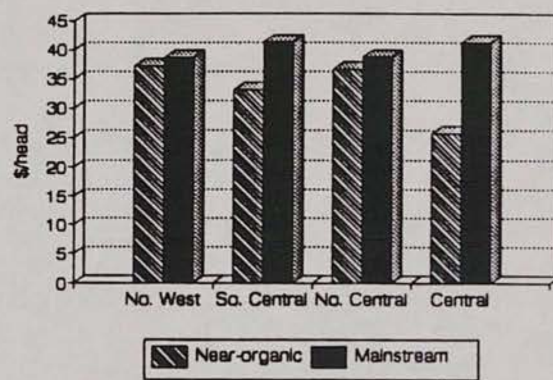


Table 35. Cash expenses and labor requirements; backgrounding and slaughter cattle enterprises; case farms.

Cash expenses and labor requirements	Backgrounding (90 days) Base-line	Backgrounding (90 days) Northwest Near-organic	Backgrounding (90 days) Northwest Main-stream	Backgrounding (90 days) So Central Near-organic	Backgrounding (90 days) No Central Near-organic	Slaughter steer Central Base-line	Slaughter steer Central Near-organic
	Costs (hours) per animal						
Cash expenses ($)[a]							
Mineral and salt	1.60	1.60	1.60	1.60	1.60	9.00	9.00
Veterinary and medicine	0.50	0.25	0.50	0.15	0.40	6.00	1.20
Supplies	0.50	0.50	0.50	0.40	0.50	9.00	3.00
Marketing costs	1.50	2.00	1.50	2.00	1.50	14.00	14.00
Power and fuel	2.80	3.35	2.80	2.80	4.20	8.80	8.45
Building repairs	0.05	0.05	0.05	0.05	0.05	3.25	1.70
Equipment repairs	0.05	0.05	0.05	0.05	0.05	2.90	2.00
Sub-total	7.00	7.80	7.00	7.05	8.30	52.95	39.35
Labor requirements (hours per head)[b]	2.1	2.3	2.1	2.2	2.1	10	12

[a]The baseline cash expenses are based on Pflueger et al. (1991, pp 4, 6, 10, 14, 20, 32) and the judgment of concerned scientists.

[b]Labor requirements are based on assumptions in Taylor et al. (1990, p 9).

Cow-calf enterprises. Discussion is first in terms of the overall results for (1) the four West River versus four East River case farms and (2) the four near-organic versus four mainstream case farms. The discussion of overall results is followed by a comparison of each pair of matching case farms.

These discussions are based on Tables 33 and 36-39. Tables 36 and 37 contain summary data from Annex E. Table 38 is based on the disposition of home-raised feedstuff data shown on p 2 of each case farmer's whole-farm summary analysis contained in Annex G and on Annex Table C.2. Table 39, which shows costs per pound of TDN from various home-raised feedstuffs, was developed with data from Table 7 and Annex Table C.2. TDN was the reference point for Table 39, since, in the aggregate diets for the various cattle herds, TDN tended to be more limiting than protein.

Table 36. Measures of profitability, cow-calf enterprise, matching pairs of near-organic and mainstream case farms.

	Northwest		South Central		North Central		Central	
Revenues and costs	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Gross revenue per cow	$ 480	$ 531	$ 557	$ 486	$ 558	$ 516	$ 508	$ 520
Costs of production per cow								
Direct costs	352	322	449	367	451	449	444	461
Fixed costs	119	128	129	117	127	139	124	146
Total costs except management	471	450	578	484	578	588	568	607
Net revenue per cow over:								
Direct costs	128	209	108	119	107	67	64	59
Total costs except management	9	81	- 21	2	- 20	- 72	- 60	- 87

Table 37. Costs of production per cow-calf unit, cow-calf enterprise, matching pairs of near-organic and mainstream case farms.

	Northwest				South Central				North Central				Central			
	Near-organic		Main-stream		Near-organic		Main-stream		Near-organic		Main-stream		Near-organic		Main-stream	
Type of cost	$/cow	%	$/cow	%	$/cow	%	$/cow	%	$/cow	%	$/cow	%	$/cow	%	$/cow	%
Direct costs of production																
Raised feed																
Pasture	$ 67	14.2	$121	26.9	$218	37.8	$191	39.5	$ 92	15.9	$ 90	15.3	$ 66	11.6	$150	24.7
Harvested roughages	178	37.8	96	21.3	103	17.8	66	13.6	255	44.1	258	43.9	254	44.7	176	29.0
Grains	10	2.1	10	2.2	18	3.1	5	1.0	10	1.7	13	2.2	10	1.8	12	2.0
Sub-total	$255	54.1	$227	50.4	$339	58.7	$262	54.1	$357	61.7	$361	61.4	$330	58.1	$338	55.7
Cash expenses																
Labor	$ 49	10.4	$ 45	10.0	$ 71	12.5	$ 46	9.5	$ 42	7.3	$ 45	7.7	$ 72	12.7	$ 72	11.8
Veterinary, medicine, supplies, & marketing	20	4.2	22	4.9	17	2.9	22	4.5	20	3.4	22	3.7	10	1.8	23	3.8
Purchased feed	17	3.6	17	3.8	10	1.7	23	4.8	21	3.7	10	1.7	21	3.7	15	2.5
Building and equipment repairs, power, & fuel	7	1.6	7	1.6	7	1.0	9	1.9	7	1.2	7	1.2	6	1.0	8	1.3
Interest	4	0.8	4	0.9	5	0.9	5	1.0	4	0.7	4	0.7	5	0.9	5	0.8
Sub-total	$ 97	20.6	$ 95	21.2	$110	19.0	$105	21.7	$ 94	16.3	$ 88	15.0	$114	20.1	$123	20.2
DIRECT PROD COST SUB-TOTAL	$352	74.7	$322	71.6	$449	77.7	$367	75.8	$451	78.0	$449	76.4	$444	78.2	$461	75.9
Fixed costs																
Interest on livestock investment	$ 95	20.2	$ 98	21.8	$111	19.2	$ 93	19.2	$ 99	17.1	$105	17.8	$ 99	17.4	$105	17.3
Replacement of bull	17	3.6	23	5.1	11	1.9	17	3.5	21	3.7	27	4.6	18	3.2	34	5.6
Building & equipment depreciation, taxes, interest, and insurance	7	1.5	7	1.5	7	1.2	7	1.5	7	1.2	7	1.2	7	1.2	7	1.2
FIXED PROD COST SUB-TOTAL	$119	25.3	$128	28.4	$129	22.3	$117	24.2	$127	22.0	$139	23.6	$124	21.8	$146	24.1
TOTAL PRODUCTION COST EXCEPT MANAGEMENT	$471	100.0	$450	100.0	$578	100.0	$484	100.0	$578	100.0	$588	100.0	$568	100.0	$607	100.0

Table 38. Percentages of produced TDN from various home-raised feedstuffs fed to livestock, matching pairs of near-organic and mainstream case farms.[a]

Feedstuff	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Grazed forages								
Pasture	28.8	56.1	56.9	64.4	17.6	18.0	10.6	19.7
Graze corn stubble	0	0	0	0	0.6	0	0	8.9
Sub-total	28.8	56.1	56.9	64.4	18.2	18.0	10.6	28.6
Harvested forages								
Alfalfa hay	18.2	0	37.9	0	24.6	25.3	17.4	29.8
Alfalfa/grass hay	0	13.0	0	25.2	0	0	0	0
Millet hay	0	0	0	8.4	0	0	0	0
Native hay	8.5	0	0	0	23.1	11.4	14.2	0
Oat hay	0	27.0	0	0	0	0	0	0
Corn silage	34.6	0	0	0	29.8	42.0	21.1	0
Sorghum silage	0	0	0	0	0	0	24.9	0
Sub-total	61.3	40.0	37.9	33.6	77.5	78.7	77.6	29.8
Harvested grains								
Corn	0	0	0	0	1.9	0	7.0	39.5
Oats	9.9	3.9	5.2	0	2.4	3.3	4.8	2.1
Sorghum	0	0	0	2.0	0	0	0	0
Sub-total	9.9	3.9	5.2	2.0	4.3	3.3	11.8	41.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a]The percentages of TDN shown below are of "produced" pounds, with no attention to storage, shrinkage, and feeding losses.

Table 39. Cost per pound of produced TDN from home-raised feedstuffs.

Feedstuff	Unit	Price ($) per unit	Lb of TDN per unit[a]	Cents per lb of TDN
Forages				
Alfalfa hay	ton	55.00	1,044	5.27[b]
Alfalfa/grass hay	ton	50.00	1,008	4.96[b]
Millet hay	ton	30.00	1,027	2.92
Native hay	ton	40.00	939	4.26
Oat hay	ton	35.00	1,001	3.50
Corn silage	ton	17.00	462	3.68
Sorghum silage	ton	15.00	330	4.55
Pasture				
Northwest	acre	5.10	154	3.31
South Central	acre	10.10	196	5.15
North Central	acre	12.70	196	6.48
Central	acre	15.20	224	6.79
Grains				
Corn	bu	2.35	44.3	5.08
Oats	bu	1.35	26.0	5.19
Sorghum	bu	1.85	40.9	4.52

[a]The pounds of TDN shown below are "produced" pounds, with no attention to storage, shrinkage, and feeding losses.

[b]Per-ton prices of alfalfa and alfalfa/grass hay in the South Central Region are $40.00 and $36.50. Thus, the costs (cents) per pound of TDN from these two sources in that region are 5.1 and 4.8, respectively.

Overview. Gross revenue per cow-calf unit ranges among case farms from \$480 to \$558 and averages \$520 (Figure 24). It is 2.3% lower for case farms in the West than in the East (\$514 versus \$526). Higher average weaning weights in the West (9-10%) are inadequate to compensate for the lower average weaning percentage in the West (91.7%) than in the East (95.4%). Compared to their respective mainstream counterparts, gross revenue is higher for two and lower for the other two near-organic farms. The average gross revenue for the near-organic farms is \$526, 2.5% more than the average for the mainstream farms (\$513). This slight difference in gross revenue is attributable to slightly higher weaning percentages and slightly heavier weaned calves on the near-organic farms.

FIG. 24. GROSS REVENUE/COW-CALF UNIT: matching pairs of case farms

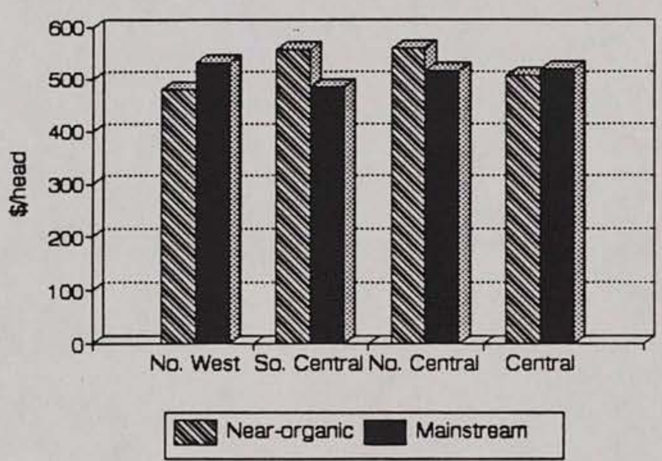
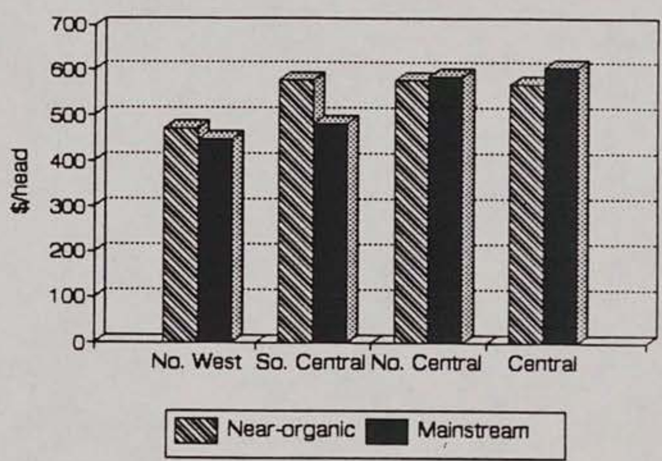


FIG. 25. TOT. PROD. COST/COW-CALF UNIT: matching pairs of case farms



Of the average total production cost for the eight farms, 76% is represented by direct costs and 24% by fixed costs. Of the various cost items, on average, the following are largest (percentages of total costs for the respective items are shown in parentheses):

* Harvested roughages (32%);
* Pasture (23%);
* Interest on livestock investment (19%); and
* Labor (10%).

Total costs of production except management per cow-calf unit range among case farms from \$450 to \$607 and average \$541 (Figure 25). Total costs per cow-calf unit are 15% less in the West (\$496) than in the East (\$585). The primary reason is much less reliance on harvested roughages and grains in the West than in the East. For example, the average expenditure on harvested feedstuffs for case farms in the West is \$122; in the East it is \$247. The value of pasture as a percentage of the value of total home-raised feedstuffs for West River case farms averages 55%; for East River farms it averages only 29%.

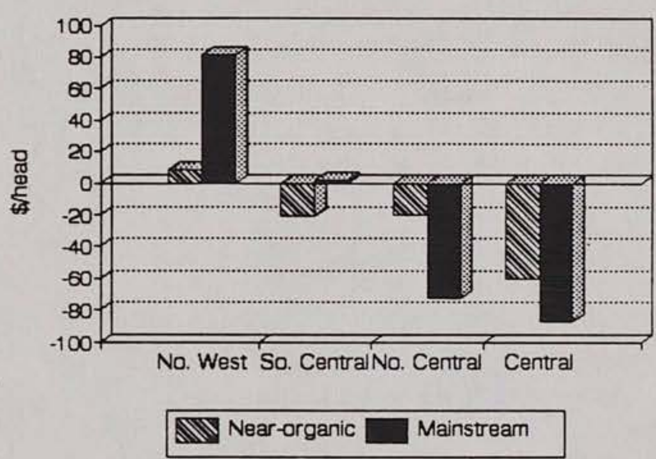
Compared to case farms in the other three regions, the average per-head total costs of production for the Northwest Region's two case farms are $107 less than those for the other six case farms. Production costs are lower in the Northwest because of unusually low costs per lb of TDN for the major feedstuffs utilized by the two case farmers: (1) for the near-organic farm, pasture at 3.3 cents and corn silage at 3.7 cents; and (2) for the mainstream farm, pasture at 3.3 cents and oat hay at 3.5 cents.

Total costs of production except management are higher for two near-organic farms and lower for the other two. The average total cost for near-organic farms of $549 is slightly more (3.2%) than the average for the mainstream farms ($532).

Net revenue over direct production costs per cow-calf unit ranges among case farms from $59 to $209 and averages $108. It is 91% higher for case farms in the West ($141) than in the East ($74). It is higher for two near-organic farms and lower for the other two. On average, net revenue over direct costs is 11% less on the near-organic ($102) than mainstream ($114) farms.

Net revenue over total production costs except management per cow-calf unit ranges among case farms from - $87 to + $81 and averages - $21 (Figure 26). The average net revenue over total costs is $78/cow-calf unit more in the West than in the East (+ $18 versus - $60). Thus, the 15% lower total cost of production in the West more than offsets the 2.3% lower gross revenue in the West.

FIG. 26. NET REVENUE/COW-CALF UNIT:
matching pairs of case farms



Compared to mainstream farmers, the average net revenue is again higher for two near-organic counterparts and lower for the other two. The average for the near-organic farms is slightly less ($4/cow-calf unit) than for the mainstream farms (- $23 versus - $ 19). Thus, the 3.2% greater average total production cost for the near-organic farms more than offsets their 2.4% greater average gross revenue.

Matching pairs of case farms. Net revenues over total costs except management of $9 and $81 per cow-calf unit for the **Northwest Region** near-organic and mainstream case farms, respectively, are higher than those in the other three regions. Of the $72/cow-calf unit profit-advantage on the mainstream farm, $51 arises from greater gross revenue ($531 versus $480) and $21 from less total cost ($450 versus $471). The mainstream farm's greater gross revenue arises from its 12% higher calf weaning weights[22] and a 4.1 percentage point higher calf weaning percentage.

On the cost side, the market value of home-raised feed is $28/cow-calf unit less for the mainstream than near-organic farm. This outcome arises because the per-pound-of-TDN costs of the major feedstuffs comprising cattle herds' aggregate diets are lower for the mainstream farm (56% of total TDN from pasture at 3.3 cents and 27% from oat hay at 3.5 cents) than the near-organic farm (35% from corn silage at 3.7 cents, 29% from pasture at 3.3 cents, and 18% from alfalfa hay at 5.3 cents). Partially offsetting the mainstream's lower home-raised feed cost is its $6 greater herd bull replacement cost (one bull/24 cows versus one bull/32 cows for the near-organic farm).

Net revenue over total costs except management per cow-calf unit in the **South Central Region** for the near-organic farm is - $21, whereas for the mainstream farm it is + $2. The near-organic farm realizes $71 more gross revenue per cow-calf unit ($557 versus $486). But doing so requires $94 per-head greater total costs of production ($578 versus $484). The higher gross revenue for the near-organic farm arises from its having a higher weaning percentage (by 9.1 percentage points) and heavier calves at weaning (8% greater for steers and 14% greater for heifers).

The main form of cost-saving on the mainstream farm is a $67/head lower cost of home-raised feedstuffs ($262 versus $339). For both farms, pasture is the dominant feed source. But, for the mainstream farm, the second and third most important components of the aggregate herd diet are alfalfa/grass hay (25% of the diet) for which the per-pound-of-TDN cost is 4.8 cents and millet hay (8%) which costs 2.9 cents. For the near-organic herd, on the other hand, the second most important aggregate diet component is alfalfa (38%) for which the TDN cost is 5.1 cents/lb.

The labor cost per cow-calf unit for the mainstream farm is $25 less for the near-organic farm. However, this difference arises by assumption (economies-of-size in per-head labor to handle 128 versus 39 cows), rather than from actual data obtained from the respective farmers. Interest costs are also $18/head lower for the mainstream than near-organic farm. This difference arises from investment in the disproportionately larger number of replacement heifers in the near-organic herd which is in the process of being built up.

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[22]Typical ages at weaning for the near-organic and mainstream farms are 6 mo and 7 mo, respectively. However, average daily gains to weaning for the mainstream farm are 2.4-2.7% lower than for the near-organic farm.

Partially offsetting these higher costs for the near-organic farm are three production items for which production costs per cow-calf unit are more for the mainstream farm: \$13 more purchased feed (protein supplement); \$6 higher bull replacement cost (one bull/21 cows on the mainstream farm versus one bull/39 cows on the near-organic farm); and \$5 more for veterinary, medicine, supplies, and marketing.

Net revenue over total costs except management per cow-calf unit in the **North Central Region** for the near-organic farm is - \$20, whereas for the mainstream farm it is - \$72. Of the \$52/head profit advantage for the near-organic farm, \$42 arises from more gross revenue per cow-calf unit (\$558 versus \$516) and \$10 from lower total costs of production (\$578 versus \$588). The higher gross revenue for the near-organic farm is a result of its having heavier calves at weaning (10% greater for steers and 11% greater for heifers) and a higher weaning percentage (by 4.5 percentage points).

Production costs for individual items differ rather little between the near-organic and mainstream case farms. Near-organic production costs per cow-calf unit are slightly less for livestock investment interest (\$6), bull replacement (\$6), raised feed (\$4), labor (\$3), and veterinary, medicine, supplies, and marketing (\$2). For purchased feed (protein supplement), however, near-organic costs are \$11/head higher. Thus, in balance, near-organic total costs are \$10/head lower.

Net revenue over total costs except management per cow-calf unit in the **Central Region** for the near-organic farm is - \$60, whereas for the mainstream farm it is - \$87. While the near-organic farm's gross revenue/head is \$12 less than that for the mainstream farm (\$508 versus \$520), its costs are \$39/head lower (\$568 versus \$607). Near-organic gross revenue is less because of that farm's slower calf average daily gains from birth to weaning (12% less for steers and 3% for heifers) and a slightly lower weaning percentage (2.8% percentage points less).

The three items for which near-organic costs/cow-calf unit differ most from mainstream costs are as follows: \$16 lower herd bull replacement cost (one bull/26 cows on the near-organic farm versus one bull/16 cows on the mainstream farm); \$13 lower veterinary, medicine, supplies, and marketing expense; and \$6 livestock investment interest cost (3 percentage points lower heifer replacement rate).

Supplementary cattle enterprises. Tables 40 and 41 contain summary data from Annex E for the backgrounding enterprises for four case farms and the finishing enterprise for one of the farms. This analysis shows these supplemental cattle enterprises to be unprofitable.[23] Net revenue over total costs except management/head for the backgrounding enterprises averages - \$27 and for the finishing enterprise it is - \$249.

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[23]With raised feed valued at production costs, however, net revenue over total costs of production except management for the backgrounding enterprise on one of the farms is positive, namely, for the North Central near-organic farm (\$21/head).

Table 40. Measures of profitability, backgrounding and slaughter cattle enterprises, case farms.

Revenues and costs	Backgrounding: Northwest near-organic	Backgrounding: Northwest main-stream	Backgrounding: So Central near-organic	Backgrounding: No Central near-organic	Slaughter steer Central near-organic
Gross revenue per animal	$ 643	$ 630	$ 683	$ 658	$ 955
Costs of production per animal					
Direct costs	656	645	708	656	1,097
Fixed costs	15	13	14	14	107
Total costs except management	671	658	722	670	1,204
Net revenue per animal over:					
Direct costs	- 13	- 15	- 25	2	- 142
Total costs except management	- 28	- 28	- 39	- 12	- 249

Table 41. Costs of production, backgrounding and slaughter cattle enterprises, case farms.[a]

Type of cost	Backgrounding: Northwest Near-organic	Backgrounding: Northwest Main-stream	Backgrounding: So Central near-organic	Backgrounding: No Central near-organic	Slaughter steer Central near-organic
	(------------------Dollars per head				------------------)
Direct costs of production					
Raised feed					
Alfalfa hay	39	52	48	48	228
Grains	22	22	22	21	174
Sub-total	61	74	70	69	402
Cash expenses					
Interest	26	25	28	25	30
Labor	15	14	14	14	78
Other	7	6	7	13	39
Sub-total	48	45	49	52	147
DIRECT PROD COST SUB-TOTAL	109	119	119	121	549
Fixed costs					
Interest on livestock investment	14	12	14	13	95
Building & equipment depreciation, taxes, interest, and insurance	1	1	1	1	12
FIXED PROD COST SUB-TOTAL	15	13	15	14	107
TOTAL PRODUCTION COST	124	132	134	135	656

[a]The initial costs of feeder cattle are not shown in this table.

The dominant direct cost of production for the supplemental cattle enterprises is, of course, the initial value of the feeder calf. Of the other major costs of production, raised feed is most important. It constitutes on average 53% of other backgrounding costs and 61% of other finishing cattle costs. Second and third most important are interest and labor costs, which constitute on average 30% and 11%, respectively, of other backgrounding costs and 19% and 12%, respectively, of other finishing cattle costs.

Cattle enterprises collectively. Summary data from Annex E on the combined profitability of cow-calf and supplementary cattle enterprises for the various case farms are displayed in Table 42. Net revenues over all costs except (1) management; (2) labor and management; (3) interest, labor, and management; and (4) land, interest, labor, and management are shown for all cattle associated with each farm.

Table 42. Net revenue earned by livestock enterprises collectively, matching pairs of near-organic and mainstream case farms.

	Net revenue over all costs except:			
Case farm	Management	Labor and management	Interest, labor, and management	Land interest, labor, and management
Northwest				
Near-organic	786	7,284	20,722	33,519
Mainstream	9,183	14,875	27,828	44,655
Near-organic minus mainstream	- 8,397	- 7,591	- 7,106	- 11,136
South Central				
Near-organic	- 968	1,878	6,576	16,512
Mainstream	180	6,004	18,541	45,962
Near-organic minus mainstream	- 1,148	- 4,126	- 11,965	- 29,450
North Central				
Near-organic	- 4,966	4,563	28,231	56,105
Mainstream	- 12,344	- 4,518	14,128	37,901
Near-organic minus mainstream	+ 7,378	+ 9,081	+ 14,103	+ 18,204
Central				
Near-organic	- 6,309	- 1,648	5,267	11,086
Mainstream	- 2,792	- 504	3,035	8,568
Near-organic minus mainstream	- 3,517	- 1,144	+ 2,232	+ 2,518

To assist in determining the validity and interpretation of data on cattle herds aggregated to the level of region and type of farm (Table 43), the following descriptive data on average size of cattle enterprises should be kept in mind:

* Average size of cow herd (head): eight case farms 109, four West River farms 104, four East River farms 114, four near-organic farms 105, and four mainstream farms 113;

* Total number of backgrounded cattle on case farms collectively: West River farms 35, East River farms 76, near-organic farms 94, and mainstream farms 17; and

* Thirteen cattle finished on an East River near-organic farm.

Thus, East River farmers have slightly larger cow herds and collectively background and finish a few more cattle than in the West. On the other hand, the near-organic farmers, who on average have slightly smaller cow herds, background and finish a few more cattle than their mainstream counterparts.

Table 43. Net revenue earned by livestock enterprises collectively, by region and type of case farm.

	Category of case farms				
		Region		Type	
Net revenue category	All eight	West River	East River	Near-organic	Main-stream
Net revenue over all costs except:					
Management	- 2,154	2,295	- 6,603	- 2,864	- 1,443
Labor and management	3,492	7,510	- 527	3,019	3,964
Interest, labor, and management	15,541	18,417	12,665	15,199	15,883
Land, interest, labor, and management	31,789	35,162	28,415	29,306	34,272

By all four net revenue criteria, case farm cattle herds on average are more profitable in the West than in the East. The average margin of profit in favor of the West ranges among profit criteria from \$5,752 to \$8,898/herd. Since West River herds are slightly smaller than East River herds, this study shows beef cattle production in the West to generally be more profitable than in the East.[24] As indicated above, this profit advantage derives importantly from (1) cheaper feed sources and (2) calves that gain faster from birth to weaning in the West.

Similarly, by all four net revenue criteria, near-organic cattle herds on average are less profitable than mainstream cattle herds. The average margin of profit disadvantage for the near-organic farms ranges among profit criteria from \$684 to \$4,966/herd. In comparing the four pairs of farms with respect to the four net revenue criteria, the near-organic farm is less profitable than its matching mainstream counterpart in 10 of the 16 instances. In the other 6 instances (North Central farms by all four criteria, Central farms by third and fourth net revenue criteria), however, the near-organic farms are more profitable.

[24]This statement is qualified by "generally" since, by some profit criteria, certain of the individual case farms in the East are more profitable than those in the West.

HOG COMPONENT OF CASE FARMS

The Northwest Region near-organic and Central Region mainstream case farms have modest-sized hog farrow-finish operations.

Enterprise descriptions

The Northwest Region near-organic hog farrow-finish operation involves six sows that farrow twice per year. Sows are housed in open-front, tin-covered calf shelters bedded with straw. They farrow twice a year in small pens; weaning age is 2 months; average litter size is 9.25 pigs. Baby pigs are vaccinated with a 3-way shot at 7-10 days of age and a booster shot 3 weeks later. Replacement gilts are home-raised, and one boar to service them is purchased each year. Sows were assumed to be sold after their second farrowing at a weight of 675 lb and boars at a weight of 700 lb. Of the total feed fed to sows, 95% is oat grain and 5% is alfalfa.

Finishing pigs are housed in a straw-bedded old chicken coup with a cement floor and straw-insulated ceiling. They have access to dirt runs outside. Starting and ending weights for finishing pigs are 40 lb and 240 lb. Finishing pigs are fed a ration consisting of 65% oat grain, 30% barley grain, and 5% alfalfa.

The Central Region mainstream hog farrow-finish operation involves 18 sows, half of which farrow once/yr and the other half twice/yr. The hog house has roof ventilation and a cement floor bedded with straw. Sows receive 3-way shots 1 month before farrowing and the baby pigs 3-way shots at 4 weeks. Sows wean an average of 9 pigs/litter at 5 weeks of age. Replacement gilts are home-raised and two boars to service them are purchased annually. Sows were assumed to be sold at a weight of 500 lb and boars at a weight of 600 lb. The sow ration consists of 75% corn grain and 25% protein supplement.

Finishing pigs are housed in a straw-bedded, open-fronted steel shed with dirt lots. They are wormed at 6 weeks. Starting and ending finishing pig weights are 30 lb and 260 lb. An annual death loss of 0.9% was assumed. Finishing pigs are fed a ration consisting of 75% corn grain and 25% protein supplement.

Budget assumptions and procedures

The hog farrow-finish enterprise unit of analysis was defined to cover the brood sow, her baby pigs until weaning, her weaned pigs until finished (17.5 pigs/sow for the Northwest Region farm and 12.4 pigs/sow for the Central Region farm), her replacement, and that part of the boar required to serve her (0.17 and 0.11 for the two farms, respectively).

Baseline hog prices reflect average 1993 prices at the Sioux Falls market, the same as for cattle. Assumed prices for different categories of hogs are as follows (per cwt): $45.76 slaughter hogs, $38.25 cull sows, and $32.95 cull boars.

Direct costs consist of the value of home-raised feed and cash expenses, with the latter covering labor, purchased feeds, veterinary and medicine, supplies, marketing, power and fuel, building and equipment repairs, and interest on direct costs--except for home-raised feed--for an average loan/utilization period of 6 months. Wage and interest rates and feed prices assumed for hogs are the same as those used for beef cattle.

Other assumed cash expenses per sow unit per year are as follows: $28.80 veterinary and medicine, $13.00 supplies, $23.90 marketing, $12.50 power and fuel, and $16.65 building and equipment repairs. Except for (1) building and equipment and (2) power and fuel expenses, these were taken directly from Pflueger et al. (1991, pp 4, 42). Since neither hog-producer has special-purpose confinement facilities, hog building/equipment and power/fuel expenses in this study were assumed to be only one-half those in Pflueger et al. Based on Lamp et al. (1989, p 50), the assumed annual labor requirements per sow unit are 42 hr and 38 hr for the Northwest and Central Region hog operations, respectively.

Fixed costs cover interest on hog investment, replacement of boar, and building and equipment depreciation, taxes, interest, and insurance (DTII). Procedures for determining the first two fixed cost items are the same as those used for beef cattle. The money invested in the replacement gilt was assumed to be tied up on average for 0.50 yr, for the boar 0.70 yr, and for the sow 1.0 year. Assumed average annual values of the replacement gilt, yearling brood sow, and boar are $100, $200, and $250, respectively. An average annual DTII expense of $76.25 per sow unit was based on one-half the values shown in Pflueger et al. (1991, pp 4-5).

Feed requirements were based on the procedures and data provided by Mayrose et al. (n.d.). Average feed efficiencies, defined as the pounds of feed required per pound of gain by slaughter hogs, were assumed to be 4.1 for the entire farrow-to-finish period and 3.6 for feeder pigs until marketing.

To illustrate application of these average feed efficiencies, for one sow unit of the Northwest Region hog operation, 17.5 slaughter hogs weighing 240 lb each are produced. Total feed required for one unit of the farrow-to-finish enterprise is therefore:

$$17.5 \text{ hogs} * 240 \text{ lb} * 4.1 \text{ lb feed/lb of gain} = 17{,}220 \text{ lb.}$$

Of this total, 12,600 lb are required for slaughter hogs (17.5 hogs * 200 lb gain * 3.6 lb feed/lb of gain) and the remainder of 4,620 lb for sows. Of the 12,600 lb, 65% is from oats (256 bu/sow), 30% is from barley (79 bu/sow), and 5% is from alfalfa (0.315 ton/sow). Of the 4,620 lb, 95% is from oats (137 bu/sow) and 5% is from alfalfa (0.116 ton/sow). Combining the two, the total feed requirement per sow unit for the Northwest Region hog operation is 393 bu oats, 79 bu barley, and 0.43 ton alfalfa. Applying similar procedures to the Central Region hog operation resulted in determination of a feed requirement of 178 bu corn and 1.66 tons of soybean oil meal per sow unit.

Economic analysis

Table 44 contains summary data from the hog enterprise budgets for the two case farms displayed in Annex F. Total production costs for the two farmers average $1,287/sow unit. Of total costs, on average 37% are for raised feed, 22% for purchased feed, 20% for labor, 11% for fixed costs, and 10% for other. Both hog operations are quite profitable, with net revenue over all costs except management $1,001/sow for the Northwest Region farmer and $362/sow for the Central Region farmer. Because the Central Region farmer's hog enterprise is larger, the contribution of net revenue from hogs to the two overall farms is quite similar: Northwest Region $6,006 and Central Region $6,525.

Table 44. Costs and returns from hog farrow-to-finish production, case farms.

Revenues and costs	Northwest near-organic	Central mainstream
	(--dollars per sow unit---)	
Gross revenue	2,249	1,688
Direct production costs		
Raised feed	554	401
Purchased feed	159	415
Labor	273	247
Other	119	129
Sub-total	1,105	1,192
Fixed costs	143	134
Total production costs	1,248	1,326
Net revenue over all costs except management	1,001	362

WHOLE-FARM ANALYSIS

Livestock-crop balance

The balance between livestock and crops for the respective case farms is evaluated from the following standpoints: (1) percent of total farm gross revenue from livestock, (2) percent of total farm net revenue over direct costs of production from livestock,[25] (3) percent of total amounts of TDN produced that are fed to farmers' livestock for each of cropland and total farmland (the latter inclusive of pasture), and (4) percentages of total production of various feedstuffs fed to farmers' livestock. Data presented in Tables 45 and 46 are either taken directly or computed from data contained in Annex G.

Table 45. Crop-livestock balance, whole-farm analysis, matching pairs of near-organic and mainstream case farms.

Indicator of crop-livestock balance	Northwest Near-organic	Northwest Main-stream	South Central Near-organic	South Central Main-stream	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
Percent of total farm gross revenue from livestock	57.4	55.2	19.9	65.3	73.2	66.0	37.0	37.2
Percent of total farm net revenue over direct costs of production from livestock	30.0	38.0	5.4	31.6	21.1	13.9	2.7	16.8
Percent of total TDN produced on farms fed to farmers' livestock from:								
Cropland	44.4	32.3	9.3	32.6	56.3	59.0	28.9	20.1
Total farmland	52.9	52.1	18.6	57.1	68.3	67.1	33.4	23.9
Percent of total farm production fed to farmers' livestock								
Roughages								
Pasture	100.0	100.0	83.6	97.5	100.0	100.0	100.0	100.0
Native hay	82.7	n/a	n/a	n/a	100.0	100.0	50.0	n/a
Alfalfa hay	59.6	20.6	14.2	41.6	45.8	100.0	14.3	36.5
Corn or sorghum sudan silage	100.0	n/a	n/a	n/a	100.0	100.0	100.0	n/a
Oat or millet hay	n/a	100.0	n/a	100.0	n/a	n/a	n/a	n/a
Grains[a]								
Oats	40.6	58.9	7.9	n/a	58.0	36.3	13.4	7.8
Sorghum	n/a	n/a	n/a	9.3	n/a	n/a	n/a	n/a
Corn	n/a	n/a	n/a	n/a	38.3	n/a	12.2	33.4

[a]Farmers sold 100% of the following grains and oilseeds produced: spring wheat, winter wheat, millet grain, buckwheat, barley, and soybeans.

Table 46. Crop-livestock balance, whole-farm economic analysis, by region and type of farm.

Indicator of crop-livestock balance	Category of case farms: All eight	Region: West River	Region: East River	Type: Near-organic	Type: Main-stream
Percent of total farm gross revenue from livestock	53.1	49.4	56.4	50.8	55.5
Percent of total farm net revenue over direct costs of production from livestock	19.8	25.2	15.0	16.3	23.9
Percent of total farm costs of production from livestock	53.9	50.0	57.3	51.8	56.0
Percent of total TDN produced on farm fed to farmer's livestock from:					
Cropland	36.7	29.4	42.6	36.4	37.4
Total farmland	48.7	44.7	52.0	46.6	51.1

[25]Because net revenues over total production costs from livestock on some case farms were negative, the livestock-crop net revenue balance had to be assessed in terms of the percent of total farm net revenue over **direct**, rather than total, costs of production from livestock.

Percentages of total farm gross revenue from livestock range among case farms from 20% to 73% (Figure 27). For the eight farms as a whole, 53% of total farm gross revenue is from livestock. This compares to 59% for all farms in South Dakota in 1993 (S.D. Agric Stat Serv, 1995, p 104). The relative importance of livestock in contributing to total farm gross revenue for three case farms is above the state-average and for five farms it is less. On average, livestock are a less important contributor to total farm gross revenue for West than East River farms and for near-organic than mainstream farms. The unexpected regional outcome reflects an unusually large relative importance of livestock on the two North Central case farms.

FIG. 27. LIVEST. GR. REV. AS % OF TOT.
matching pairs of case farms

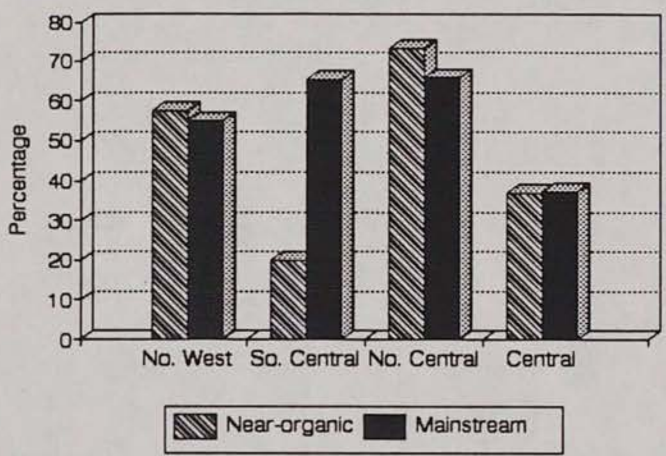
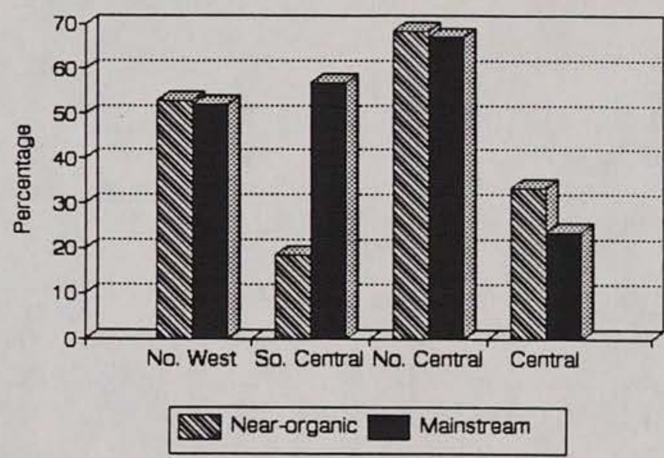


FIG. 28. % PRODUCED TDN FED LIVESTOCK:
matching pairs of case farms



Percentages of total farm net revenue over direct production costs from livestock range among case farms from 3% to 38%. For the eight farms as a whole, 20% of total farm net revenue is from livestock. The relatively lower contribution of livestock to net than gross farm revenue, of course, reflects the generally lower profitability of livestock compared to crop production in this study. Unlike with gross revenue, net revenue from livestock as a percent of total farm revenue is greater in the West than in the East.

Percentages of total amounts of TDN produced on cropland that are fed to farmers' own livestock range among case farms from 9% to 59% and average 37%. For total farmland, the percentages range from 19% to 68% and average 49% (Figure 28). Judged by the cropland TDN criterion, the only case farms in which more than 50% of total TDN produced is fed to livestock are the two in the North Central Region. Judged by the total farmland TDN criterion, however, three additional farms (the two in the Northwest and the South Central Region mainstream farm) feed more than 50% of total TDN produced to livestock.

Except for alfalfa hay generally and native hay for the Central Region near-organic farmer, either all or the vast majority of roughages produced are fed to farmers' own livestock. Percentages of alfalfa fed on the different case farms are as high as 60% and as low as 14%.

greater importance of livestock in terms of total farm gross revenue and total farm production costs; (2) an approximate even balance between livestock and crops in total amount of TDN produced fed to farmers' own livestock; and (3) a much lesser importance of livestock in net revenue. Taking into joint account the various criteria, I also conclude that the two North Central Region farms and the South Central Region mainstream farm have predominantly livestock; the two Northwest Region farms are roughly balanced between livestock and crops; and especially the South Central near-organic farm, but also the two Central Region farms, have predominantly crops.

Economic analysis

Analysis of livestock production until now has been exclusively with feeds valued at market prices. The first section below draws together, at the whole-farm level, the above presented cost and return information on the crops and livestock comprising individual case farms--with livestock feeds valued at market prices. In the second section below, impacts on costs and returns of valuing livestock feeds at the respective farmers' actual costs of production are examined.

Livestock feeds valued at market prices. Table 47 contains summary information on results of the whole-farm economic analysis reported in Annex G. In Table 48, data from Table 47 are summarized in the form of averages for (1) the eight case farms, (2) the four West River and four East River case farms, and (3) the four near-organic and four mainstream case farms.

Gross revenue per case farm ranges from \$84,188 to \$165,827 and averages \$121,198 (Figure 29). This average is 11% greater than the 1993 average of \$108,758 for all farms in South Dakota (S.D. Agric Stat Serv, 1995, pp 4 and 104). Average gross revenue for West River farms (\$114,687) is 10% less than that for East River farms. Whereas crop revenue is 4% greater in the West than in the East, livestock revenue is 21% less in the West than in the East. Gross revenue for three near-organic farms is greater than that for mainstream counterparts and less for the other near-organic farm. Average gross revenue for near-organic farms (\$123,754) is 4% more than that for mainstream farms. Whereas crop revenue is 15% greater for near-organic than mainstream farms, livestock revenue is 5% less.

Total costs of production except management per case farm range from \$65,560 to \$128,499 and average \$96,418 (Figure 30). Average total production costs for West River farms (\$92,474) are 8% less than those for East River farms. Production costs are less in the

FIG. 29. WHOLE-FARM TOTAL GROSS REV.: matching pairs of case farms

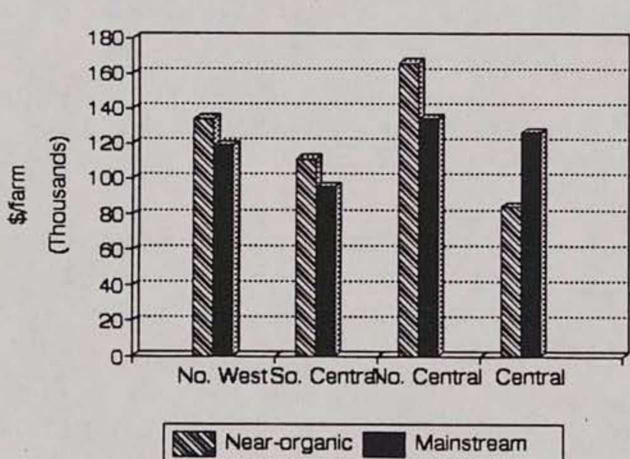


FIG. 30. WHOLE-FARM TOTAL PROD. COSTS: matching pairs of case farms

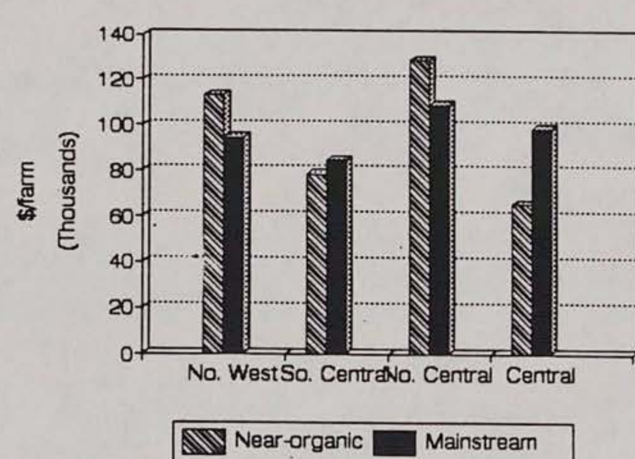


Table 47. Whole-farm economic analysis summary, matching pairs of near-organic and mainstream case farms.

Economic measure	Northwest Near-organic	Northwest Main-stream	South Central Near-organic	South Central Main-stream	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
Gross revenue								
Crops sold and government payments	$ 56,964	$ 53,138	$ 89,159	$ 32,980	$ 44,378	$ 45,691	$ 53,014	$ 79,396
Cattle sold	63,297	65,437	22,087	62,192	121,449	88,717	31,174	16,636
Hogs sold	13,494	0	0	0	0	0	0	30,384
TOTAL	$133,755	$118,575	$111,246	$ 95,172	$165,827	$134,408	$ 84,188	$126,416
Total costs of production except management, and with feed valued at market prices								
Crops	$ 71,367	$ 52,125	$ 60,046	$ 31,540	$ 60,473	$ 54,364	$ 46,796	$ 68,529
Livestock								
Cow-calf enterprise	60,778	54,000	22,520	62,012	116,172	101,061	28,959	19,428
Backgrounding enterprise[a]	1,733	2,254	535	0	10,243	0	0	0
Slaughter cattle enterprise[a]	0	0	0	0	0	0	8,524	0
Hog farrow-finish enterprise	7,488	0	0	0	0	0	0	23,859
Sub-total	69,999	56,254	23,055	62,012	126,415	101,061	37,483	43,287
UNADJUSTED TOTAL[b]	$141,366	$108,379	$ 83,101	$ 93,552	$186,888	$155,425	$ 84,279	$111,816
ADJUSTED TOTAL[b]	$113,027	$ 94,395	$ 78,101	$ 84,373	$128,499	$108,797	$ 65,560	$ 98,593
Net revenue over total costs of production except management								
Crops	$ 13,936	$ 14,997	$ 34,113	$ 10,619	$ 42,294	$ 37,955	$ 24,937	$ 24,090
Livestock								
Cow-calf enterprise	1,176	9,664	- 810	180	- 4,071	-12,344	- 3,070	- 2,792
Backgrounding enterprise	- 390	- 481	- 158	0	- 895	0	0	0
Slaughter cattle enterprise	0	0	0	0	0	0	- 3,239	0
Hog farrow-finish enterprise	6,006	0	0	0	0	0	0	6,525
Sub-total	$ 6,792	$ 9,183	$- 968	$ 180	$- 4,966	$-12,344	$- 6,309	$ 3,733
TOTAL	$ 20,728	$ 24,180	$ 33,145	$ 10,799	$ 37,328	$ 25,611	$ 18,628	$ 27,823
Net revenue over total costs of production except:								
Labor and management	$ 35,310	$ 33,837	$ 41,151	$ 19,659	$ 53,203	$ 37,176	$ 28,109	$ 39,802
Land, labor, and management	62,728	65,106	73,141	58,615	89,049	72,004	45,185	59,473

[a]The initial value of feeder/heifer calves for these enterprises is excluded from the "total costs" shown.

[b]Since no cash expenditure was made for home-raised feed fed to livestock, this value was subtracted from "unadjusted total costs" to obtain "adjusted total costs." The latter can be viewed as economic expenditures; they exceed actual cash expenditures to the extent that farmers use owned rather than borrowed capital.

Table 48. Whole-farm economic analysis summary, by region and type of farm.

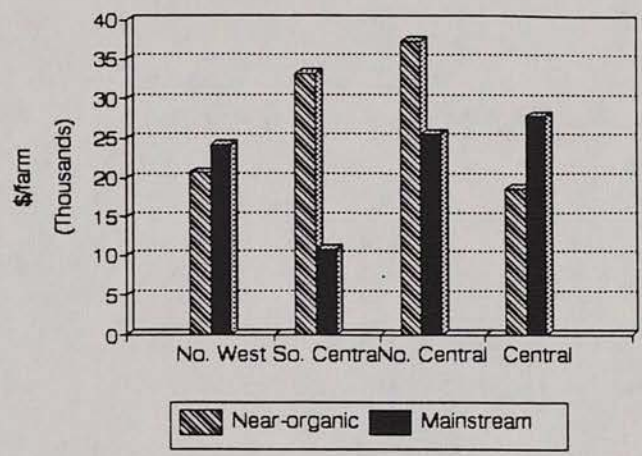
Economic measure	All eight	West River	East River	Near-organic	Main-stream
	Category of case farms				
		Region		Type	
	(----------average dollars per farm----------)				
Gross revenue					
Crops	56,840	58,060	55,620	60,879	52,801
Livestock	64,358	56,627	72,090	62,875	65,842
Total	121,198	114,687	127,710	123,754	118,643
Total production costs except management					
Crops	55,655	53,770	57,540	59,671	51,640
Livestock	64,946	52,830	77,062	64,238	65,654
Unadjusted total[a]	120,601	106,600	134,602	123,909	117,294
Adjusted total[a]	96,418	92,474	100,362	96,297	96,540
Net revenue over total costs except management					
Crops	25,368	18,416	32,319	28,820	21,915
Livestock	- 588	3,797	- 4,972	- 1,363	188
Total	24,780	22,213	27,347	27,457	22,103
Net revenue over total costs except:					
Labor and management	36,031	32,489	39,573	39,443	32,619
Land, labor, and management	65,663	64,898	66,428	67,526	63,800

[a]Since the value of home-raised feed is common to both the crop and livestock budgets, this value is subtracted from the "unadjusted total" to obtain the "adjusted total" for the whole farm.

West than in the East for both crops and livestock, but the margin of regional difference is greater for livestock than crops. Total production costs for two near-organic farms are greater than those for mainstream counterparts and less for the other two near-organic farms. Average total production costs for near-organic farms ($96,297) are essentially the same as those for mainstream farms. Whereas crop production costs are 16% greater for near-organic than mainstream farms, livestock production costs are 2% less.

Net revenue over all costs except management per case farm ranges from $10,799 to $37,328 and averages $24,780 (Figure 31). Average net revenue for West River farms ($22,213) is 19% less than that for East River farms. Whereas crop net revenue is $13,903 less in the West than in the East, livestock net revenue is $8,769 greater. Net revenue for two near-organic farms is greater than that for mainstream counterparts and less for the other two near-organic farms. Average net revenue for near-organic farms ($27,457) is 24% more than that for mainstream farms ($22,103). Whereas crop net revenue is $6,905 greater for near-organic than mainstream farms, livestock net revenue is $1,551 less.

FIG. 31. WHOLE-FARM TOTAL NET REVENUE:
matching pairs of case farms



Net revenue over all costs except labor and management per case farm averages $36,031, which implies that average labor earnings are $11,251/case farm. This is low relative to the $17,500 family labor earning default value currently used with FINPAK farm management extension in South Dakota. Net revenue over all costs except land, labor, and management per case farm average $65,663, which implies that the average rental value of all farmland operated by the case farmers--plus the value of their management--is $29,632/farm. With respect to both additional net revenue criteria, West River farms are also less profitable than East River farms and near-organic farms are more profitable than mainstream farms. However, relative margins of difference in profits for both region and type of farm are less with the other net revenue criteria, particularly with the third criterion which includes a return to land.

Livestock feeds valued at costs of production. The above analysis shows crop production to be more profitable than livestock production. Sometimes, when confronted with data like these, livestock producers hold the view that their livestock would show themselves to be more profitable if the feed consumed by the livestock were valued according to the actual production cost of the feed, rather than at market prices for the feed.

With this in mind, analysis in this study was modified to also include the valuing of feed fed to various producers' livestock at actual costs of production for the respective producers. Assumed 1993 market prices and actual production costs for feeds fed by the case farmers are displayed in Table 49. For 20 of the 29 feedstuff-case farm situations, actual producer costs are less than market prices. The only feedstuff for which actual producer costs exceed market prices for more than one farmer is oat grain. Oat production costs for five of the seven case farmers exceed the assumed market price of $1.35/bu.

Table 49. Market prices and actual costs of production, home-raised feedstuffs, matching pairs of near-organic and mainstream case farms.

		Cost of production							
		Northwest		South Central		North Central		Central	
Feedstuff	Market price	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Roughages ($ per ton)									
Alfalfa hay	55[a]	33.23	n/a	24.17	n/a	21.19	17.88	27.32	30.83
Alfalfa/grass hay	50[a]	n/a	29.83	n/a	25.55	n/a	n/a	n/a	n/a
Native hay	40	45.10	n/a	n/a	n/a	20.31	17.53	26.97	n/a
Oat hay	35	n/a	28.72	n/a	n/a	n/a	n/a	n/a	n/a
Millet hay	30	n/a	n/a	n/a	33.46	n/a	n/a	n/a	n/a
Corn silage	17	19.68	n/a	n/a	n/a	15.42	15.67	14.65	n/a
Sorghum sudan silage	15	n/a	n/a	n/a	n/a	n/a	n/a	11.72	n/a
Grains ($ per bu)									
Oats	1.35	1.20	1.50	1.36	n/a	1.46	0.96	1.52	1.86
Sorghum	1.85	n/a	n/a	n/a	2.05	n/a	n/a	n/a	n/a
Corn	2.25	n/a	n/a	n/a	n/a	1.88	n/a	1.90	n/a

[a]The market prices for these two hays in the South Central Region are $40.00 and $36.50, respectively.

Values for each case farmers' raised livestock feed valued at (1) market prices and (2) actual costs of production shown in Table 50 are taken from Annex G. For all producers, the cost of feed fed to livestock valued at production costs is less than at market prices. Total feed value differences range among farmers from 5% to 29%. These differences vary widely by region, with feed values according to actual production costs differing from feed values at market prices most in the North Central Region (28-29% less) and least in the Northwest and South Central Regions (5-11% less). The margin of difference is greatest for the North Central Region farmers primarily because of their relatively low alfalfa and native hay production costs.

Livestock net revenues over total costs of production except management with raised feed valued at actual production costs versus market prices for the case farmers displayed in Table 51 are taken from Annex G. With feed valued at market prices, livestock net revenue for four producers is positive and for four it is negative. With feed valued at production costs, livestock net revenues become positive for three of the four case farmers having negative profits when feed is valued at market prices. The increase in net revenue with raised feed valued at production costs, rather than at market prices, ranges among farmers from $1,654 to $22,549 and averages $7,117. Increases in net revenue are strongly associated with region, with average increases in each region as follows: South Central $1,692; Northwest $2,450; Central $4,197; and North Central $20,131.

Table 50. Raised feed fed to livestock valued at market prices and actual costs of production, matching pairs of near-organic and mainstream case farms.

Case farm	Raised feed valued at: Market price	Raised feed valued at: Cost of production	Feed valued at cost of production as a percent of feed valued at market price
Northwest			
Near-organic	$ 37,024	$ 35,300	95.3
Mainstream	28,463	25,286	88.8
South Central			
Near-organic	13,514	11,861	87.8
Mainstream	33,591	31,862	94.9
North Central			
Near-organic	76,931	54,382	70.7
Mainstream	62,059	44,346	71.5
Central			
Near-organic	22,063	17,247	78.2
Mainstream	18,011	14,434	80.1

Table 51. Net revenue over total costs of production except management, livestock enterprises, raised feed valued at market prices and actual costs of production, matching pairs of near-organic and mainstream case farms.

Case farm	Net revenue with raised feed valued at: Market price	Net revenue with raised feed valued at: Cost of production	Increase in net revenue with raised feed valued at cost of production
Northwest			
Near-organic	$ 6,792	$ 8,516	$ 1,724
Mainstream	9,183	12,359	3,176
South Central			
Near-organic	- 968	686	1,654
Mainstream	180	1,909	1,729
North Central			
Near-organic	- 4,966	17,583	22,549
Mainstream	-12,344	5,369	17,713
Central			
Near-organic	- 6,309	- 1,493	4,816
Mainstream	3,733	7,310	3,577

Readers are encouraged to return to the first section of the report for a summary of the findings and conclusions from the study.

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ANNEX A

CROP ROTATIONS BUDGETS: NEAR-ORGANIC AND MAINSTREAM CASE FARMS

Note: To compute the per-acre "government payment" for each small grain that a case farmer enrolled in the government program, the following cross product was calculated:

Base yield (bu) * deficiency payment ($/bu) * "flex factor" of 0.85.

The same formula was used for corn, except that an adjustment factor of 0.75 (rather than 0.85) was used, to account for the 10% set-aside rate in addition to the 15% flex rate.

While this procedure allowed satisfactory accounting of per-acre government payments, it did not take into account that 10% of the corn acreage should have been set aside in one or more other specified crops, some of which may have been less profitable than corn. The degree of this distortion is probably rather limited, however, since corn constitutes only 10% of the aggregate cropland acreage for the 10 farms.

"NEAR-ORGANIC" FARM, NORTHWEST REGION
CROP ROTATION BUDGET "A": 570 ACRES

	Spring wheat$_{clover}$		Summer fallow
CROP ROTATION ACREAGES	285		285
Gross revenue			
Market value			
Yield (units/acre)	30		n/a
Selling price ($/unit)	3.15		n/a
Market value ($/acre)	94.50		n/a
Government Payments			
Base yield (units/acre)	16		n/a
Deficiency payment ($/unit)	1.03		n/a
Government payment ($/acre)	14.01		n/a
Other income ($/acre)	0		n/a
I. TOTAL GROSS REVENUE ($/ACRE)	108.51		0
Direct production cost ($/acre)			
Materials			
Seed			
Grain	5.50		
Legume			
Alfalfa			
Clover	3.80		
Fertilizer			
Anhydrous ammonia			
10-34-0			
18-46-0			
Fish oil with molasses			
Trace mineral phosphate (0-27-0)	8.25		
Herbicide			
Twine			
Materials sub-total	17.55		0
Machinery operation costs	2.60		1.92
Trucking costs	4.50		
Silage handling			
Crop insurance	5.00		
Labor charge	3.18		2.47
Custom hire			
Spraying			
Combining			
Machinery rental			
Baling			
Interest on operating capital	1.40		0.10
II. TOTAL FIXED PRODUCTION COSTS	34.23		4.49
FIXED PRODUCTION COSTS ($/ACRE)			
Machinery ownership costs	15.71		4.31
Land cost	14.60		14.60
III. TOTAL FIXED PRODUCTION COSTS	30.31		18.91
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	64.54		23.40
PROFITABILITY SUMMARY			
Return over direct costs ($/acre)	74.28		(4.49)
Net return ($/acre)	43.97		(23.40)
Break-even prices ($/unit)			
With respect to direct costs	1.14		n/a
With respect to total costs	2.15		n/a
Net revenue, per average hypothetical acre in rotation, over:			
Direct costs		34.90	
Total costs except management		10.29	

NEAR-ORGANIC FARM, NORTHWEST REGION
CROP ROTATION BUDGET "B": 420 ACRES

	Corn silage	Oat grain$_{clover}$	Spring wheat$_{clover}$	Summer fallow
CROP ROTATION ACREAGES	105	105	105	105
Gross revenue				
Estimated yield (units/acre)	6.5	60.0	30.0	0
Estimated selling price ($/unit)	17.00	1.35	3.15	
Sale value ($/acre)	110.50	81.00	94.50	0
Government Payments				
Base yield (units/acre)	30.0	38.0	30.0	
Deficiency payment ($/unit)	0.28	0.11	1.03	
Government payment ($/acre)	6.30	3.55	14.01	
Other Income ($/acre)	0	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	116.80	84.55	108.51	0
DIRECT PRODUCTION COSTS ($/ACRE)				
Materials				
Seeds				
Grains	13.50	2.25	5.50	
Legumes				
Alfalfa				
Clover		3.80	3.80	
Fertilizers				
Anhydrous ammonia				
10-34-0				
18-46-0				
Fish oil with molasses				
Granulated phosphate		8.25	8.25	
Herbicides				
Twine				
Materials Sub-Total	13.50	14.30	17.55	0
Machinery operation costs	15.35	2.85	2.60	1.92
Trucking costs		9.00	4.50	
Silage handling	6.50			
Crop insurance	5.00	5.00	5.00	
Labor charge	16.85	3.44	3.18	2.47
Custom hire				
Spraying				
Combining				
Machinery rental				
Baling				
Interest on operation capital	1.91	1.40	1.40	0.10
II. TOTAL DIRECT PRODUCTION COSTS	59.11	35.99	34.23	4.49
FIXED PRODUCTION COSTS ($/ACRE)				
Machinery ownership costs	54.20	17.64	15.71	4.31
Land cost	14.60	14.60	14.60	14.60
III. TOTAL FIXED PRODUCTION COSTS	68.80	32.24	30.31	18.91
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	127.91	68.23	64.54	23.40
PROFITABILITY SUMMARY				
Return over direct costs ($/acre)	57.99	48.56	74.28	(4.49)
Net return ($/acre)	(11.11)	16.32	43.97	(23.40)
Break-even prices ($/unit)				
With respect to direct costs	9.09	.60	1.14	n/a
With respect to total costs	19.68	1.14	2.15	n/a

Net revenue, per average hypothetical acre in rotation, over:	
Direct costs	44.01
Total costs except management	6.45

NEAR-ORGANIC FARM, NORTHWEST REGION
CROP ROTATION BUDGET "C": 228 ACRES

	Oat grain (alfalfa est)	Alfalfa (4 yr)	Alfalfa (break-up)	Native hay
CROP ROTATION ACREAGES	38	152	38	100
Gross revenue				
Estimated yield (units/acre)	60.0	1.5	1.0	1.0
Estimated selling price ($/unit)	1.35	55.00	55.00	40.00
Sale value ($/acre)	81.00	82.50	55.00	40.00
Government Payments				
Base yield (units/acre)	38.0			
Deficiency payment ($/unit)	0.11			
Government payment ($/acre)	3.55			
Other Income ($/acre)	0	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	84.55	82.50	55.00	40.00
DIRECT PRODUCTION COSTS ($/ACRE)				
Materials				
Seeds				
Grain	2.25			
Legumes				
Alfalfa	15.50			
Clover				
Fertilizers				
Anhydrous ammonia				
10-34-0				
18-46-0				
Fish oil with molasses				
Granulated phosphate	8.25			
Herbicides				
Twine		0.74	0.49	0.49
Materials Sub-Total	26.00	0.74	0.49	0.49
Machinery operation costs	3.09	5.16	7.97	6.31
Trucking costs	9.00			
Silage handling				
Crop insurance	5.00			
Labor charge	3.73	5.92	9.23	7.20
Custom hire				
Spraying				
Combining				
Machinery rental				
Baling				
Interest on operating capital	1.92	0.39	0.47	0.31
II. TOTAL DIRECT PRODUCTION COSTS	48.74	12.21	18.16	14.31
FIXED PRODUCTION COSTS ($/ACRE)				
Machinery ownership costs	18.90	16.96	24.82	21.29
Land cost	14.60	14.60	14.60	9.50
III. TOTAL FIXED PRODUCTION COSTS	33.50	31.56	39.42	30.79
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	82.24	43.77	57.58	45.10
PROFITABILITY SUMMARY				
Return over direct costs ($/acre)	35.81	70.29	36.84	25.69
Net return ($/acre)	2.31	38.73	(2.58)	(5.10)
Break-even prices ($/unit)				
With respect to direct costs	0.81	8.14	18.16	14.31
With respect to total costs	1.37	29.18	57.58	45.10
Net revenue, per average hypothetical acre in rotation, over:				
Direct costs		58.97		
Total costs except management		25.78		

MAINSTREAM FARM, NORTHWEST REGION
CROP ROTATION BUDGET "A": 420 ACRES

	Oat hay (alfalfa est)	Alf/grass (4 yr)	Alf/grass (break-up)
CROP ROTATION ACREAGES	70	280	70
Gross revenue			
Estimated yield (units/acre)	3.0	1.5	1.0
Estimated selling price ($/unit)	35.00	50.00	50.00
Sale value ($/acre)	105.00	75.00	50.00
Government Payments			
Base yield (units/acre)	36.0		
Deficiency payment ($/unit)	0.11		
Government payment ($/acre)	1.32		
Other Income ($/acre)	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	106.32	75.00	50.00
DIRECT PRODUCTION COSTS ($/ACRE)			
Materials			
Seeds			
Grain	4.50		
Legumes			
Alfalfa	15.50		
Clover			
Fertilizers			
Anhydrous ammonia			
10-34-0			
18-46-0 7.04			
Fish oil with molasses			
Granulated phosphate			
Herbicides			
Twine	1.47	0.74	0.49
Materials Sub-Total	28.51	0.74	0.49
Machindery operation costs	6.43	3.34	9.22
Trucking costs			
Silage handling			
Crop insurance	5.00		
Labor charge	7.87	4.72	13.10
Custom hire			
Spraying			
Combining			
Machinery rental			
Baling			
Interest on operating capital	2.11	0.32	0.72
II. TOTAL DIRECT PRODUCTION COSTS	49.92	9.12	23.53
FIXED PRODUCTION COSTS ($/ACRE)			
Machinery ownership costs	21.64	11.93	28.03
Land cost	14.60	14.60	14.60
III. TOTAL FIXED PRODUCTION COSTS	36.24	26.53	42.63
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	86.16	35.65	66.16
PROFITABILITY SUMMARY			
Return over direct costs ($/acre)	56.40	65.88	26.47
Net return ($/acre)	20.16	39.35	(16.16)
Break-even prices ($/unit)			
With respect to direct costs	16.64	6.08	23.53
With respect to total costs	28.72	23.77	66.16
Net revenue, per average hypothetical acre in rotation, over:			
Direct costs		57.73	
Total costs except management		26.90	

MAINSTREAM FARM, NORTHWEST REGION
CROP ROTATION BUDGET "B": 330 ACRES

CROP ROTATION ACREAGES	Spring wheat 110	Spring wheat 70		Oat grain 40	Summer fallow 110
Gross revenue					
Estimated yield (units/acre)	22.0	22.0		50.0	0
Estimated selling price ($/unit)	3.15	3.15		1.35	
Sale value ($/acre)	69.30	69.30		67.50	0
Government Payments					
Base yield (units/acre)	20.0	20.0		36.0	30.3
Deficiency payment ($/acre)	1.03	1.03		0.11	0.28
Government payment ($/acre)	17.51	17.51		1.30	3.86
Other Income ($/acre)	0	0		0	0
I. TOTAL GROSS REVENUE ($/ACRE)	86.81	86.81		68.80	3.86
DIRECT PRODUCTION COSTS ($/ACRE)					
Materials					
Seeds					
Grain	6.88	6.88		4.50	
Legumes					
Alfalfa					
Clover					
Fertilizers					
Anhydrous ammonia					
10-34-0					
18-46-0	7.04	7.04		7.04	
Fish oil with molasses					
Granulated phosphate					
Herbicides					
Twine					
Materials Sub-Total	13.92	13.92		11.54	0
Machinery operation costs	2.22	2.22		2.22	1.65
Trucking costs	3.30	3.30		7.50	
Silage handling					
Crop insurance	5.00	5.00		5.00	
Labor charge	2.46	2.46		2.46	1.56
Custom hire					
Spraying	3.50	3.50		5.50	11.00
Combining	14.00	14.00		14.00	
Machinery rental					
Baling					
Interest on operating capital	1.74	1.74		1.68	0.59
II. TOTAL DIRECT PRODUCTION COSTS	46.14	46.14		49.90	14.80
FIXED PRODUCTION COSTS ($/ACRE)					
Machinery ownership costs	10.37	10.37		10.37	3.97
Land cost	14.60	14.60		14.60	14.60
III. TOTAL FIXED PRODUCTION COSTS	24.97	24.97		24.97	18.57
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	71.11	71.11		74.87	33.37
PROFITABILITY SUMMARY					
Return over direct costs ($/acre)	40.67	40.67		18.90	(10.94)
Net return ($/acre)	15.70	15.70		(6.07)	(29.51)
Break-even prices ($/unit)					
With respect to direct costs	2.10	2.10		1.00	n/a
With respect to total costs	3.23	3.23		1.50	n/a
Net revenue, per average hypothetical acre in rotation, over:					
Direct costs			20.83		
Total costs except management			(2.01)		

MAINSTREAM FARM, NORTHWEST REGION
CROP ROTATION BUDGET "C": 230 ACRES

	Spring wheat		Summer fallow
CROP ROTATION ACREAGES	115		115
Gross revenue			
Estimated yield (units/acre)	22.0		0
Estimated selling price ($/unit)	3.15		
Sale value ($/acre)	69.30		0
Government Payments			
Base yield (units/acre)	20.0		30.3
Deficiency payment ($/unit)	1.03		0.28
Government payment ($/acre)	17.51		3.86
Other Income ($/acre)	0		0
I. TOTAL GROSS REVENUE ($/ACRE)	86.81		3.86
DIRECT PRODUCTION COSTS ($/ACRE)			
Materials			
Seeds			
Grain	6.88		
Legumes			
Alfalfa			
Clover			
Fertilizers			
Anhydrous ammonia			
10-34-0			
18-46-0	7.04		
Fish oil with molasses			
Granulated phosphate			
Herbicides			
Twine			
Materials Sub-Total	13.92		0
Machinery operation costs	2.22		1.65
Trucking costs	3.30		
Silage handling			
Crop insurance	5.00		
Labor charge	2.46		1.56
Custom hire			
Spraying	3.50		11.00
Combining	14.00		
Machinery rental			
Baling			
Interest on operating capital	1.74		0.59
II. TOTAL DIRECT PRODUCTION COSTS	46.14		14.80
FIXED PRODUCTION COSTS ($/ACRE)			
Machinery ownership costs	10.37		3.97
Land cost	14.60		14.60
III. TOTAL FIXED PRODUCTION COSTS	24.97		18.57
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	71.11		33.37
PROFITABILITY SUMMARY			
Return over direct costs ($/acre)	40.67		(10.94)
Net return ($/acre)	15.70		(29.51)
Break-even prices ($/unit)			
With respect to direct costs	2.10		n/a
With respect to total costs	3.23		n/a
Net revenue, per average hypothetical acre in rotation, over:			
Direct costs		14.87	
Total costs except management		(6.91)	

NEAR-ORGANIC FARM, SOUTH CENTRAL REGION
CROP ROTATION BUDGET: 957 ACRES

	Millet$_{clover}$	Spring wheat$_{clover}$	Buck-wheat$_{clover}$	Oat grain	Oat grain (alfalfa est)	Alfalfa (4 yr)	Alfalfa (break-up)
CROP ROTATION ACREAGES	185	100	160	44	78	312	78
Gross revenue							
Estimated yield (units/acre)	10.0	30.0	11.0	60.0	60.0	2.0	1.5
Estimated selling price ($/unit)	8.30	3.20	8.60	1.40	1.40	40.00	40.00
Sale value ($/acre)	82.50	94.50	94.60	81.00	81.00	80.00	60.00
Government Payments							
Base yield (units/acre)		28.0		31.0	31.0		
Deficiency payment ($/unit)		1.03		0.11	0.11		
Government payment ($/acre)		24.51		2.03	2.03		
Other Income ($/acre)	0	0	0	0	0	31.00	31.00
I. TOTAL GROSS REVENUE ($/ACRE)	82.50	119.01	94.60	83.03	83.03	111.00	91.00
DIRECT PRODUCTION COSTS ($/ACRE)							
Materials							
Seeds							
Grain	3.10	11.00	15.00	7.50	7.50		
Legumes							
Alfalfa					15.50		
Clover	3.80	3.80	3.80	3.80			
Fertilizers							
Anhydrous ammonia							
10-34-0							
18-46-0							
Fish oil with molasses							
Granulated phosphate							
Herbicides							
Twine						0.98	0.74
Materials Sub-Total	6.90	14.80	18.80	11.30	23.00	0.98	0.74
Machinery operation costs	4.36	3.23	5.94	5.10	3.70	3.26	4.43
Trucking costs	3.00	4.50	3.66	9.00	9.00		
Silage handling							
Crop insurance		5.00					
Labor charge	5.38	3.79	7.02	6.03	4.38	5.05	6.15
Custom hire							
Spraying							
Combining							
Machinery rental							
Baling							
Interest on operating capital	0.16	1.36	1.12	1.20	1.75	0.32	0.34
II. TOTAL DIRECT PRODUCTION COSTS	20.25	32.68	36.54	32.63	41.83	9.61	11.66
FIXED PRODUCTION COSTS ($/ACRE)							
Machinery ownership costs	19.56	14.10	25.63	22.61	18.57	12.65	15.90
Land cost	22.80	22.80	22.80	22.80	22.80	22.80	22.80
III. TOTAL FIXED PRODUCTION COSTS	42.36	36.90	48.43	45.41	41.37	35.45	38.70
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	62.61	69.58	84.97	78.04	83.20	45.06	50.36
PROFITABILITY SUMMARY							
Return over direct costs ($/acre)	62.25	86.33	58.06	50.40	41.20	101.39	79.34
Net return ($/acre)	19.89	49.43	9.63	4.99	(0.17)	65.94	40.64
Break-even prices ($/unit)							
With respect to direct costs	2.03	1.09	3.32	0.54	0.70	4.81	7.77
With respect to total costs	6.26	2.32	7.72	1.30	1.39	22.53	33.57
Net revenue, per average hypothetical acre in rotation, over:							
Direct costs				75.96			
Total costs except management				35.65			

MAINSTREAM FARM, SOUTH CENTRAL REGION
CROP ROTATION BUDGET: 610 ACRES

CROP ROTATION ACREAGES	Winter wheat 90	Fallow 120	Grain sorghum 110	Hay millet 30	Alfalfa establish 30	Alfalfa (6 yr) 193	Alfalfa (break-up) 37
Gross revenue							
Estimated yield (units/acre)	32.0	0	36.0	2.0	0	3.0	2.0
Estimated selling price ($/unit)	3.00	0	1.85	30.00	0	50.00	50.00
Sale value ($/acre)	96.00	0	66.60	60.00	0	150.00	100.00
Government Payments							
Base yield (units/acre)	27.0						
Deficiency payment ($/unit)	1.03						
Government payment ($/acre)	23.64	5.25					
Other Income ($/acre)	0	0	0	0	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	119.64	5.25	66.60	60.00	0	150.00	100.00
DIRECT PRODUCTION COSTS ($/ACRE)							
Materials							
Seeds						0	
Grain	5.50		8.75	4.80			
Legumes							
Alfalfa					13.20		
Clover							
Fertilizers							
Anhydrous ammonia							
10-34-0							
18-46-0							
Fish oil with molasses							
Granulated phosphate							
Herbicides							
Twine				0.98		1.47	0.98
Materials Sub-Total	5.50	0	8.75	5.78	13.20	1.47	0.98
Machinery operation costs	2.20	1.73	5.75	6.81	2.34	3.30	4.04
Trucking costs	5.03		5.40				
Silage handling							
Crop insurance	5.00						
Labor charge	2.34	1.54	8.86	8.84	1.50	5.44	6.28
Custom hire							
Spraying							
Combining							
Machinery retnal							
Baling							
Interest on operating capital	0.33	0.11	0.92	0.53	0.73	0.35	0.35
II. TOTAL DIRECT PRODUCTION COSTS	20.40	3.38	29.68	21.96	17.77	10.56	11.65
FIXED PRODUCTION COSTS ($/ACRE)							
Machinery ownership costs	10.65	3.22	21.37	22.16	23.23	12.32	14.51
Land cost	22.80	22.80	22.80	22.80	22.80	22.80	22.80
III. TOTAL FIXED PRODUCTION COSTS	33.45	26.02	44.17	44.96	46.03	35.12	37.31
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	53.85	29.40	73.85	66.92	63.80	45.68	48.96
PROFITABILITY SUMMARY							
Return over direct costs ($/acre)	99.24	1.87	36.92	38.04	(17.77)	139.44	88.35
Net return ($/acre)	65.79	(24.15)	(7.25)	(6.92)	(63.80)	104.32	51.04
Break-even prices ($/unit)							
With respect to direct costs	0.64	0	0.82	10.98	0	3.52	5.83
With respect to total costs	1.68	0	2.05	33.46	0	15.23	24.48
Net revenue, per average hypothetical acre in rotation, over:							
Direct costs				72.14			
Total costs except management				36.27			

NEAR-ORGANIC FARM, NORTH CENTRAL REGION
CROP ROTATION BUDGET: 540 ACRES

	Spring wheat	Corn grain	Corn silage		Oat grain (alfalfa est)	Alfalfa (4 yr)	Alfalfa (break-up)	Native hay
CROP ROTATION ACREAGES	140	30	110		40	176	44	200
Gross revenue								
Estimated yield (units/acre)	30.0	60.0	9.5		65.0	4.0	3.0	2.0
Estimated selling price ($/unit)	3.15	2.25	17.00		1.35	55.00	55.00	40.00
Sale value ($/acre)	94.50	135.00	161.50		87.75	220.00	165.00	80.00
Government Payments								
Base yield (units/acre)	18.0	38.0	38.0		41.0			
Deficiency payment ($/unit)	1.03	0.28	0.28		0.11			
Government payment ($/acre)	6.87	7.98	7.98		3.83			
Other Income ($/acre)	0	0	0		0	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	101.37	142.98	169.48		91.58	220.00	165.00	80.00
DIRECT PRODUCTION COSTS ($/ACRE)								
Materials								
Seeds								
Grain	11.00	14.85	14.85		7.50			
Legumes								
Alfalfa					15.50			
Clover								
Fertilizers								
Anydrous ammonia								
10-34-0								
18-46-0								
Fish oil with molasses								
Granulated phosphate								
Herbicides								
Twine						1.96	1.47	0.98
Materials Sub-Total	11.00	14.85	14.85		23.00	1.96	1.47	0.98
Machinery operation costs	6.00	8.00	16.44		4.68	9.58	11.71	4.79
Trucking costs	4.50	9.00			9.75			
Silage handling			9.50					
Crop insurance		5.00	5.00					
Labor charge	6.09	8.07	15.51		5.26	10.12	12.32	5.06
Custom hire								
Spraying								
Combining		15.50						
Machinery rental								
Baling								
Interest on operating capital	1.12	1.51	2.11		1.77	0.58	0.63	0.22
II. TOTAL DIRECT PRODUCTION COSTS	28.71	61.93	63.41		44.46	22.24	26.13	11.05
FIXED PRODUCTION COSTS ($/ACRE)								
Machinery ownership costs	25.78	24.38	56.48		23.52	29.73	35.59	14.86
Land cost	26.60	26.60	26.60		26.60	26.60	26.60	14.70
III. TOTAL FIXED PRODUCTION COSTS	52.38	50.98	83.08		50.12	56.33	62.19	29.56
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	81.09	112.91	146.49		94.58	78.57	88.32	40.61
PROFITABILITY SUMMARY								
Return over direct costs ($/acre)	72.66	81.05	106.07		47.12	197.76	138.87	68.95
Net return ($/acre)	20.28	30.07	22.99		(3.00)	141.43	76.68	39.39
Break-even prices ($/unit)								
With respect to direct costs	0.96	1.03	6.67		0.68	5.56	8.71	5.53
With respect to total costs	2.70	1.88	15.42		1.46	19.64	29.44	20.31
Net revenue, per average hypothetical acre in rotation, over:								
Direct costs				124.21				
Total costs except management				63.73				

MAINSTREAM FARM, NORTH CENTRAL REGION
CROP ROTATION BUDGET "A": 515 ACRES

ROTATION ACREAGES	Corn silage 160	Oat grain 70		Barley 120	Spring wheat 165
Gross revenue					
Estimated yield (units/acre)	7.5	65.0		50.0	30.0
Estimated selling price ($/unit)	17.00	1.35		2.00	3.15
Sale value ($/acre)	127.50	87.75		100.00	94.50
Government Payments					
Base yield (units/acre)	30	40		35	18
Deficiency payment ($/unit)	0.28	0.11		0.67	1.03
Government payment ($/acre)	6.30	1.39		8.53	15.76
Other Income ($/acre)	0	0		0	0
I. TOTAL GROSS REVENUE ($/ACRE)	133.80	89.14		108.53	110.26
DIRECT PRODUCTION COSTS ($/ACRE)					
Materials					
Seeds					
Grain	14.85	7.50		10.00	8.25
Legumes					
Alfalfa					
Clover					
Fertilizers					
Anhydrous ammonia	7.83				
10-34-0	5.50				
18-46-0					
Fish oil with molasses					
Granulated phosphate					
Herbicides					
Twine					
Materials Sub-Total	28.18	7.50		10.00	8.25
Machinery operation costs	12.24	2.64		2.84	2.69
Trucking costs		9.75		7.50	4.50
Silage handling	7.50				
Crop insurance					
Labor charge	8.59	2.53		2.74	2.63
Custom hire					
Spraying					
Combining					
Baling					
Interest on operating capital	2.10	0.81		0.89	0.73
II. TOTAL DIRECT PRODUCTION COSTS	58.61	23.23		23.97	18.80
FIXED PRODUCTION COSTS ($/ACRE)					
Machinery ownership costs	32.35	12.29		13.86	13.22
Land cost	26.60	26.60		26.60	26.60
III. TOTAL FIXED PRODUCTION COSTS	58.95	38.89		40.46	39.82
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	117.56	62.12		64.43	58.62
PROFITABILITY SUMMARY					
Return over direct costs ($/acre)	75.19	65.91		84.56	91.46
Net return ($/acre)	16.24	27.02		44.10	51.64
Break-even prices ($/unit)					
With respect to direct costs	7.81	0.36		0.48	0.63
With respect to total costs	15.67	0.96		1.29	1.95
Net revenue, per average hypothetical acre in rotation, over:					
Direct costs			81.32		
Total costs except management			35.54		

MAINSTREAM FARM, NORTH CENTRAL REGION
CROP ROTATION BUDGET "B": 170 ACRES

	Spring wheat	Barley (alfalfa est)		Alfalfa (4 yr)	Alfalfa (break-up)	Native hay
CROP ROTATION ACREAGES	70	16		68	16	80
Gross revenue						
Estimated yield (units/acre)	30.0	50.0		4.0	3.0	2.0
Estimated selling price ($/unit)	3.15	2.00		55.00	55.00	40.00
Sale value ($/acre)	94.50	100.00		220.00	165.00	80.00
Government payments						
Base yield (units/acre)	18.0	35.0				
Deficiency payment ($/unit)	1.03	0.67				
Government payment ($/acre)	15.76	8.53				
Other income ($/acre)	0	0		0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	110.26	108.53		220.00	165.00	80.00
DIRECT PRODUCTION COSTS ($/ACRE)						
Materials						
Seeds						
Grain	8.25	7.50				
Legumes						
Alfalfa		15.50				
Clover						
Fertilizers						
Anhydrous ammonia						
10-34-0						
18-46-0						
Fish oil with molasses						
Granulated phosphate						
Herbicides						
Twine				2.20	1.47	0.98
Materials Sub-Total	8.25	23.00		2.20	1.47	0.98
Machinery operation costs	2.69	1.90		6.08	8.13	3.11
Trucking costs	4.50	7.50				
Silage handling						
Crop insurance						
Labor charge	2.63	1.92		9.45	11.42	4.81
Custom hire						
Spraying						
Combining						
Machinery rental						
Interest on operating capital	0.73	1.19		0.48	0.52	0.20
II. TOTAL DIRECT PRODUCTION COSTS	18.80	35.51		18.21	21.54	9.10
FIXED PRODUCTION COSTS ($/ACRE)						
Machinery ownership costs	13.22	11.13		21.68	26.91	11.26
Land cost	26.60	26.60		26.60	26.60	14.70
III. TOTAL FIXED PRODUCTION COSTS	39.82	37.73		48.28	53.51	25.96
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	58.62	73.24		66.49	75.05	35.06
PROFITABILITY SUMMARY						
Return over direct costs ($/acre)	91.46	73.02		201.79	143.46	70.90
Net return ($/acre)	51.64	35.29		153.51	89.95	44.94
Break-even prices ($/unit)						
With respect to direct costs	0.63	0.71		4.55	7.18	4.55
With respect to total costs	1.95	1.46		16.62	25.02	17.53
Net revenue, per average hypothetical acre in rotation, over:						
Direct costs			138.75			
Total costs except management			94.45			

NEAR-ORGANIC FARM, CENTRAL REGION
CROP ROTATION BUDGET "A": 275 ACRES

CROP ROTATION ACREAGES	Corn grain 100	Corn silage 25		Oat grain 115	Sorghum silage 35
Gross revenue					
Estimated yield (units/acre)	60.0	8.5		55.0	10.0
Estimated selling price ($/unit)	2.25	17.00		1.35	15.00
Estimated sale value ($/acre)	135.00	144.50		74.25	150.00
Government Payments					
Base yield (Units/acre)	43.0	43.0		42.0	
Deficiency payment ($/unit)	0.28	0.28		0.11	
Government payment ($/acre)	9.03	9.03		2.79	
Other Income ($/acre)	0	0		0	0
I. TOTAL GROSS REVENUE ($/ACRE)	144.03	153.53		77.04	150.00
DIRECT PRODUCTION COSTS ($/ACRE)					
Materials					
Seeds					
Grain	15.30	15.30		5.25	14.00
Legumes					
Alfalfa					
Clover					
Fertilizers					
Anydrous ammonia					
10-34-0					
18-46-0					
Fish oil with molasses	5.00	5.00			
Granulated phosphate					
Herbicides					
Twine					
Materials Sub-Total	20.30	20.30		5.25	14.00
Machinery operation costs	8.68	10.78		4.68	10.38
Trucking costs	9.00			8.25	10.00
Silage handling		8.50			
Crop insurance					
Labor charge	12.55	13.52		5.63	13.05
Custom hire					
Spraying					
Combining				14.00	
Machinery rental					
Baling					
Interest on operating capital	1.37	1.44		1.36	1.54
II. TOTAL DIRECT PRODUCTION COSTS	51.90	54.54		39.17	48.97
FIXED PRODUCTION COSTS ($/ACRE)					
Machinery ownership costs	37.74	45.78		20.39	43.99
Land cost	24.20	24.20		24.20	24.20
III. TOTAL FIXED PRODUCTION COSTS	61.94	69.98		44.59	68.19
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	113.84	124.52		83.76	117.16
PROFITABILITY SUMMARY					
Return over direct costs ($/acre)	92.13	98.99		37.87	101.03
Net return ($/acre)	30.19	29.01		(6.72)	32.84
Break-even prices ($/unit)					
With respect to direct costs	0.87	6.42		0.71	4.90
With respect to total costs	1.90	14.65		1.52	11.72
Net revenue, per average hypothetical acre in rotation, over:					
Direct costs			71.20		
Total costs except management			14.98		

NEAR-ORGANIC FARM, CENTRAL REGION
CROP ROTATION BUDGET "B": 135 ACRES

	Alfalfa establish	Alfalfa (10-15 yr)	Alfalfa (break-up)	Native hay
CROP ROTATION ACREAGES	11	113	11	70
Gross revenue				
Estimated yield (units/acre)	0	4.5	3.0	2.0
Estimated selling price ($/unit)	0	55.00	55.00	40.00
Estimated sale value	0	247.50	165.00	80.00
Government Payments				
Base yield (units/acre)				
Deficiency payment ($/unit)				
Government payment ($/acre)				
Other Income ($/acre)	0	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	0	247.50	165.00	80.00
DIRECT PRODUCTION COSTS ($/ACRE)				
Materials				
Seeds				
Grain				
Legumes				
Alfalfa	15.50			
Clover				
Fertilizers				
Anydrous ammonia				
10-34-0				
18-46-0				
Fish oil with molasses				
Granulated phosphate				
Herbicides				
Twine				
Materials Sub-Total	15.50	0	0	0
Machinery operation costs	1.58	12.49	7.09	5.00
Trucking costs				
Silage handling				
Crop insurance				
Labor charge	1.71	14.26	8.80	5.66
Custom hire				
Spraying				
Combining				
Machinery rental				
Baling		21.56	14.37	9.58
Interest on operating capital	0.87	1.30	1.02	0.72
II. TOTAL DIRECT PRODUCTION COSTS	19.66	49.61	31.28	20.96
FIXED PRODUCTION COSTS ($/ACRE)				
Machinery ownership costs	5.08	44.79	21.82	16.58
Land cost	24.20	24.20	24.20	16.40
III. TOTAL FIXED PRODUCTION COSTS	29.28	68.99	46.02	32.98
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	48.94	118.60	77.30	53.94
PROFITABILITY SUMMARY				
Return over direct costs ($/acre)	(19.66)	197.89	133.72	59.04
Net return ($/acre)	(48.94)	128.90	87.70	26.06
Break-even prices ($/unit)				
With respect to direct cost	n/a	11.02	10.43	10.48
With respect to total costs	n/a	26.36	25.77	26.97
Net revenue, per average hypothetical acre in rotation, over:				
Direct costs		174.94		
Total costs except management		111.05		

MAINSTREAM FARM, CENTRAL REGION
CROP ROTATION BUDGET "A": 340 ACRES

	Spring wheat	Corn grain	Soybeans
CROP ROTATION ACREAGES	230	85	25
Gross revenue			
Estimated yield (units/acre)	32.0	80.0	28.0
Estimated selling price ($/unit)	3.15	2.25	5.70
Sale value ($/acre)	100.80	180.00	159.60
Government Payments			
Base yield (units/acre)	30.0	48.0	
Deficiency payment ($/unit)	1.03	0.28	
Government payment ($/acre)	26.27	10.08	
Other income ($/acre)	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	127.07	190.08	159.60
DIRECT PRODUCTION COSTS ($/ACRE)			
Materials			
Seeds			
Grain	11.00	15.30	12.00
Legumes			
Alfalfa			
Clover			
Fertilizers			
Anhydrous ammonia			
10-34-0			
18-46-0	18.31	18.31	
Fish oil with molasses			
Granulated phosphate			
Herbicides		19.42	
Twine			
Materials Sub-Total	29.31	53.03	12.00
Machinery operation costs	3.77	7.39	3.22
Trucking costs	4.80	10.20	4.20
Silage handling			
Crop insurance	5.00	5.00	
Labor charge	4.73	12.19	5.76
Custom hire			
Spraying	5.50		8.50
Combining	14.00		15.50
Machinery rental			
Baling			
Interest on operating capital	2.95	3.47	1.87
II. TOTAL DIRECT PRODUCTION COSTS	70.06	91.28	51.05
FIXED PRODUCTION COSTS ($/ACRE)			
Machinery ownership costs	16.46	33.48	12.71
Land cost	24.20	24.20	24.20
III. TOTAL FIXED PRODUCTION COSTS	40.66	57.68	36.91
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	110.72	148.96	87.96
PROFITABILITY SUMMARY			
Return over direct costs ($/acre)	57.01	98.80	108.55
Net return ($/acre)	16.35	41.12	71.64
Break-even prices ($/unit)			
With respect to direct costs	2.19	1.14	1.82
With respect to total costs	3.46	1.86	3.14
Net revenue, per average hypothetical acre in rotation, over:			
Direct costs		71.25	
Total costs except management		26.61	

MAINSTREAM FARM, CENTRAL REGION
CROP ROTATION BUDGET "B": 190 ACRES

	Winter wheat	Corn grain	Oat grain
CROP ROTATION ACREAGES	100	35	55
Gross revenue			
Estimated yield (units/acre)	45.0	80.0	55.0
Estimated selling price ($/unit)	3.00	2.25	1.35
Sale value ($/acre)	135.00	180.00	74.25
Government Payments			
Base yield (units/acre)	30.0	48.0	43.0
Deficiency payment ($/unit)	1.03	0.28	0.11
Government payment ($/acre)	26.27	10.08	1.37
Other Income ($/acre)	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	161.27	190.08	75.62
DIRECT PRODUCTION COSTS ($/ACRE)			
Materials			
Seeds			
Grain	8.25	15.30	5.25
Legumes			
Alfalfa			
Clover			
Fertilizers			
Anhydrous ammonia			
10-34-0			
18-46-0		18.31	9.15
Fish oil with molasses			
Granulated phosphate			
Herbicides		19.42	
Twine			
Materials Sub-Total	8.25	53.03	14.40
Machinery operation costs	3.07	7.39	5.15
Trucking costs	6.75	10.20	8.25
Silage handling			
Crop insurance		5.00	
Labor charge	4.38	12.19	6.93
Custom hire			
Spraying			5.50
Combining	14.00		14.00
Machinery rental			
Baling			
Interest on operating capital	0.36	3.47	2.14
II. TOTAL DIRECT PRODUCTION COSTS	36.81	91.28	56.37
FIXED PRODUCTION COSTS ($/ACRE)			
Machinery ownership costs	13.78	33.48	21.95
Land cost	24.20	24.20	24.20
III. TOTAL FIXED PRODUCTION COSTS	37.98	57.68	46.15
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	74.79	148.96	102.52
PROFITABILITY SUMMARY			
Return over direct costs ($/acre)	124.46	98.80	19.25
Net return ($/acre)	86.48	41.12	(26.90)
Break-even prices ($/unit)			
With respect to direct costs	0.82	1.14	1.02
With respect to total costs	1.66	1.86	1.86
Net revenue, per average hypothetical acre in rotation, over:			
Direct costs		89.28	
Total costs except management		45.30	

MAINSTREAM FARM, CENTRAL REGION
CROP ROTATION BUDGET "C": 85 ACRES

	Oat grain (alfalfa est)	Alfalfa (5-7 yr)	Alfalfa (break-up)
CROP ROTATION ACREAGES	12	61	12
Gross revenue			
Estimated yield (units/acre)	55.0	4.0	3.0
Estimated selling price ($/unit)	1.35	55.00	55.00
Sale value ($/acre)	74.25	220.00	165.00
Government Payments			
Base yield (units/acre)	43.0		
Deficiency payment ($/unit)	0.11		
Government payment ($/acre)	1.37		
Other Income ($/acre)	0	0	0
I. TOTAL GROSS REVENUE ($/ACRE)	75.62	220.00	165.00
DIRECT PRODUCTION COSTS ($/ACRE)			
Materials			
Seeds			
Grain	5.25		
Legumes			
Alfalfa	15.50		
Clover			
Fertilizers			
Anhydrous ammonia			
10-14-0			
18-46-0	9.15		
Fish oil with molasses			
Granulated phosphate			
Herbicides			
Twine		1.96	1.47
Materials Sub-Total	29.90	1.96	1.47
Machinery operation costs	3.32	15.41	12.69
Trucking costs	8.25		
Silage handling			
Crop insurance			
Labor charge	4.74	23.64	19.35
Custom hire			
Spraying			
Combining	14.00		
Machinery rental			
Baling			
Interest on operating capital	2.55	1.28	1.12
II. TOTAL DIRECT PRODUCTION COSTS	62.76	42.29	34.63
FIXED PRODUCTION COSTS ($/ACRE)			
Machinery ownership costs	16.34	54.87	43.63
Land cost	24.20	24.20	24.20
III. TOTAL FIXED PRODUCTION COSTS	40.54	79.07	67.83
IV. TOTAL DIRECT & FIXED PRODUCTION COSTS	103.30	121.36	102.46
PROFITABILITY SUMMARY			
Return over direct costs ($/acre)	12.86	177.71	130.37
Net return ($/acre)	(27.68)	98.64	62.54
Break-even prices ($/unit)			
With respect to direct costs	1.14	10.57	11.54
With respect to total costs	1.88	30.34	34.15
Net revenue, per average hypothetical acre in rotation, over:			
Direct costs		147.75	
Total costs except management		75.71	

ANNEX B

FARM MACHINERY USED BY MATCHING PAIRS OF
NEAR-ORGANIC AND MAINSTREAM CASE FARMERS

	Northwest		South Central		North Central		Central	
Farm machinery item	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
Land preparation								
Moldboard plow 5-16"					1	1		1
Moldboard plow 4-16"	1							
Offset disk 16'			1					
Offset disk 14'	1	1						
Tandem disk 24'					1			
Tandem disk 20'				1			1	1
Field cultivator 24'								1
Field cultivator 18'							1	
Field cultivator 12'		1						
Chisel plow 29'				1				
Chisel plow 24'						1		
Chisel plow 20'		1	1					
Chisel plow 17'								1
Chisel plow 15'							1	
Nobel blade 16'				1				
Blade	1		1					
V-ripper 25" O.C. 14					1			
Springtooth drag 30'								1
Fertilizer spreader 40'								1
Planting								
Planter 8-36"						1		
Planter 8-34"					1			
Planter 6-36'							1	
Planter 4-38"	1							1
Planter 4-36"				1				
Grain drill 28'			1			1		
Grain drill 16'	1	1		1	1			1
Grain drill 14'								1
Air seeder (alfalfa) 40'							1	

Farm machinery item	Northwest Near-organic	Northwest Main-stream	South Central Near-organic	South Central Main-stream	North Central Near-organic	North Central Main-stream	Central Near-organic	Central Main-stream
Weed control								
Cultivator 8-36"						1		
Cultivator 8-34"					1			
Cultivator 6-36"							1	
Cultivator 4-38"	1							1
Cultivator 4-36"				1				
Rotary hoe 18'							1	
Sprayer, pull 30'								1
Grain harvest								
Combine large				1		1		
Combine medium	1		1[a]	1[a]				
Combine small					1			1
Corn picker 2 row							1	1
Silage harvest and storage								
Forage harvester 2 row	1				1	1	1	
Hay harvest								
Hay swather, SP 20'			1			1		
Hay swather, SP 18'	1	1			1			
Hay swather, SP 15'			1					1
Hay swather with cond, SP 15'							1	
Hay swather with cond, pull 14'				1				
Hay swather, with cond, pull 12'	1							
Rake, V wheel			1	1				
Rake (Hyd) 9'							1	
Hay baler	1	1	1	1	1	1		1
Hay hauler	1	1	1	1	1	1	1	1

[a]This combine is also used for harvesting alfalfa seed.

ANNEX C

BALANCING DEMANDS BY LIVESTOCK FOR FEEDSTUFFS WITH THE SUPPLIES OF FEEDSTUFFS PRODUCED ON CASE FARMS

In this annex, procedures are explained for matching (1) the total digestible nutrient (TDN) energy and protein requirements of individual case farm herds with (2) the TDN and protein contained in various feedstuffs raised on the case farms, plus possible purchased protein supplement. The first step was to determine amounts of TDN and energy required by various types of cattle at various stages in their productive cycles. Second, the TDN and protein composition of various feedstuffs was determined. Third, decisions were made on particular feedstuffs which should be assumed to be used to satisfy each category of cattle nutrient requirement. Resulting from these efforts was a determination of the amounts of each feedstuff produced by each case farmer that should be assumed to be fed to the farmer's livestock; residual amounts were assumed to be sold.

Demands for TDN and protein

Annual TDN and protein requirements for various types of cattle in the herd of each case farmer were determined according to (a) weight of mature breeding cattle and average weight over the feeding period for growing cattle (Table 31), (b) rate of gain, and (c) numbers of days on feed for each producer's mature brood cows, herd sires, replacement heifers, backgrounded steers, and finishing steers. Daily nutrient requirements for various types of cattle were extracted from NRC (1984, pp 77-85) as follows:

* Mature brood cows: (a) "cows nursing calves--average milking ability," from calving to weaning (days farmer-specific; see Table 32 for weaning ages); (b) "dry pregnant mature cows--middle third of pregnancy," from weaning until the 274th day of the cattle production year (days farmer-specific); and (c) "dry pregnant cows--last third of pregnancy" for the final 91 days of cattle production year;

* Herd sires: "bulls, maintenance and slow rate of growth (regain body condition)," with zero lb/day gain, for 365 days;

* Replacement heifers: "medium-frame heifer calves" for all case farms except the North Central Region near-organic farm which has "large-frame heifer calves," with three periods of feeding--(a) weaning to breeding at 15 months (days farmer-specific), (b) 183 days from breeding to completion of two-thirds of pregnancy, and (c) 91 days for "pregnant yearling heifers--last third of pregnancy;

* Backgrounded cattle: medium- and large-frame steers and heifers as above for replacement heifers, 90 day feeding period, 2.0 lb/day rate of gain for medium-frame cattle and 2.5 lb/day for large-frame cattle; and

* Finishing cattle: "medium-frame steers," 1.46 lb/day rate of gain for 515 days.

The total annual demand for TDN for cattle in the herds of the case farmers was determined to range from 95 tons (190.8 thousand lb) to 673 tons (1,345.9 thousand lb) and average 337 tons/herd (Annex Table C.1). Protein demand ranges from 14 tons (28.5 thousand lb) to 103 tons (205.9 thousand lb) and averages 51 tons/herd. As a point of comparison, the average total production of TDN on the case farms is 830 tons, which is nearly 2.5 times the amount of TDN required by the cattle on case farms.

Supplies of TDN and protein

The above demands for TDN and protein were assumed to be met through TDN and protein provided by home-raised feedstuffs, plus possible purchased protein supplement. The TDN and protein contents of all feedstuffs except pasture and grazed corn stalks were taken from NRC (1984, pp 47-84). Pounds of nutrients "produced" shown in Annex Table C.2 are based on (i) percentages of dry matter, TDN, and protein contained in various feedstuffs and (ii) pounds per unit for the respective feedstuffs. The per-bushel weights of various grains are as follows: corn 56 lb, oats 38 lb, and sorghum 56 lb. Taking into account assumed storage, shrinkage, and feeding losses of 25% for hay, 20% for silage, and 5% for grain (Taylor et al., 1990, p 7), the pounds of nutrients "available for consumption" by livestock are also shown in the table.

The nutrient contents of pasture shown in the above table were determined through the following procedure. Pasture production was initially measured by the estimated number of "animal unit months" (AUMs) that could be supported by the pasture acreages for the respective case farms. Level of pasture production was assumed to depend on average annual precipitation and pasture condition ("excellent," "good," "fair," or "poor") (Lamp et al., 1989, p 33). Average monthly precipitation data for 1961-90 for the weather station closest to each pair of case farms were obtained from the Office of Climate and Weather Information in the Agricultural Engineering Department at SDSU.[1] Annual totals were calculated (Annex Table C.3, Column 2).

Traditionally, the Society of Range Management has defined "animal unit months" (AUMs) as the amount of feed or forage required by a mature 1,000 lb cow for one month; this amount is 600 lb of feed/forage (Holechek et al., 1989, p 173). Based on a table of pasture production rates in Lamp et al. (1989, p 33) and (1) taking into account annual levels of precipitation in the region of each pair of case farms and (2) assuming "fair" to "good" pasture conditions, the "traditional" AUMs per acre shown in Column 3 were determined. Pastures were assumed to be "fair" to "good" to help insure that the appraisal of pasture productivity would be conservative.

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[1]The weather stations are as follows: McIntosh for Northwest Region, Cedar Butte for South Central Region, Ipswich for North Central Region, and Huron for Central Region.

Because beef cows over the past 2-3 decades have become generally larger-framed and heavier, "traditional" AUMs are now being redefined to represent the feed required by 1,200 lb cows (personal communication, April 14, 1995, Patricia S. Johnson, SDSU Range Management Specialist). Over the course of a year, a 1,200 lb mature producing cow requires about 12.5% more feed than a 1,000 lb cow (NRC, 1984, pp 84-85). To reflect the feed needs of "modern" larger cows, "traditional" AUMs/acre were down-sized by 12.5% (Column 4).

By multiplying the "modern" AUMs per acre by the numbers of acres of pasture (Column 5) for the respective case farmers, total levels of AUM production from pasture for each farmer were calculated (Column 6). To convert pasture AUMs to TDN, I assumed that 1.0 AUM was equivalent to 0.33 ton of grass hay (Lamp et al., 1989, p 34). Taking into account the percentages of dry matter, TDN, and protein in "prairie plants, Midwest, hay, sun-cured" reported in NRC (1984, p 54) and judgment of concerned scientists, it was decided to assume that one AUM of pasture provides 320 lb of TDN and 36 lb of protein. Cattle were assumed to derive one AUM of feed value from grazing one acre of corn stalks (Taylor et al., 1990 p 6).

Matching demands and supplies of TDN and protein

Case farmers were asked whether they conditioned cows with protein supplement at the time of breeding and/or calving. Those who followed this practice were assumed to feed soybean oil meal at the following rates per cow: at time of breeding 35 lb and at time of calving 50 lb. Farmers reported use of protein supplements as follows:

* At time of breeding: South Central Region mainstream, North Central Region near-organic, and Central Region near-organic and mainstream; and

* At time of calving: Northwest Region near-organic and mainstream, South Central Region mainstream, North Central Region near-organic, and Central Region near-organic.

Energy and protein needs of replacement heifers, backgrounded cattle, and finishing cattle--during their respective periods of feeding--were met with the following per-head amounts of TDN and protein supplied by home-raised grains, alfalfa, and/or soybean oil meal (Pflueger et al., 1991, p 6, 10, and 14; Taylor and Wagner, 1991, pp 24-25):

* Replacement heifers: 915 lb TDN and 165 lb protein;

* Backgrounded cattle: 410 lb TDN and 60 lb protein; and

* Finishing cattle: 3,240 lb TDN and 415 lb protein.

Other nutrient needs of growing and finishing cattle were assumed to be met by alfalfa. The following special consideration was given to determining the above TDN and protein requirements for finishing cattle for the Central Region near-organic farm. In the Taylor and

Wagner study of feedlot cattle in South Dakota, the average percentages of grain--relative to total dry matter--in the diets of backgrounding and finishing cattle averaging to gain 2.36 lb/day and 3.05 lb/day were 39% and 80%, respectively. Since finishing steers on the case farm in this study gain an average of only 1.46 lb/day, only 50% of the total nutritional needs were assumed to be met through grain.

Replacement heifers were assumed to be on pasture for 183 days, during the period immediately after their being bred. Mature cows and herd sires were assumed to graze on pasture as long as pasture production of the respective case farmers was adequate, but for no more than the following:

* North Central Region near-organic and mainstream farms: 215 and 185 days, respectively;

* Central Region near-organic and mainstream farms: 210 and 180 days, respectively; and

* West River farms: 9.5 months.

The maximum grazing periods for East River farms were the grazing periods reported by the respective farmers. The reported grazing periods for the West River farmers were only 6-7 months. Since the normal grazing period in the West is generally longer, I followed the 9.5 month maximum established in prior research (Taylor et al., 1990, p 28). If protein needs were not met through the protein contained in grazed pasture resources, those unmet needs were provided through supplemental feeding of alfalfa. If the nutrients provided by a case farmer's pasture resources were not totally used by his herd within the maximum stipulated grazing period, he was assumed to rent out the "surplus" pasture.[2]

In balancing supply and demand of various feedstuffs, cattle nutrient needs remaining after exhaustion of grazing resources and/or the maximum grazing period were assumed to be met first by corn and/or sorghum sudan silage and then by various types of hays. Unless cattle protein needs were unfulfilled with native hay, millet hay, and oat hay, the supplies of these hays were used up before alfalfa hay was assumed to be used. Any protein deficits remaining after use of the above procedures were assumed to be met by soybean oil meal.

The amounts of home-raised feedstuffs and soybean oil meal consumed by the individual cattle enterprises on each case farm are shown in the beef cattle budgets contained in Annex E. The amounts of home-raised feedstuffs consumed by all livestock enterprises collectively, in relation to the total amount produced on each farm, are shown on p 2 of each case farmer's whole-farm summary analysis contained in Annex G.

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[2]In the whole-farm economic analysis, attention was given to neither ownership costs nor rental receipts from surplus rented-out pasture, since ownership costs were assumed to be identical with rental receipts.

Annex Table C.1. Total demand for TDN and protein for cattle, matching pairs of near-organic and mainstream farms.

Nutrient and type of cattle	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
	(thousands of pounds)							
Total digesible nutrients								
Brood cows								
Nursing calves	300.5	327.2	106.3	324.4	683.8	560.1	139.0	74.5
Middle 1/3 pregnancy	119.9	73.9	24.0	98.3	71.0	57.6	31.4	29.7
Last 1/3 pregnancy	138.5	128.9	41.9	137.4	239.6	195.7	54.8	34.4
Herd sires	20.4	25.6	5.1	33.3	49.9	54.4	21.3	10.6
Replacement heifers								
Weaning to breeding	61.7	56.9	33.0	42.9	84.8	81.1	23.7	18.8
Middle 1/3 pregnancy	49.7	48.9	31.9	33.1	89.3	88.6	20.9	15.2
Last 1/3 pregnancy	24.4	24.0	15.7	13.9	44.2	49.1	10.4	7.6
Backgrounded cattle	13.5	20.3	4.2	n/a	83.3	n/a	n/a	n/a
Finished cattle	n/a	n/a	n/a	n/a	n/a	n/a	84.2	n/a
Herd total	728.6	705.7	262.1	683.3	1,345.9	1,086.6	385.7	190.8
Protein								
Brood cows								
Nursing calves	49.3	53.7	17.5	53.2	112.3	91.9	22.8	12.2
Middle 1/3 pregnancy	16.6	10.2	3.3	13.6	10.0	8.0	4.4	4.1
Last 1/3 pregnancy	20.0	18.6	6.0	19.8	34.8	28.2	7.9	4.9
Herd sires	2.9	3.7	0.7	4.6	6.9	7.5	2.9	1.5
Replacement heifers								
Weaning to breeding	8.4	7.7	4.5	5.9	11.5	11.2	3.3	2.7
Middle 1/3 pregnancy	6.5	6.3	4.0	4.3	11.1	11.2	2.7	2.0
Last 1/3 pregnancy	3.5	3.5	2.3	2.0	6.3	6.9	1.5	1.1
Backgrounded cattle	2.1	2.8	0.6	n/a	13.0	n/a	n/a	n/a
Finished cattle	n/a	n/a	n/a	n/a	n/a	n/a	10.7	n/a
Herd total	109.3	106.5	38.9	103.4	205.9	164.9	56.2	28.5

Annex Table C.2. Assumed TDN and protein content of livestock feedstuffs.

		Pounds of nutrients			
		Produced[a]		Available for consumption[b]	
Feedstuff	Unit	TDN	Protein	TDN	Protein
Forages					
Alfalfa hay	ton	1,044	307	783	230
Alfalfa/grass hay	ton	1,008	263	756	197
Millet hay	ton	1,027	149	770	112
Native hay	ton	939	107	704	80
Oat hay	ton	1,001	169	751	127
Corn silage	ton	462	54	370	43
Sorghum silage	ton	330	65	264	52
Pasture	AUM	320	36	320	36
Grazed corn stalks	acre	320	36	320	36
Grains					
Corn	bu	44.3	4.9	42.1	4.7
Oats	bu	26.0	4.5	24.7	4.3
Sorghum	bu	40.9	4.9	38.9	4.7
Soybean oil meal	ton	1,495	888	1,495	888

Annex Table C.3. Determination of pasture production for case farms, by region.

Region	1961-90 average annual precipitation (in)	"Traditional" AUMs per acre	"Modern" AUMs per acre	Acres of pasture	Total AUM production
(1)	(2)	(3)	(4)	(5)	(6)
Northwest					
Near-organic	16.5	0.55	0.481	1,703	819
Mainstream	16.5	0.55	0.481	2,839	1,366
South Central					
Near-organic	18.1	0.70	0.613	1,007	617
Mainstream	18.1	0.70	0.613	2,480	1,520
North Central					
Near-organic	18.7	0.70	0.613	1,460	895
Mainstream	18.7	0.70	0.613	1,215	745
Central					
Near-organic	20.1	0.80	0.700	220	154
Mainstream	20.1	0.80	0.700	315	221

ANNEX D

CATTLE MANAGEMENT PRACTICES NEAR-ORGANIC AND MAINSTREAM CASE FARMS

BREEDING MANAGEMENT PRACTICES

	Northwest		South Central		North Central		Central	
	Near-organic	Mainstream	Near-organic	Mainstream	Near-organic	Mainstream	Near-organic	Mainstream
1. Use EPD (expected progeny difference) information in selecting herd sires to mate to individual mature cows?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
2. In selecting herd sires, weight (on a scale from 0 to 10) given to each of the following EPD criteria?								
Birth weight/calving ease	8	8	10	6	9[1]	10	n/a	10
Weaning weight	10	9	8	10	8	10	n/a	9
Yearling weight	5	7	8	10	8	0	n/a	5
Maternal milk (bull's daughters' calves: milking ability)	8	9	6	9	8	8	n/a	8
Total maternal (bull's daughters' calves: weaning weight)	8	7	8	9	8	5	n/a	6
Carcass criteria (e.g., marbling, rib eye, carcass weight)	5	5	8	8	7	0	n/a	7
3. In selecting herd sires, weight (on a scale from 0 to 10) given to each of the following additional criteria?								
Transmitting milk production to daughters	10	10	8	9	7	8	10	8
High calf weaning weights	10	10	8	10	10	10	9	8
Sound feet and legs	5	9	10	10	8	10	8	6
"Correct" body confirmation	5	8	10	10	10	10	8	6
Disease resistance	8	5	8	5	2	10	9	7
Other reproductive features (e.g., pelvic measurement, scrotal circumference)	1	9	8	5	6	8	9	5
Efficient feedstuff utilization	1	5	8	4	5	5	9	7
Temperament	10	10	10	6	4	10	10	7
Other: Polled sire selections	8	n/a	n/a	n/a	n/a	n/a	n/a[2]	n/a
4. Breeding management practices followed?								
Fertility test bulls	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Pregnancy test cows	No	Yes	Yes	Yes	No	Yes	Yes	No
Check pelvic measurements on first-calf replacement heifers	No	No	Yes	No	No	No	No	No
Use hormones to control breeding seasons:								
First-calf replacement heifers	Yes	No	No	No	No	Yes	No	No
Mature brood cows	No	No	No	No	No	No	No	No
Production test cows	No	Yes	No	No	Yes	No	No	No
5. Use artificial insemination (AI)?	Yes	No	No	No	No	No	Yes	Yes
6. Use AI with what type of cows?								
First-calf heifers	Yes	n/a	n/a	n/a	n/a	n/a	Yes	Yes
Most productive mature cows	No	n/a	n/a	n/a	n/a	n/a	Yes	No

[1]Nine for heifers, 2 for cows.

[2]Calving ease = 10

7. Reasons for using artificial insemination?								
Help ensure calving ease with first-calf heifers	Yes	n/a	n/a	n/a	n/a	n/a	Yes	Yes
Correct weaknesses of certain cows	No	n/a	n/a	n/a	n/a	n/a	No	No
Cheaper than owning herd sires	Yes	n/a	n/a	n/a	n/a	n/a	No	No
Other: Enable early synchronization of first-calf heifers	Yes	n/a	n/a	n/a	n/a	n/a	No	No
Other: Take advantage of semen from top bulls	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Yes
8. Typical breeding seasons?								
First-calf replacement heifers								
Beginning date	6-1	5-15	5-21	6-1	6-20	6-10	5-15	5-28
Number of days	61	87	92	68	61	80	120	125
Second-calf replacement heifers and mature brood cows								
Beginning date	6-10	5-25	5-21	6-24	6-20	6-10	5-15	6-17
Number of days	61	77	92	44	61	80	120	197

COW-CALF MANAGEMENT PRACTICES

	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
1. Practices to improve cows' body condition prior to breeding?								
Place cows in fresh pastures	Yes	Yes	Yes	No	No	No	Yes	No
Feed cows grain	No	No	No	Yes	Yes	No	Yes	Yes
Control for worms	No	No	No	No	No	No	No	Yes
Use protein supplements	No	Yes	No	Yes	Yes	No	Yes	Yes
Use antibiotics	No	No	No	No	Yes	No	No	Yes
Use vitamin supplements	No	Yes	Yes	Yes	No	No	Yes	Yes
Use mineral supplements	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
2. Practices to improve cows' body condition at calving?								
Place cows in fresh pastures	No	No	No	No	No	No	Yes	Yes
Feed cows grain	No	No	No	Yes	Yes	No	Yes	No
Control for worms	No	No	No	No	No	No	No	No
Use protein supplements	Yes	Yes	No	Yes	Yes	No	Yes	No
Use antibiotics	No	No	No	No	Yes	No	No	No
Use vitamin supplements	Yes	Yes	No	Yes	No	No	Yes	No
Use mineral supplements	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Other: Use lice control	Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3. Main strategies to help ensure birth and survival of live baby calves?								
Place groups of heavy springing cows in separate pastures	No	Yes	No	Yes	Yes	Yes	No	Yes
Place groups of heavy springing cows under covered maternity areas	No	No	No	No	No	No	No	No
Place "problem-prone" cows in individual maternity pens	No	Yes	No	No	No	No	No	No
Observe heavy springing cows several times each day	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other: Calve in small lots to facilitate observation	n/a	Yes	n/a	n/a	n/a	n/a	n/a	n/a
Other: Provide covered shelter, in case of bad storm	n/a	n/a	Yes	n/a	n/a	n/a	n/a	n/a
Other: Use excess straw bales for bedding	n/a	n/a	Yes	n/a	n/a	n/a	n/a	n/a
4. Practices for handling cows whose calves die?								
Retain cow in herd with no calf until next season	Yes[3]	Yes[4]	Yes[5]	No	Yes[6]	Yes[7]	No	No
Re-breed cow and sell her for breeding	No	No	No	No	No	No	No	No
Replace dead calf with orphan calf	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Cull cow immediately	Yes	No	No	No	Yes	Yes[8]	Yes	No
Cull cow after conditioning	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

[3]Yes, depending on age of cow.

[4]Yes, if the calf dies after June 15th.

[5]Only for cows under 4 years of age.

[6]Yes, if the cow is young.

[7]If the cow is young or if it wasn't "the cow's fault."

5. Percent of calves born during first:								
21 days of calving season?	29	75	60	83	73	66	18	16
42 days of calving season?	66	100	98	96	91	93	36	100
63 days of calving season?	86	100	100	99	95	98	72	100
6. Individually identify calves via:								
Ear tags?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ear tattoos?	Yes	No	No	No	No	No	No	No
7. Creep feed calves?	Never	Some-times	Some-times	Never	Some-times	Never	Never	Some-times
8. Reasons for sometimes or always creep feeding?								
Pastures are short	n/a	Yes	No	n/a	Yes	n/a	n/a	Yes
Cows are run-down in condition	n/a	No	No	n/a	No	n/a	n/a	Yes
Market price of home-grown possible creep feed is unusually low	n/a	No	Yes	n/a	No	n/a	n/a	No
Prepare calves for post-weaning transition	No	No	No	No	No	No	No	Yes
Other: Obtain additional gain on calves	n/a	n/a	Yes	n/a	n/a	n/a	n/a	n/a
9. Type of creep feed used?								
Home-raised feeds	n/a	No	Yes	n/a	Yes	n/a	n/a	No
Purchased complete creep feed	n/a	Yes	No	n/a	No	n/a	n/a	Yes
10. Reasons for not creep feeding?								
Doesn't pay	Yes	n/a	n/a	Yes	n/a	No	No	n/a
Rates of gain after weaning will be lower	No	n/a	n/a	No	n/a	No	No	n/a
Other: Too time-consuming to move feeder	n/a	n/a	n/a	n/a	n/a	Yes	No	n/a
Other: Doesn't have necessary equipment	n/a	n/a	n/a	n/a	n/a	No	Yes	n/a
11. Dehorn calves?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age at dehorning?	Birth	2-4 wk	5 mo	7 wk	1 day	1 day	8 mo	6 mo
Method of dehorning?	Paste	Hot iron	Hot iron	Hot iron	Puddex	Hot iron	Dehorn spoon	Saw
12. Castrate calves?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age at castrating?	Birth	2-4 wk	5 mo	7 wk	1 day	2-3 mo	8 mo	6 mo
Method of castrating?	Elas-trator	Cut-ting	Cut-ting	Cut-ting	Elas-trator	Cut-ting	Cut-ting	Cut-ting
13. Brand calves?	Yes	Yes	Yes	Yes	No	No[9]	Yes	Yes
Age at branding?	2 mo	2-4 wk	5 mo	7 wk	n/a	n/a	3 mo	6 mo
Method of branding?	Hot iron	Hot iron	Hot iron	Hot iron	n/a	n/a	Hot iron[10]	Hot iron[11]

[8]If the cow is "old."

[9]Except replacement heifers which are both hot iron and freeze branded.

[10]Also freeze brands yearling heifers.

[11]Freeze brands his replacement heifers at 10 months.

HERD HEALTH MANAGEMENT PRACTICES

	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
1. Incidence of using vaccinations and other production tools: "Reg" = regularly; "Som_a" = some, but not all cattle in particular years; "Som_b" = some years, but not in others; "Nev" = never?								
Brucellosis vaccination	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg
Blackleg vaccination	Reg	Reg	Reg	Reg	Reg	Reg	Som_a	Reg
IBR-BVD-PI^3 vaccination	Som_b	Reg	Reg	Reg	Reg	Reg	Reg	Reg
Calf scours vaccination	Nev	Som_a	Nev	Nev	Nev	Reg	Reg	Nev
Insecticides/fumigants								
Ear tags	Nev	Som_a	Reg	Som_b	Reg	Nev	Nev	Nev
Dusters	Nev	Nev	Nev	Som_b	Nev	Nev	Nev	Nev
Rabon	Nev	Nev	Nev	Nev	Nev	Nev	Nev	Nev
Other: Spray	n/a	Reg	n/a	n/a	n/a	n/a	n/a	n/a
Other: Back oil (Permectrin II)	n/a	n/a	n/a	n/a	n/a	Reg	n/a	n/a
Parasiticides								
Internal	Nev	Som_b	Nev	Nev	Nev	Reg	Nev	Reg
External	Som_b	Reg	Nev	Nev	Reg	Reg	Nev	Reg
Other: Overeating shots	n/a	Reg	n/a	n/a	n/a	n/a	n/a	n/a
2. Use antibiotics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes[12]	Yes
Treat specific sicknesses/injuries that arise with individual animals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subtherapeutically (routinely) at low levels in creep feed	No	Yes	No	No	No	No	No	No
With groups of animals at particular times (e.g., calves at weaning, cows under stress)	No	Yes	Yes[13]	Yes[13]	No	No	No	No

[12] As a "last resort."

[13] "If infection is evident."

3. Relative importance, on a scale of 0 to 10, of following measures to promote herd health and minimize cattle injury

Provide sound nutrition	10	10	10	10	10	10	10	10
Take special care when handling cattle	2	10	8	8	10	10	9	10
Provide wind protection during winter	8	10	10	10	10	10	9	10
Provide shade for protection from summer heat	2	1	8	6	5	0	4	10
Provide plenty of room for cattle	2	5	10	5	10	10	10	10
Provide plenty of good quality water to cattle	10	10	10	10	10	10	9	10
Provide dry, bedded loafing areas	8	3	8	6	7	10	10	10
Stay away from high birth-weight bulls	8	10	10	8	9	10	10	10
Have a strong vaccination program	5	9	8	5	10	10	9	10
Have a strong program for controlling insects and parasites	5	10	8	6	10	10	5	10
Continuously monitor the condition of cows and calves	5	9	10	8	10	10	10	10
Regularly rotate pens and pastures	5	9	10	8	9	10	5	10
Select breeds that are disease resistant	8	0	10	5	8	10	9	0
Provide separate facilities for sick/injured cattle	5	10	10	2	10	10	9	10
Use non-conventional treatments (e.g., "holistic" methods, homeopathy)	0	0	6	2	1	0	10	0
Other: Survival of the fittest	8	n/a	n/a	n/a	n/a	n/a	n/a	n/a

4. Special care and/or facilities provided to:

First-calf heifers	Yes	Yes	No	Yes	No	Yes	No	Yes
Second-calf heifers	Some-times	Some-times	No	No	No	No	No	No

	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
1. Percentages of beef cow herd's annual water needs met from the following sources:								
Groundwater?	50	20	50	50	67	0	0	75
Natural or man-made ponds?	50	80	40	0	33	Summer	0	0
Rivers, creeks?	0	0	10	0	0	0	0	0
Natural springs, artesian wells?	0	0	0	50	0	Winter	100	25
Lakes?	0	0	0	0	0	Summer	0	0
2. Pumping required to lift/transport water from its source to drinking points?	Yes	Yes	Yes	Yes	Yes	No	No	Yes
3. Pumping required for:								
Lifting water from its source to a drinking point at a higher elevation? If so, number of feet of lift?	No	150	30	30	60	n/a	n/a	200
Transporting water a "short distance" from its source to a drinking point?	Yes	No	Yes	No	No	n/a	n/a	No
Transporting water a "long distance" from its source to a drinking point where the cattle are pastured? If so, over what distance (feet)?	No	No	1,300	1,000	No	n/a	n/a	No
4. Source of energy for lifting/transporting water?								
Conventional energy (e.g., diesel, electricity)	Yes	Yes	Yes	No	Yes	n/a	n/a	Yes
Windmills	No	Yes	No	Yes	No	n/a	n/a	No
Artesian pressure	No	No	No	Yes	No	Yes	Yes	Yes
5. Access of beef cow herd to its main water source(s)?								
Direct from natural water supply (e.g., cattle drink directly from a pond, river, artesian water source)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
From a drinking fountain or tank supplied with water	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
6. Experience drinking water quantity problems under following conditions?								
Years of below-average (e.g., worst 2 of 10 years) precipitation and water run-off	No	Yes	No	No	No	No	No	No
An average year of precipitation and water run-off	No	No	No	No	No	No	No	No
7. Currently experiencing drinking water quality problems?	No	No	No	No	No	No	Yes	No
Salinity	n/a	n/a	n/a	n/a	n/a	n/a	No	n/a
Sodium	n/a	n/a	n/a	n/a	n/a	n/a	Yes	n/a
Bacteria	n/a	n/a	n/a	n/a	n/a	n/a	No	n/a
Phosphate	n/a	n/a	n/a	n/a	n/a	n/a	No	n/a
Nitrate	n/a	n/a	n/a	n/a	n/a	n/a	No	n/a
Sulfate	n/a	n/a	n/a	n/a	n/a	n/a	Yes	n/a
8. Experienced drinking water quality problems in the past?	Sometimes	Sometimes	Yes	No	Yes	No	n/a	Yes

	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
1. Manure spread on farmland? If so, in what form?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Solid raw, spread "immediately" after being scraped	Yes	No	No	n/a	No	No	Yes	No
Solid raw, after being stacked for several weeks/months	No	Yes	No	n/a	Yes	Yes	Yes	Yes
Solid composted manure	No	No	Yes	n/a	No	No	No	No
Run-off holding pond/lagoon	No	No	No	n/a	No	No	No	No
2. Use different manure application rates with different types of farmland? If so, why?	No	Yes	No	n/a	Yes	No	Yes	No
Some fields are closer than others to the manure source	n/a	Yes	n/a	n/a	No	n/a	Yes	n/a
Apply heavier applications to cropland than pasture land	n/a	No	n/a	n/a	No	n/a	No	n/a
Soil fertility needs of certain fields can be more fully met with livestock manure than purchased fertilizer	n/a	No	n/a	n/a	Yes	n/a	No	n/a
Certain fields seem to respond more favorably to livestock manure than others	n/a	No	n/a	n/a	No	n/a	No	n/a
Other: Hill-tops to prevent erosion	n/a	Yes	n/a	n/a	n/a	n/a	n/a	n/a
3. Any manure produced that remains unused?	No	No	No	No	No	No	Yes[14]	No
4. Point of view about manure?								
A resource, with benefits which more than offset the effort and expense required to handle it	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Something with a value roughly commensurate with the effort and expense required to handle it	Yes	No	No	No	No	Yes	No	No
A waste product, which somehow has to be disposed of	No	No	No	No	No	No	No	No

[14] If a wet fall season, may push manure up to form a ridge which serves as a cattle windbreak.

GRAZING MANAGEMENT PRACTICES

	Northwest		South Central		North Central		Central	
	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream	Near-organic	Main-stream
1. Main grazing management system?								
Continuous grazing: Graze particular pastures throughout the grazing season year after year	Yes	No	No	Yes	No	Yes	Yes	No
Deferred rotation: Among 3-5 pastures over 3-5 years, each year allow a different one to rest idle during a critical time period, e.g., early summer to allow warm season grasses to become well established	No	Yes	Yes	No	Yes	No	No	No
Rotational deferment: Divide one pasture into several sub-parts and rotate graze among the sub-parts 1-3 times within a year	No	No	No	No	Yes	No	No	No
Complimentary rotation: Rotate grazing between improved pasture and native range	No	No	Yes	No	Yes	No	No	Yes
Short-duration grazing: Divide single grazing management units into several small parcels, grazing each in rotation for 3-8 days at a time	No	No	No	No	Yes	No	No	No
2. Pasture stocking rates based primarily on:								
Soil Conservation Service (now NRCS) rates?	No	No	No	Yes	No	No	No	Yes
Other organizational standards?	No	No	No	No	No	No	No	No
Grazing management system followed	No	No	No	No	No	No	No	No
Periodic assessment of grazing materials present in pastures?	No	Yes	Yes	No	Yes	Yes	No	No
Personal experience over time?	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Other: "Standard" rate for this area?	Yes	n/a	n/a	Yes	n/a	n/a	n/a	n/a

ANNEX E

BEEF CATTLE BUDGETS: NEAR-ORGANIC AND MAINSTREAM CASE FARMS

"NEAR-ORGANIC" FARM, NORTHWEST REGION
BEEF CATTLE BUDGETS FOR 1993

	Cow-calf enterprise (129 cows)		Backgrounding enterprise (14 steers)	
Gross revenue	Per animal	Cow-calf enterprise	Per steer	Backgrounding enterprise
57 steer calves (555 lb)	$ 547.22	$31,192	n/a	n/a
32 heifer calves (525 lb)	489.30	15,658	n/a	n/a
23 cull cows (1,200 lb)	540.00	12,420	n/a	n/a
1.33 cull bull (1,800 lb)	1,116.00	1,484	n/a	n/a
2 cull yrlg heifers (1,000 lb)	600.00	1,200	n/a	n/a
14 backg'ed steers (735 lb)	n/a	n/a	$ 643.13	$ 9,004
TOTAL GROSS REVENUE	$ 480.26	$61,954	$ 643.13	$ 9,004
Direct production costs				
	Cow-calf enterprise		Backgrounding enterprise	
Raised feed[a]	Amount	Value	Amount	Value
Corn silage	682.5 T	$11,603	n/a	n/a
Pasture	1,703 A	8,685	n/a	n/a
Alfalfa hay	146.18 T	8,040	9.84 T	$ 540
Native hay	82.7 T	3,308	n/a	n/a
Oat grain	898 bu	1,212	230 bu	311
Raised feed sub-total	$254.64	$32,848	$60.86	$ 851
Cash expenses	Per cow	Cow-calf enterprise	Per steer	Backgrounding enterprise
Labor	7.5 hr	$ 6,289	2.3 hr	$ 209
Veterinary, medicine, supplies, & marketing	$20.00	2,580	$ 2.75	39
Veterinary & medicine	$ 5.00	645	0.25	4
Supplies	6.00	774	0.50	7
Marketing	9.00	1,161	2.00	28
Purchased feed	$16.73	2,158	$ 1.60	23
Protein supplement	55 lb	881	0	0
Mineral and salt	$ 9.90	1,277	1.60	23
Initial value of feeder cattle	n/a	n/a	547.21	7,661
Building and equipment repairs, power, & fuel	$ 7.35	948	$ 3.45	48
Power and fuel	$ 6.25	806	3.35	46
Building repairs	0.75	97	0.05	1
Equipment repairs	0.35	45	0.05	1
Interest	$ 4.18	539	$25.64	359
Cash expenses sub-total	$97.01	$12,514	$595.64	$8,339
DIRECT PROD COSTS SUB-TOTAL	$351.65	$45,362	$656.50	$9,190

[a]In this budget, raised feed is valued at market prices.

Fixed production costs	Per cow	Cow-calf enterprise	Per steer	Backgrounding enterprise
Interest on livestock investment	$95.69	$12,345	$13.95	$ 195
Replacement of bull	17.05	2,200	n/a	n/a
Building & equipment depreciation, taxes, interest, and insurance	6.75	871	0.60	9
FIXED PROD COST SUB-TOTAL	$119.50	$15,416	$14.55	$ 204
TOTAL PRODUCTION COST	471.15	60,778	671.05	9,394

Net revenue over:

	Per cow	Cow-calf enterprise	Per steer	Backgrounding enterprise
Direct production costs	$128.61	$16,592	$ - 13.37	$ - 186
All costs except management	9.11	1,176	- 27.92	- 390

All costs except:	Cattle for whole farm
Management	$ 786
Labor and management	7,284
Interest, labor, and management	20,722
Land, interest, labor, and management	33,519

"MAINSTREAM" FARM, NORTHWEST REGION
BEEF CATTLE BUDGETS FOR 1993

Gross revenue	Cow-calf enterprise (120 cows)		Backgrounding heifer enterprise (17 head)	
	Per animal	Cow-calf enterprise	Per heifer	B/gd heifer enterprise
55 steer calves (620 lb)	$ 579.70	$31,884	n/a	n/a
31 heifer calves (525 lb)	525.69	16,296	n/a	n/a
23 cull cows (1,200 lb)	540.00	12,420	n/a	n/a
1.67 cull bulls (1,800 lb)	1,116.00	1,864	n/a	n/a
2 cull yrlg heifers (1,000 lb)	600.00	1,200	n/a	n/a
17 bred heifers (715 lb)	n/a	n/a	$ 630.00[a]	$10,710
TOTAL GROSS REVENUE	$ 530.53	$63,664	$ 630.00	$10,710

Direct production costs

	Cow-calf enterprise		B/gd heifer enterprise	
Raised feed[b]	Amount	Value	Amount	Value
Pasture	2,839 A	$14,479	n/a	n/a
Oat hay	210 T	7,350	n/a	n/a
Alfalfa/grass hay	83.3 T	4,165	17.6 T	$ 880
Oat grain	898 bu	1,212	279 bu	377
Raised feed sub-total	$226.72	$27,206	$ 73.94	$ 1,257

Cash expenses	Per cow	Cow-calf enterprise	Per heifer	B/gd heifer enterprise
Labor	7 hr	$ 5,460	2.1 hr	$ 232
Veterinary, medicine, supplies, & marketing	$22.00	2,640	$ 2.50	43
Veterinary & medicine	$10.00	1,200	0.50	9
Supplies	6.00	720	0.50	9
Marketing	6.00	720	1.50	25
Purchased feed	$16.78	2,013	$ 1.60	27
Protein supplement	55 lb	825	0	0
Mineral and salt	$ 9.90	1,188	1.60	27
Initial value of heifer calves	n/a	n/a	525.71	8,937
Building and equipment repairs, power, & fuel	$ 6.70	804	$ 2.90	49
Power and fuel	$ 5.20	624	2.80	47
Building repairs	0.70	84	0.05	1
Equipment repairs	0.80	96	0.05	1
Interest	$ 4.09	491	$24.59	418
Cash expenses sub-total	$95.07	$11,408	$570.94	$ 9,706
DIRECT PROD COSTS SUB-TOTAL	$321.78	$38,614	$644.88	$10,963

[a]The producer sold his 715 lb backgrounded heifers for breeding at $630 each.

[b]In this budget, raised feed is valued at market prices.

Fixed production costs	Per cow	Cow-calf enterprise	Per heifer	B/gd heifer enterprise
Interest on livestock investment	$98.55	$11,826	$ 12.82	$ 218
Replacement of bull	22.92	2,750	n/a	n/a
Building & equipment depreciation, taxes, interest, and insurance	6.75	810	0.60	10
FIXED PROD COST SUB-TOTAL	$128.22	$15,386	$ 13.42	$ 228
TOTAL PRODUCTION COST	450.00	54,000	658.30	11,191

Net revenue over:

	Per cow	Cow-calf enterprise	Per heifer	B/gd heifer enterprise
All direct production costs	$208.75	$25,050	$ - 14.88	$ - 253
All costs except management	80.53	9,664	- 28.30	- 481

All costs except:	Cattle for whole farm
Management	$ 9,183
Labor and management	14,875
Interest, labor and management	27,828
Land, interest, labor and management	44,655

"NEAR-ORGANIC" FARM, SOUTH CENTRAL REGION
BEEF CATTLE BUDGETS FOR 1993

	Cow-calf enterprise (39 cows)		Backgrounding enterprise (4 steers)	
Gross revenue	Per animal	Cow-calf enterprise	Per steer	Backgrounding enterprise
19 steer calves (630 lb)	$ 589.07	$11,192	n/a	n/a
14 cull cows (1,200 lb)	540.00	7,560	n/a	n/a
4 heifer calves (575 lb)	512.25	2,049	n/a	n/a
1 cull yrlg heifer (1,050 lb)	630.00	630	n/a	n/a
0.25 cull bull (1,800 lb)	1,116.00	279	n/a	n/a
4 backg'ed steers (810 lb)	n/a	n/a	$ 683.25	$ 2,733
TOTAL GROSS REVENUE	$ 556.67	$21,710	$ 683.25	2,733
Direct production costs				
	Cow-calf enterprise		Backgrounding enterprise	
Raised feed[a]	Amount	Value	Amount	Value
Pasture	843 A	$ 8,514	n/a	n/a
Alfalfa hay	100.7 T	4,028	4.8 T	$ 192
Oat grain	512 bu	691	66 bu	89
Raised feed sub-total	$339.31	$13,233	$70.25	$ 281
Cash expenses	Per cow	Cow-calf enterprise	Per steer	Backgrounding enterprise
Labor	11 hr	$ 2,789	2.2 hr	$ 57
Veterinary, medicine, supplies, & marketing	$16.70	651	$ 2.55	10
Veterinary & medicine	$ 3.00	117	0.15	0.60
Supplies	5.00	195	0.40	1.60
Marketing	8.70	339	2.00	8.00
Purchased feed	$ 9.90	386	$ 1.60	7
Protein supplement	0	0	0	0
Mineral and salt	$ 9.90	386	1.60	7
Initial value of feeder cattle	n/a	n/a	589.00	2,356
Building and equipment repairs, power, & fuel	$ 6.50	253	$ 2.90	12
Power and fuel	$ 5.20	203	2.80	11.20
Building repairs	0.95	37	0.05	0.20
Equipment repairs	0.35	13	0.05	0.20
Interest	$ 4.72	184	$27.50	110
Cash expenses sub-tot	$109.31	$ 4,263	$637.85	$2,552
DIRECT PROD COSTS SUB-TOTAL	$448.62	$17,496	$708.10	$2,833

[a]In this budget, raised feed is valued at market prices.

Fixed production costs	Per cow	Cow-calf enterprise	Per steer	Backgrounding enterprise
Interest on livestock investment	$ 111.49	$ 4,348	$14.00	$ 56
Replacement of bull	10.58	413	n/a	n/a
Building & equipment depreciation, taxes, interest, and insurance	6.75	263	0.60	2
FIXED PROD COST SUB-TOTAL	$128.82	$ 5,024	$ 14.60	$ 58
TOTAL PRODUCTION COST	577.44	22,520	722.70	2,891

Net revenue over:

	Per cow	Cow-calf enterprise	Per steer	Backgrounding enterprise
Direct production costs	$108.05	$ 4,214	$ - 24.85	$ - 100
All costs except management	- 20.77	- 810	- 39.45	- 158

All costs except:	Cattle for whole farm
Management	$ - 968
Labor and management	1,878
Interest, labor, and management	6,576
Land, interest, labor, and management	16,512

"MAINSTREAM" FARM, SOUTH CENTRAL REGION
BEEF CATTLE BUDGETS FOR 1993

Gross revenue	Cow-calf enterprise (128 cows) Per animal	Cow-calf enterprise
57 steer calves (585 lb)	$ 576.81	$ 32,878
38 heifer calves (505 lb)	470.66	17,885
16 cull cows (1,200 lb)	540.00	8,640
1.33 cull bulls (2,000 lb)	1,116.00	1,649
2 cull yrlg heifer (950 lb)	570.00	1,140
TOTAL GROSS REVENUE	$ 485.88	$ 62,192

Direct production costs	Cow-calf enterprise Amount	Value
Raised feed[a]		
Pasture	2,417 A	$ 24,412
Alfalfa/grass hay	183.5 T	6,698
Millet hay	60 T	1,800
Sorghum grain	368 bu	681
Raised feed sub-total	$262.42	$ 33,591

Cash expenses	Per cow	Cow-calf enterprise
Labor	7 hr	$ 5,824
Veterinary, medicine, supplies, & marketing	$22.00	2,816
Veterinary & medicine	$ 5.00	640
Supplies	6.00	768
Marketing	11.00	1,408
Purchased feed[b]	$23.26	2,977
Protein supplement	$13.36	1,710
Mineral and salt	$ 9.90	1,267
Building and equipment repairs, power, & fuel	$ 9.40	1,203
Power and fuel	$ 7.80	998
Building repairs	0.95	122
Equipment repairs	0.65	83
Interest	$ 4.51	577
Cash expenses sub-total	$104.67	$ 13,397
DIRECT PROD COSTS SUB-TOTAL	$367.09	$ 46,988

[a]In this budget, raised feed is valued at market prices. In practice, this producer's grazing season is somewhat shorter than that assumed for producers west of the Missouri River, with the implication that the producer commonly feeds 30-35% more hay than is shown in this budget.

[b]Because of a special purchasing arrangement, the producer's actual cost of these purchased feeds is considerably less than for the feeds as shown (which are costed at the common purchase price for all producers in the study).

Fixed production costs	Per cow	Cow-calf enterprise
Interest on livestock investment	$ 93.44	$11,960
Replacement of bull	17.19	2,200
Building & equipment depreciation, taxes, interest, and insurance	6.75	864
FIXED PROD COST SUB-TOTAL	$117.38	$15,024
TOTAL PRODUCTION COST	484.47	62,012

Net revenue over:

	Per cow	Cow-calf enterprise
Direct production costs	$118.79	$15,204
All costs except:		
Management	1.41	180
Labor and management	46.91	6,004
Interest, labor, and management	144.85	18,541
Land, interest, labor, and management	359.08	45,962

"NEAR-ORGANIC" FARM, NORTH CENTRAL REGION
BEEF CATTLE BUDGETS FOR 1993

	Cow-calf enterprise (201 cows)		Backgrounding enterprise (38 steers, 38 heifers)	
Gross revenue	Per animal	Cow-calf enterprise	Per animal	Backgrounding enterprise
77 steer calves (580 lb)	$ 571.88	$ 44,035	n/a	n/a
77 heifer calves (560 lb)	498.96	38,420	n/a	n/a
38 cull cows (1,200 lb)	540.00	23,940	n/a	n/a
2.57 cull bulls (2,000 lb)	1,240.00	3,187	n/a	n/a
4 cull yrlg heifers (1,050 lb)	630.00	2,520	n/a	n/a
38 backg'ed steers (805 lb)	n/a	n/a	$ 679.03	$ 25,803
38 backg'ed heifers (785 lb)	n/a	n/a	637.82	24,237
TOTAL GROSS REVENUE	$ 557.72	$112,101	$ 658.42	$ 50,040
Direct production costs				
	Cow-calf enterprise		Backgrounding enterprise	
Raised feed[a]	Amount	Value	Amount	Value
Pasture	1,460 A	$ 18,542	n/a	n/a
Corn silage	1,045 T	17,765	n/a	n/a
Alfalfa hay	315.85 T	17,372	66.65 T	$ 3,666
Native hay	400 T	16,000	n/a	n/a
Oat grain	1,508 bu	2,036	n/a	n/a
Corn grain	n/a	n/a	689 bu	1,550
Raised feed sub-total	$356.79	$ 71,715	$68.63	$ 5,216
Cash expenses	Per cow	Cow-calf enterprise	Per animal	Backgrounding enterprise
Labor	6.5 hr	$ 8,492	2.1 hr	$ 1,037
Veterinary, medicine, supplies, & marketing	$20.00	4,020	$ 2.40	183
Veterinary & medicine	$ 8.00	1,608	0.40	31
Supplies	6.00	1,206	0.50	38
Marketing	6.00	1,206	1.50	114
Purchased feed	$21.15	4,250	$ 6.50	494
Protein supplement	90 lb	2,260	39 lb	372
Mineral and salt	$ 9.90	1,990	1.60	122
Initial value of feeder cattle	n/a	n/a	535.42	40,692
Building and equipment repairs, power, & fuel	$ 6.80	1,367	$ 4.30	327
Power and fuel	$ 5.20	1,045	4.20	319
Building repairs	0.95	191	0.05	4
Equipment repairs	0.65	131	0.05	4
Interest	$ 4.06	816	$25.30	1,923
Cash expenses sub-total	$94.26	$ 18,945	$587.58	$44,656
DIRECT PROD COSTS SUB-TOTAL	$451.05	$ 90,660	$656.21	$49,872

[a]In this budget, raised feed is valued at market prices.

Fixed production costs	Per cow	Cow-calf enterprise	Per animal	Backgrounding enterprise
Interest on livestock investment	$99.06	$ 19,912	$13.39	$ 1,017
Replacement of bull	21.11	4,243	n/a	n/a
Building & equipment depreciation, taxes, interest, and insurance	6.75	1,357	0.60	46
FIXED PROD COST SUB-TOTAL	$126.92	$ 25,512	$ 13.99	$ 1,063
TOTAL PRODUCTION COST	577.97	116,172	670.20	50,935

Net revenue over:

	Per cow	Cow-calf enterprise	Per animal	Backgrounding enterprise
Direct production costs	$106.67	$21,441	$ 2.21	$ 168
All costs except management	- 20.25	- 4,071	- 11.78	- 895

All costs except:	Cattle for whole farm
Management	$ - 4,966
Labor and management	4,563
Interest, labor, and management	28,231
Land, interest, labor, and management	56,105

"MAINSTREAM" FARM, NORTH CENTRAL REGION
BEEF CATTLE BUDGETS FOR 1993

	Cow-calf enterprise (172 cows)	
Gross revenue	Per animal	Cow-calf enterprise
80 steer calves (525 lb)	$ 532.88	$ 42,630
39 cull cows (1,300 lb)	585.00	22,815
37 heifer calves (505 lb)	470.65	17,414
2.86 cull bulls (1,950 lb)	1,209.00	3,458
4 cull yrlg heifer (1,000 lb)	600.00	2,400
TOTAL GROSS REVENUE	$ 515.80	$ 88,717
Direct production costs	Cow-calf enterprise Amount	Value
Raised feed[a]		
Corn silage	1,200 T	$ 20,400
Alfalfa hay	320 T	17,600
Pasture	1,215 A	15,430[b]
Native hay	160 T	6,400
Oat grain	1,651 bu	2,229
Raised feed sub-total	$360.81	$ 62,059
Cash expenses	Per cow	Cow-calf enterprise
Labor	7 hr	$ 7,826
Veterinary, medicine, supplies, & marketing	$22.00	3,784
Veterinary & medicine	$10.00	1,720
Supplies	6.00	1,032
Marketing	6.00	1,032
Purchased feed	$ 9.90	1,703
Protein supplement	0	0
Mineral and salt	$ 9.90	1,703
Building and equipment repairs, power, & fuel	$ 6.80	1,169
Power and fuel	$ 5.20	894
Building repairs	0.95	163
Equipment repairs	0.65	112
Interest	$ 3.79	652
Cash expenses sub-total	$87.99	$ 15,134
DIRECT PROD COSTS SUB-TOTAL	$448.80	$ 77,193

[a]In this budget, raised feed is valued at market prices. The producer considers the value of alfalfa/grass hay to be more nearly $40 per ton than the $50 per ton assumed in this budget and for all case study producers except those in the Southwest. The pasture and cropland rental rates actually paid by this producer are only about 65% as much as those assumed in this budget.

Fixed production costs	Per cow	Cow-calf enterprise
Interest on livestock investment	$ 104.62	$17,994
Replacement of bull	27.40	4,713
Building & equipment depreciation, taxes, interest, and insurance	6.75	1,161
FIXED PROD COST SUB-TOTAL	$138.77	$23,868
TOTAL PRODUCTION COST	587.57	101,061

Net revenue over:

	Per cow	Cow-calf enterprise
Direct production costs	$ 67.00	$11,524
All costs except:		
Management	- 71.77	- 12,344
Labor and management	- 26.27	- 4,518
Interest, labor, and management	82.14	14,128
Land, interest, labor, and management	220.35	37,901

"NEAR-ORGANIC" FARM, CENTRAL REGION
BEEF CATTLE BUDGETS FOR 1993

	Cow-calf enterprise[a] (51 cows)		Slaughter steer enterprise (13 steers)	
Gross revenue	Per animal	Cow-calf enterprise	Per animal	Slaughter steer enterprise
24 steer calves (540 lb)	$ 548.08	$ 13,154	n/a	n/a
13 heifer calves (500 lb)	468.77	6,094	n/a	n/a
10 cull cows (1,200 lb)	540.00	5,400	n/a	n/a
0.57 cull bulls (1,900 lb)	1,178.00	671	n/a	n/a
1 cull yrlg heifers (950 lb)	570.00	570	n/a	n/a
13 slaughter steers (1,290 lb)	n/a	n/a	$ 954.62	$12,410
TOTAL GROSS REVENUE	$ 507.63	$ 25,889	$ 954.62	12,410
Direct production costs	Cow-calf enterprise		Slaughter steer enterprise	
Raised feed[b]	Amount	Value	Amount	Value
Sorghum sudan silage	350 T	$ 5,250	n/a	n/a
Corn silage	212.5 T	3,613	n/a	n/a
Pasture	220 A	3,344	n/a	n/a
Native hay	70 T	2,800	n/a	n/a
Alfalfa hay	23.7 T	1,303	53.8 T	$ 2,959
Oat grain	395 bu	533	455 bu	614
Corn grain	n/a	n/a	732 bu	1,647
Raised feed sub-total	$330.25	$16,843	$401.54	$5,220
Cash expenses	Per cow	Cow-calf enterprise	Per steer	Slaughter steer enterprise
Labor	11 hr	$ 3,647	12 hr	$ 1,014
Veterinary, medicine, supplies, & marketing	$10.00	510	$18.20	237
Veterinary & medicine	$ 2.00	102	1.20	16
Supplies	2.00	102	3.00	39
Marketing	6.00	306	14.00	182
Purchased feed	$21.31	1,087	$ 9.00	117
Protein supplement	91 lb	582	0	0
Mineral and salt	$ 9.90	505	9.00	117
Initial value of feeder cattle	n/a	n/a	$ 548.08	7,125
Building and equipment repairs, power, & fuel	$ 5.80	296	$12.15	158
Power and fuel	$ 5.00	255	8.45	110
Building repairs	0.50	26	1.70	22
Equipment repairs	0.30	15	2.00	26
Interest	$ 4.88	249	$29.92	389
Cash expenses sub-tot	$113.51	$ 5,789	$695.38	$9,040
DIRECT PROD COSTS SUB-TOTAL	$443.76	$22,632	$1,096.92	$14,260

[a]In some years, the producer sells bulls for breeding at a price premium.

[b]In this budget, raised feed is valued at market prices.

Fixed production costs	Per cow	Cow-calf enterprise	Per steer	Slaughter steer enterprise
Interest on livestock investment	$ 98.82	$ 5,040	$ 95.20	$ 1,237
Replacement of bull	18.49	943	n/a	n/a
Building & equipment depreciation, taxes, interest, and insurance	6.75	344	11.65	152
FIXED PROD COST SUB-TOTAL	$124.06	$ 6,327	$ 106.85	$ 1,389
TOTAL PRODUCTION COST	567.82	28,959	1,203.77	15,649

Net revenue over:

	Per cow	Cow-calf enterprise	Per steer	Slaughter steer enterprise
Direct production costs	$ 63.87	$ 3,257	$ - 142.35	$ - 1,850
All costs except management	- 60.19	- 3,070	- 249.15	- 3,239

All costs except:	Cattle for whole farm
Management	$ - 6,309
Labor and management	- 1,648
Interest, labor, and management	5,267
Land, interest, labor, and management	11,086

"MAINSTREAM" FARM, CENTRAL REGION
BEEF CATTLE BUDGETS FOR 1993

	Cow-calf enterprise (32 cows)	
Gross revenue	Per animal	Cow-calf enterprise
16 steer calves (525 lb)	$ 532.88	$ 8,526
7 cull cows (1,200 lb)	540.00	3,780
7 heifer calves (450 lb)	424.43	2,971
0.67 cull bull (1,900 lb)	1,178.00	789
1 cull yrlg heifer (950 lb)	570.00	570
TOTAL GROSS REVENUE	$ 519.88	$ 16,636
Direct production costs	Cow-calf enterprise	
	Amount	Value
Raised feed[a]		
Alfalfa hay	102.3 T	$ 5,627
Pasture	315 A	4,788
Oat grain	287 bu	387
Raised feed sub-total	$337.56	$10,802
Cash expenses	Per cow	Cow-calf enterprise
Labor	11 hr	$ 2,288
Veterinary, medicine, supplies, & marketing	$23.00	736
Veterinary & medicine	$11.00	352
Supplies	6.00	192
Marketing	6.00	192
Purchased feed	$15.06	482
Protein supplement	41 lb	165
Mineral and salt	$ 9.90	317
Building and equipment repairs, power, & fuel	$ 8.30	265
Power and fuel	$ 5.20	166
Equipment repairs	1.80	57
Building repairs	1.30	42
Interest	$ 5.31	170
Cash expenses sub-total	$123.16	$ 3,941
DIRECT PROD COSTS SUB-TOTAL	$460.72	$14,743

[a]In this budget, raised feed is valued at market prices.

Fixed production costs	Per cow	Cow-calf enterprise
Interest on livestock investment	$ 105.28	$ 3,369
Replacement of bull	34.38	1,100
Building & equipment depreciation, taxes, interest, and insurance	6.75	216
FIXED PROD COST SUB-TOTAL	$146.41	$ 4,685
TOTAL PRODUCTION COST	607.13	19,428

Net revenue over:

	Per cow	Cow-calf enterprise
Direct production costs	$ 59.16	$ 1,893
All costs except:		
Management	- 87.25	- 2,792
Labor and management	- 15.75	- 504
Interest, labor, and management	94.84	3,035
Land, interest, labor, and management	267.75	8,568

ANNEX F

HOG BUDGETS, NEAR-ORGANIC AND MAINSTREAM CASE FARMS

"NEAR-ORGANIC" FARM, NORTHWEST REGION
HOG FARROW-TO-FINISH BUDGET FOR 1993

	Hog farrow-to-finish enterprise (6 sows)	
	Per sow/yr[a]	Enterprise/yr
Gross revenue		
17.5 slaughter hogs/sow	$ 1,947	$ 11,682
0.17 cull boar/sow	39	234
1 cull sow	263	1,578
TOTAL GROSS REVENUE	$ 2,249	$ 13,494
Direct production costs		
Raised feed[b]		
Oat grain (393 bu/sow)	$ 530	$ 3,183
Alfalfa hay (0.43 ton/sow)	24	142
Raised feed sub-total	$ 554	$ 3,325
Cash expenses		
Labor (42 hr/sow)	$ 273	$ 1,638
Purchased barley (79 bu/sow)	159	953
Veterinary, medicine, supplies, & marketing	66	396
Veterinary & medicine	29	174
Supplies	13	78
Marketing	24	144
Building and equipment repairs, power, and fuel	29	174
Power and fuel	12	72
Building & equipment repairs	17	102
Interest	24	144
Cash expenses sub-total	$ 551	$ 3,305
DIRECT PRODUCTION COSTS SUB-TOTAL	$ 1,105	$ 6,630

[a]A sow unit is defined to cover a brood sow for the duration of a year, the 17.5 pigs raised per year that are fed to a slaughter weight of 240 lb, the gilt raised as a replacement, and 1/6th of the boar that services the sows in the herd.

[b]In this budget, raised feed is valued at market prices.

Fixed production costs

Interest on livestock investment	$ 25	$ 150
Replacement of boar	42	252
Building & equipment depreciation, taxes, interest, and insurance	76	456
FIXED PRODUCTION COST SUB-TOTAL	$ 143	$ 858
TOTAL PRODUCTION COST	$ 1,248	$ 7,488
Net revenue over:		
Direct production costs	$ 1,144	$ 6,864
All costs except management	1,001	6,006

	Hogs for whole farm
All costs except:	
Management	$ 6,006
Labor and management	7,644
Interest, labor, and management	7,938
Land, interest, labor, and management	8,537

"MAINSTREAM" FARM, CENTRAL REGION
HOG FARROW-TO-FINISH BUDGET FOR 1993

	Hog farrow-to-finish enterprise (18 sows)	
	Per sow/yr[a]	Enterprise/yr
Gross revenue		
12.4 slaughter hogs/sow	$ 1,475	$ 26,550
0.11 cull boar/sow	22	396
1.0 cull sow	191	3,438
TOTAL GROSS REVENUE	$ 1,688	$ 30,384
Direct production costs		
Raised feed[b]		
Corn grain (178 bu/sow)	$ 401	$ 7,209
Cash expenses		
Purchased soybean oil meal (1.66 ton/sow)	$ 415	$ 7,470
Labor (38 hr/sow)	247	4,446
Veterinary, medicine, supplies & marketing	66	1,188
Veterinary & medicine	29	522
Supplies	13	234
Marketing	24	432
Building and equipment repairs, power, and fuel	29	522
Power and fuel	12	216
Building & equipment repairs	17	306
Interest	34	612
Cash expenses sub-total	$ 791	$ 14,238
DIRECT PRODUCTION COSTS SUB-TOTAL	$ 1,192	$ 21,447

[a]A sow unit is defined to cover a brood sow, the 12.4 pigs raised per year that are fed to a slaughter weight of 260 lb, the gilt that is raised as a replacement, and 1/9th of the boar that services the sows in the herd.

[b]In this budget, raised feed is valued at market prices.

Fixed production costs

Interest on livestock investment	$ 30	$ 540
Replacement of boar	28	504
Building & equipment depreciation, taxes, interest, and insurance	76	1,368
FIXED PRODUCTION COST SUB-TOTAL	$ 134	$ 2,412
TOTAL PRODUCTION COST	$ 1,326	$ 23,859

Net revenue over:

Direct production costs	$ 496	$ 8,937

	Hogs for whole farm
All costs except:	
Management	$ 6,525
Labor and management	10,971
Interest, labor, and management	12,123
Land, interest, labor, and management	13,091

ANNEX G

WHOLE-FARM ANALYSIS: NEAR-ORGANIC AND MAINSTREAM CASE FARMS

NOTE: The whole-farm analysis for each farm consists of four pages, the first of which is a whole-farm summary and the other three of which show supporting whole-farm data. In interpreting the whole-farm summary page, please note the following.

Gross revenue from (a) livestock reflects total gross income from the cattle and hog budgets (Annexes E and F), adjusted down by the value of cattle entering the feedlot for backgrounding and/or finishing, and (b) from crops which reflects amounts of each crop sold (top panel, p 2 of whole-farm analysis for each case farmer) multiplied by baseline crop prices shown in Table 7. Because farmers did not receive cash from the sale of home-raised feeder cattle placed in the feedlot, in the summary, the value of feeder cattle was subtracted from the total gross revenue shown in the cow-calf and supplementary cattle enterprise budgets. "Total farm gross revenue" in the summary reflects the sum of gross revenues from various livestock and crop enterprises received by various farmers, exclusive of the value of home-raised feed fed to their own livestock.

Total costs of production except management (with raised feed valued at market prices) (a) for livestock are taken from the respective cattle and hog budgets, with the initial value of feeder calves being deducted, and (b) for crops are taken from the bottom panel, p 2 of the whole-farm analysis. The initial value of feeder calves is deducted from supplementary cattle enterprise costs because farmers fed home-raised cattle, rather than incurring expenses to purchase feeder cattle.

Since the value of home-raised feed fed to livestock is not included in the crop budgets as a return and no cash expenditure was made for such feed, this value was subtracted from unadjusted total costs to obtain adjusted "total farm costs of production" for the whole farm. [To save space in typing of the whole-farm analysis statements, this circumstance is denoted as the value of home-raised fed to farmers' own livestock being "in common to both livestock and crop enterprises."] These costs reflect economic expenditures by the various farmers. They exceed actual cash expenditures to the extent that farmers use owned rather than borrowed capital.

Finally, adjusted total costs are apportioned among land, labor, and "other" at the whole-farm level. The land cost is the total rental value of each farm's cropland, pasture, and native hay land. The labor cost is the total value of labor required by all livestock and crop enterprises. The "other" cost is the difference between adjusted "total farm costs of production" and the sum of land and labor costs.

Net revenue over total costs except management for (a) livestock is taken directly from the respective cattle and hog budgets and (b) crops is taken from the top panel, p 4 of the whole-farm analysis. "Total farm net revenue over all costs except management" is simply the sum of the respective net revenues from the various livestock and crop enterprises. The final two measures of whole-farm profitability are "total farm net revenue over all costs except management" adjusted up by the value of (a) whole-farm labor and (b) whole-farm labor and land, respectively.

"NEAR-ORGANIC" FARM, NORTHWEST REGION
WHOLE-FARM ANALYSIS FOR 1993

WHOLE-FARM SUMMARY

Gross revenue

Cattle sold	
43 weaned steer calves	$ 23,531
32 weaned heifer calves	15,658
23 cull cows	12,420
14 backgrounded steers	9,004
1.33 cull bulls	1,484
2 cull yearling heifers	1,200
Sub-total	$ 63,297

Hogs sold	
105 slaughter hogs	$ 11,682
6 cull sows	1,578
1 cull boar	234
Sub-total	$ 13,494

Crops sold and Gov't payments	
11,700 bu spring wheat	$ 36,855
5,094 bu oat grain	6,877
Government payments	6,633
107.4 tons alfalfa	5,907
17.3 tons native hay	692
Sub-total	$ 56,964

[Gross value of production, including raised feed fed to livestock: $85,303]

TOTAL FARM GROSS REVENUE:
$63,297 + $ 13,494 + $ 56,964 = $133,755
(57.4% livestock, 42.6% crops)

Total costs of production, except management (with raised feed valued at market prices)

Livestock enterprise	Cost
129 cows and calves	$ 60,778
14 backgrounded cattle (excluding the initial value of feeder calves)	1,733
6 farrow and finish sows	7,488
Sub-total	$ 69,999

Crop system	Cost
570 acres: Spring wheat$_{clover}$-summer fallow rotation	$ 25,063
420 acres: Corn silage-oat grain$_{clover}$-spring wheat$_{clover}$-summer fallow rotation	29,828
228 acres: Oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa (break-up) rotation	11,966
100 acres native hay harvest	4,510
Sub-total	$ 71,367

TOTAL FARM COSTS OF PRODUCTION:
$69,999 + $71,367 = $141,366, of which $28,339 are common to both crop and livestock enterprises; thus, whole-farm total costs are $141,366 minus $28,339, or $113,027. Of these total costs, the following amounts are for:

* Land (rental value) $27,418 * Labor (family and/or hired)$14,582 * Other $71,027

Net revenue over total costs except management

Livestock	
Enterprise	Net revenue
129 cows and calves	$ 1,176
14 backgrounded cattle (excluding the initial value of feeder calves)	- 390
6 farrow and finish sows	6,006
Sub-total	$ 6,792

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT:
$6,792 + $13,936 = $20,728

Crops	
System	Net revenue
570 acres: Spring wheat$_{clover}$-summer fallow rotation	$ 5,862
420 acres: Corn silage-oat grain$_{clover}$-spring wheat$_{clover}$-summer fallow rotation	2,707
228 acres: Oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa (break-up) rotation	5,877
100 acres native hay	- 510
Sub-total	$ 13,936

Total farm net revenue over all costs except:

Management	$20,728
Labor and management	35,310
Land, labor, and managaement	62,728

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to livestock Amount	Fed to livestock Percent	Sold Amount	Sold Percent
Pasture	1,703	819 AUMs	819 AUMs	100.0	0	0
Spring wheat	390	11,700 bu	0	0	11,700 bu	100.0
Summer fallow	390	n/a	n/a	n/a	n/a	n/a
Alfalfa	190	266 tons	158.6 tons	59.6	107.4 tons	40.4
Oat grain	143	8,580 bu	3,486 bu	40.6	5,094 bu	59.4
Corn silage	105	682.5 tons	682.5 tons	100.0	0	0
Native hay	100	100 tons	82.7 tons	82.7	17.3 tons	17.3
Total cropland	1,218	729 tons TDN	324 tons TDN	44.4	405 tons TDN	55.6
Total farmland	3,021	860 tons TDN	455 tons TDN	52.9	405 tons TDN	47.1

Livestock:

129 cow-calf units

* 96.9% calving percentage
* 8.53% calf death loss, based on exposed females
* 8.80% calf death loss, based on number of calves born
* 88.4% of cows weaned calves at 6 months (114 calves)
* 19.4% cow replacement rate (25 heifer calves)
* 75 calves sold at weaning; steers average 555 lb, heifers 525 lb
* 14 backgrounded cattle sold at 9 months; steers 735 lb

6 farrow and finish sows

* 9 weaned pigs per litter
* 2 litters per sow per year

COSTS OF PRODUCTION

Crops, by system

Crop system	Direct costs	Fixed costs	Total costs
570 acres: Spring wheat$_{clover}$-summer fallow rotation	$ 11,035	$ 14,028	$ 25,063
420 acres: Corn silage-oat grain$_{clover}$-spring wheat$_{clover}$-summer fallow rotation	14,051	15,777	29,828
228 acres: Oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa (break-up) rotation	4,398	7,568	11,966
100 acres native hay harvested	1,431	3,079	4,510
TOTAL CROP COSTS	$ 30,915	$ 40,452	$ 71,367

Livestock, by enterprise

Livestock enterprise	Fixed costs	Non-feed costs	Direct costs of production: Raised feed valued at: Market prices	Direct costs of production: Raised feed valued at: Production costs	Total direct production costs with raised feed valued at: Market prices	Total direct production costs with raised feed valued at: Production costs	Total production costs with raised feed valued at: Market prices	Total production costs with raised feed valued at: Production costs
129 cows	$ 15,416	$ 12,514	$ 32,848	$ 31,782	$ 45,362	$ 44,296	$ 60,778	$ 59,712
14 background-ed steers	204	8,339	851	603	9,190	8,942	9,394	9,146
6 farrow and finish sows	858	3,305	3,325	2,915	6,630	6,220	7,488	7,078
TOTAL	$ 16,478	$ 16,497[a]	$ 37,024[b]	$ 35,300[c]	$ 53,521	$ 51,797	$ 69,999	$ 68,275

[a]The $24,158 sum of the above figures includes the initial $7,661 value of the 14 feeder calves that were retained and later sold as backgrounded cattle. Since the $7,661 was not actually expended by the producer, the reported cost total is $7,661 less than the $24,158, or $16,478.

[b]The $37,024 includes crop production costs of $28,339 and a pasture rental value of $8,685.

[c]The $35,300 includes crop production costs of $26,615 and a pasture rental value of $8,685.

Summary: Crops and livestock

Method of valuing raised livestock feed	Direct costs of production: Crops	Direct costs of production: Livestock	Direct costs of production: Total	Total costs of production: Crops	Total costs of production: Livestock	Total costs of production: Total
Market costs	$ 30,915	$ 53,521	$ 56,097[d]	$ 71,367	$ 69,999	$113,027[e]
Production costs	$ 30,915	$ 51,797	$ 56,097[f]	$ 71,367	$ 68,275	$113,027[g]

[d]The $84,436 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $28,339 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $84,436 minus $28,339, or $56,097.

[e]The $141,366 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $28,339 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $141,336 minus $28,339, or $113,027.

[f]The $82,712 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $26,615 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $82,712 minus $26,615, or $56,097.

[g]The $139,642 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $26,615 actual cost of production of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $139,642 minus $26,615, or $113,027.

Crops, by system

Crop system	Gross revenue	Net revenue over: Direct costs	All costs except management
570 acres: Spring wheat$_{clover}$-summer fallow rotation	$ 30,925	$ 19,890	$ 5,862
420 acres: Corn silage-oat grain$_{clover}$-spring wheat$_{clover}$-summer fallow rotation	32,535	18,484	2,707
228 acres: Oat grain (alfalfa establishment)-alfalfa (4 yr)-alfalfa (break-up) rotation	17,843	13,445	5,877
100 acres native hay harvested	4,000	2,569	- 510
TOTAL CROP COSTS	$ 85,303	$ 54,388	$ 13,936

Livestock, by enterprise

Livestock enterprise	Gross revenue	Net revenue over direct costs of production with raised feed valued at: Market prices	Production costs	Net revenue over total costs of production with raised feed valued at: Market prices	Production costs
129 cows	$ 61,954	$ 16,592	$ 17,658	$ 1,176	$ 2,242
14 backgrounded steers	9,004	- 186	62	- 390	- 142
6 farrow and finish sows	13,494	6,864	7,274	6,006	6,416
TOTAL LIVESTOCK REVENUE	$ 84,452	$ 23,270	$ 24,994	$ 6,792	$ 8,516

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 76,791	Direct costs	$ 56,097[b]	Direct costs	$ 77,658
Crops sold	56,964	Fixed costs	56,930	Total costs except for management	$ 20,728
TOTAL	$133,755	TOTAL	$113,027		

[b]The $56,097 direct costs includes the $18,542 pasture rental value.

"MAINSTREAM" FARM, NORTHWEST REGION
WHOLE-FARM ANALYSIS FOR 1993

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold		Crops sold & Gov't payments	
55 weaned steer calves	$ 31,884	6,490 bu spr wheat	$ 20,444
17 backgrounded heifers for breeding	10,710	389.1 tons alf/grass	19,455
23 cull cows	12,420	Government payments	12,128
14 weaned heifer calves	7,359	823 bu oat grain	1,111
1.67 cull bulls	1,864	Sub-total	$ 53,138
2 cull yearling heifers	1,200		
Sub-total	$ 65,437	[Gross value of production, including raised feed fed to cattle: $61,172]	

TOTAL FARM GROSS REVENUE: $65,437 + $53,138 = $118,575 (55.2% livestock, 44.8% crops)

Total costs of production, except management (with raised feed valued at market prices)

Livestock		Crops	
Enterprise	Cost	Rotation	Cost
120 cows and calves	$ 54,000	420 acres: Oat grain (alfalfa establishment)-alfalfa (5 yrs)-alfalfa (break-up)	$ 20,645
17 backgrounded heifers (excluding the initial values of heifer calves) value of heifer calves)	2,254	330 acres: Spring wheat-spring wheat/oat grain-summer fallow rotation	19,465
Sub-total	$ 56,254	230 acres: Spring wheat-summer fallow rotation	12,015
		Sub-total	$ 52,125

TOTAL FARM COSTS OF PRODUCTION: $56,254 + $52,125 = $108,379, of which $13,984 are common to both crop and livestock enterprises; thus, whole-farm total costs are $108,379 minus $13,984, or $94,395. Of these total costs, the following amounts are for:

* Land (rental value) $31,269 * Labor (family and/or hired) $9,657 * Other $ 53,469

Net revenue over total costs except management

Livestock		Crops	
Enterprise	Net revenue	Rotation	Net Revenue
120 cows and calves	$ 9,664	420 acres: Oat grain (alfalfa establishment)-alfalfa/grass (5 yrs)-alfalfa/grass (break-up	$ 11,298
17 backgrounded heifers	- 481	330 acres: Spring wheat-spring wheat/oat grain-summer fallow rotation	- 663
Sub-total	$ 9,183	230 acres: Spring wheat-summer fallow rotation	- 1,588
		170 acres: CRP grassland	5,950
		Sub-total	$ 14,997

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT: $9,183 + $14,997 = $24,180

Total farm net revenue over all costs except:

Management	$ 24,180
Labor and management	33,837
Land, labor, and management	65,106

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to cattle — Amount	Fed to cattle — Percent	Sold — Amount	Sold — Percent
Pasture	2,839	1,366 AUM	1,366 AUMs	100.0	0	0
Alfalfa/grass	350	490 tons	100.9 tons	20.6	389.1 tons	79.4
Spring wheat	295	6,490 bu	0	0	6,490 bu	100.0
Summer fallow	225	n/a	n/a		n/a	
CRP grassland	170	n/a	n/a		n/a	
Oat hay	70	210 tons	210 tons	100.0	0	0
Oat grain	40	2,000 bu	1,177 bu	58.9	823 bu	41.1
Total cropland	1,150	530 tons TDN	171 tons TDN	32.3	359 tons TDN	67.7
Total farmland	3,989	749 tons TDN	390 tons TDN	52.1	359 tons TDN	47.9

Livestock: 120 cow-calf units

* 96.7% pregnancy percentage
* 2.50% pregnancy loss percentage
* 94.2% calving percentage
* 1.67% calf death loss, based on exposed females
* 1.77% calf death loss, based on number of calves born
* 92.5% of cows weaned calves at 7 months (111 calves)
* 20.8% cow replacement rate (25 heifer calves)
* 69 calves sold at weaning; steers average 620 lb, heifers 590 lb
* 17 backgrounded heifers sold for breeding at 11 months (715 lb)

COSTS OF PRODUCTION

Crops, by rotation

Rotation	Direct costs	Fixed costs	Total costs
420 acres: Oat grain (alfalfa establishment)-alfalfa/grass (5 yrs)-alfalfa/grass (break-up)	$ 7,695	$ 12,950	$ 20,645
330 acres: Spring wheat-spring wheat/oat grain-summer fallow rotation	11,929	7,536	19,465
230 acres: Spring wheat-summer fallow rotation	7,008	5,007	12,015
TOTAL CROP COSTS	$ 26,632	$ 25,493	$ 52,125

Livestock, by enterprise

Livestock enterprise	Fixed costs	Direct costs of production: Non-feed costs	Direct costs of production, raised feed valued at: Market prices	Direct costs of production, raised feed valued at: Production costs	Total direct production costs with raised feed valued at: Market prices	Total direct production costs with raised feed valued at: Production costs	Total production costs with raised feed valued at: Market prices	Total production costs with raised feed valued at: Production costs
120 cows	$15,386	$11,408	$27,206	$24,342	$38,614	$35,750	$54,000	$51,136
17 backgrounded heifers	228	9,706	1,257	944	10,963	10,650	11,191	10,878
TOTAL	$15,614	$12,177[a]	$28,463[b]	$25,286[c]	$40,640	$37,463	$56,254	$53,077

[a]The $21,114 sum of the above figures includes the initial $8,937 value of the 17 heifer calves that were backgrounded and sold for breeding. Since the $8,937 was not actually expended by the producer, the reported cost total is $8,937 less than the $21,114, or $12,177.

[b]The $28,463 includes crop production costs of $13,984 and a pasture rental value of $14,479.

[c]The $25,286 includes crop production costs of $10,807 and a pasture rental value of $14,479.

Summary: Crops and livestock

Method of valuing raised livestock feed	Direct costs of production: Crops	Direct costs of production: Livestock	Direct costs of production: Total	Total costs of production: Crops	Total costs of production: Livestock	Total costs of production: Total
Market costs	$26,632	$40,640	$53,288[d]	$52,125	$56,254	$94,395[e]
Production costs	$26,632	$37,463	$53,288[f]	$52,125	$53,077	$94,395[g]

[d]The $67,272 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $13,984 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $67,272 minus $13,984, or $53,288.

[e]The $108,379 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $13,984 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $108,379 minus 13,984, or $94,395.

[f]The $64,095 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $10,807 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $64,095 minus $10,807, or $53,288.

[g]The $105,202 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $10,807 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $105,202 minus $10,807, or $94,395.

NET REVENUE

Crops, by rotation

Rotation	Gross revenue	Net revenue over: Direct costs	Net revenue over: All costs except management
420 acres: Oat grain (alfalfa establishment)-alfalfa/grass (5 yrs)-alfalfa/grain (break-up)	$ 31,943	$ 24,248	$ 11,298
330 acres: Spring wheat-oat grain-summer fallow rotation	18,802	6,873	- 663
230 acres: Spring wheat-summer fallow rotation	10,427	3,419	-1,588
170 acres: CRP grassland	5,950	5,950	5,950
TOTAL CROP NET REVENUE	$ 67,122	$ 40,490	$ 14,997

Livestock, by enterprise

		Net revenue over direct costs of production with raised feed valued at:		Net revenue over total costs of production with raised feed valued at:	
Livestock enterprise	Gross revenue	Market prices	Production costs	Market prices	Production costs
120 cows	$ 63,664	$ 25,050	$ 27,913	$ 9,664	$ 12,527
17 backgrounded heifers	10,710	- 253	60	- 481	- 168
TOTAL LIVESTOCK REVENUE	$ 74,374	$ 24,797	$ 27,973	$ 9,183	$ 12,359

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 65,437	Direct costs	$ 53,288[h]	Direct costs	$ 65,287
Crops sold	53,138	Fixed costs	41,107		
TOTAL	$118,575	TOTAL	$ 94,395	Total costs except for management	$ 24,180

[h]The $53,288 direct cost includes the $14,479 pasture rental value.

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold	
15 weaned steer calves	$ 8,836
14 cull cows	7,560
4 backgrounded steers	2,733
4 weaned heifer calves	2,049
1 cull yearling heifers	630
0.25 cull bulls	279
Sub-total	$ 22,087

Crops sold & Gov't payments	
635.5 tons alfalfa	$ 25,420
3,700 bu millet	15,262
3,904 bu buckwheat	15,136
Alfalfa seed	12,090
3,000 bu spr wheat	9,450
6,742 bu oat grain	9,102
Government payments	2,699
Sub-total	$ 89,159

[Gross value of production, including raised feed fed to cattle: $94,159]

TOTAL FARM GROSS REVENUE: $22,087 + $89,159 = $111,246 (19.9% livestock, 80.1% crops)

Total costs of production, except management (with raised feed valued at market prices)

Livestock	
Enterprise	Cost
39 cows and calves	$ 22,520
4 backgrounded steers (excluding the initial value of steer calves)	535
Sub-total	$ 23,055

Crop rotation (957 acres): Millet$_{clover}$-spring wheat$_{clover}$-buckwheat$_{clover}$-oat grain/oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up)

Sub-total $ 60,046

TOTAL FARM COSTS OF PRODUCTION: $23,055 + $60,046 = $83,101, of which $5,000 are common to both crop and livestock enterprises; thus, whole-farm total costs are $83,101 minus $5,000, or $78,101. Of these total costs, the following amounts are for:

* Land (rental value) $31,990 * Labor (family and/or hired) $8,006 * Other $38,105

Net revenue over total costs except management

Livestock	
Enterprise	Net revenue
39 cows and calves	$ - 810
4 backgrounded steers	- 158
Sub-total	$ - 968

Crop rotation: Millet$_{clover}$-spring wheat$_{clover}$-buckwheat$_{clover}$-oat grain/oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up)

Sub-total $ 34,113

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT: $ - 968 + $34,113 = $33,145

Total farm/ranch revenue over all costs except:

Management	$33,145
Labor and management	41,151
Land, labor, and management	73,141

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to cattle Amount	Fed to cattle Percent	Sold Amount	Sold Percent
Pasture	1,007	617 AUMs	516 AUMs	83.6	101 AUMs	16.4
Alfalfa	390	741 tons	105.5 tons	14.2	635.5 tons	85.8
Millet grain	185	3,700 bu	0	0	3,700 bu	100.0
Buckwheat	160	3,904 bu	0	0	3,904 bu	100.0
Oat grain	122	7,320 bu	578 bu	7.9	6,742 bu	92.1
Spring wheat	100	3,000 bu	0	0	3,000 bu	100.0
Total cropland	957	680 tons TDN	63 tons TDN	9.3	617 tons TDN	90.7
Total farmland	1,964	779 tons TDN	145 tons TDN	18.6	634 tons TDN	81.4

Livestock: 39 cow-calf units

* 97.6% pregnancy percentage
* zero pregnancy loss percentage
* 97.6% calving percentage
* zero calf death loss, based on exposed female
* zero calf death loss, based on number of calves born
* 97.4% of cows weaned calves at 7 months (38 calves)
* 38.5% cow replacement rate (herd size building up)[a] (15 heifer calves)
* 19 calves sold at weaning; steers average 630 lb, heifers 575 lb
* 4 backgrounded steers sold at 10 months (810 lb)

COSTS OF PRODUCTION

Crops (957 acres): Millet$_{clover}$-spring wheat$_{clover}$-buckwheat$_{clover}$-oat grain/oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation

* Direct costs	$ 21,467
* Fixed costs	38,579
* TOTAL CROP COSTS	$ 60,046

[a]Sixty five cows calved in 1995.

Livestock, by enterprise

Livestock enterprise	Fixed costs	Non-feed costs	Direct cost of production — Raised feed valued at: Market prices	Direct cost of production — Raised feed valued at: Production costs	Total direct production costs with raised feed valued at: Market prices	Total direct production costs with raised feed valued at: Production costs	Total production costs with raised feed valued at: Market prices	Total production costs with raised feed valued at: Production costs
39 cows	$5,024	$4,263	$13,233	$11,655	$17,496	$15,917	$22,520	$20,941
4 background-ed steers	58	2,552	281	206	2,833	2,758	2,891	2,816
TOTAL	$5,082	$4,459[a]	$13,514[b]	$11,861[c]	$17,973	$16,320	$23,055	$21,402

[a]The $6,815 sum of the above figures includes the initial $2,356 value of the 4 feeder calves that were retained and later sold as backgrounded steers. Since the $2,356 was not actually expended by the producer, the reported cost total is $2,356 less than the $6,815, or $4,459.

[b]The $13,514 includes crop production costs of $5,000 and a pasture rental value of $8,514.

[c]The $11,861 includes crop production costs of $3,347 and a pasture rental value of $8,514.

Summary: Crops and livestock

Method of valuing raised livestock feed	Direct costs of production — Crops	Direct costs of production — Livestock	Direct costs of production — Total	Total costs of production — Crops	Total costs of production — Livestock	Total costs of production — Total
Market costs	$21,467	$17,973	$34,440[d]	$60,046	$23,055	$78,101[e]
Production costs	$21,467	$16,320	$34,440[f]	$60,046	$21,402	$78,101[g]

[d]The $39,440 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $5,000 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $39,440 minus $5,000, or $34,440.

[e]The $83,101 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $5,000 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $83,101 minus $5,000, or $78,101.

[f]The $37,787 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $3,347 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $37,787 minus $3,347, or $34,440.

[g]The $81,448 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $3,347 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $81,448 minus $3,347, or $78,101.

Crops (957 acres): Millet$_{clover}$-spring wheat$_{clover}$-buckwheat$_{clover}$-oat grain/oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation

* Gross revenue	$ 94,159
* Net revenue over direct costs of production	$ 72,692
* Net revenue over all costs of production except management	$ 34,113

Livestock, by enterprise

Livestock enterprise	Gross revenue	Net revenue over direct costs of production with raised feed valued at: Market prices	Production costs	Net revenue over total costs of production with raised feed valued at: Market prices	Production costs
39 cows	$ 21,710	$ 4,214	$ 5,793	$ - 810	$ 769
4 backgrounded steers	2,733	- 100	- 25	- 158	- 83
TOTAL LIVESTOCK NET REVENUE	$ 24,443	$ 4,114	$ 5,768	$ - 968	$ 686

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 22,087	Direct costs	$ 34,440[h]	Direct costs	$ 76,806
Crops sold	89,159	Fixed costs	43,661		
TOTAL	$111,246	TOTAL	$ 78,101	Total costs except for management	$ 33,145

[h]The $34,440 direct cost includes the $8,514 pasture rental value.

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold		Crops sold and Gov't payments	
57 weaned steer calves	$ 32,878	258 tons alf/grass	$ 9,417
38 weaned heifer calves	17,885	2,880 bu winter wheat	8,640
16 cull cows	8,640	3,592 bu grain sorghum	6,645
1.33 cull bulls	1,649	Alfalfa seed	5,520
2 cull yearling heifers	1,140	Government payments	2,758
Sub-total	$ 62,192	Sub-total	$ 32,980

[Gross value of production, including raised feed fed to cattle: $42,159]

TOTAL FARM GROSS REVENUE: $62,192 + $ 32,980 = $95,172 (65.3% livestock, 34.7% crops)

Total costs of production, except management (with raised feed valued at market prices)

* Livestock (128 cows) $ 62,012

* Crops (610 acres): Winter wheat-fallow-grain sorghum-hay millet (alfalfa establishment)-alfalfa/grass (6 years)-alfalfa/grass (break-up) rotation $ 31,540

TOTAL FARM COSTS OF PRODUCTION: $62,012 + $31,540 = $93,552, of which $9,179 are common to both crop and livestock enterprises; thus, whole-farm total costs are $93,552 minus $9,179, or $84,373. Of these total costs, the following amounts are for:

* Land (rental value) $38,956 * Labor (family and/or hired) $8,860 * Other $36,557

Net revenue over total costs except management

* Livestock (128 cows) $ 180

* Crops (610 acres): Winter wheat-fallow-grain sorghum-hay millet-(alfalfa establishment)-alfalfa/grass (6 years)-alfalfa/grass (break-up) rotation $ 10,619

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT: $ 180 + $10,619 = $10,799.

Total farm net revenue over all costs except:

Management	$ 10,799
Labor and management	19,659
Land, labor, and management	58,615

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to cattle Amount	Fed to cattle Percent	Sold Amount	Sold Percent
Pasture	2,480	1,520 AUMs	1,481 AUMS	97.4	39 AUMS	2.6
Alfalfa/grass	260	441.5 tons	183.5 tons	41.6	258 tons	58.4
Summer fallow	120	n/a	n/a	n/a	n/a	n/a
Grain sorghum	110	3,960 bu	368 bu	9.3	3,592 bu	90.7
Winter wheat	90	2,880 bu	0	0	2,800 bu	100.0
Hay millet	30	60 tons	60 tons	100.0	0	0
Total cropland	610	402 tons TDN	131 tons TDN	32.6	271 tons TDN	67.4
Total farmland	3,090	645 tons TDN	368 tons TDN	57.1	277 tons TDN	42.9

Livestock: 128 cow-calf units

* 95.3% pregnancy percentage
* 0.78% pregnancy loss percentage
* 94.5% calving percentage
* 6.25% calf death loss, based on exposed females
* 6.61% calf death loss, based on number of calves born
* 88.3% of cows weaned calves at 6.5 months (113 calves)
* 14.1% cow replacement rate (18 heifer calves)
* 95 calves sold at weaning; steers average 585 lb, heifers 505 lb

COSTS OF PRODUCTION

Crops (610 acres): Winter wheat-fallow-grain sorghum-hay millet-alfalfa establishment alfalfa/grass (6 years)- alfalfa/grass (break-up)

* Direct costs $ 9,200
* Fixed costs 22,340
* Total crop costs $ 31,540

Livestock (128 cows)

Fixed costs	$ 15,024	Total direct production costs with raised feed valued at:	
Direct costs		Market prices	$ 46,988
Non-feed costs	13,397	Production costs	45,259
Feed costs with raised feed valued at:		Total production costs with raised feed valued at:	
Market prices	33,591[a]	Market prices	62,012
Production costs	31,862[b]	Production costs	60,283

[a]The $33,591 includes crop production costs of $9,179 and a pasture rental value of $24,412.

[b]The $31,862 includes crop production costs of $7,450 and a pasture rental value of $24,412.

Summary: Crops and livestock

Method of valuing	Direct costs of production			Total costs of production		
raised livestock feed	Crops	Livestock	Total	Crops	Livestock	Total
Market costs	$ 9,200	$ 46,988	$ 47,009[c]	$ 31,540	$ 62,012	$ 84,373[d]
Production costs	$ 9,200	$ 45,259	$ 47,009[e]	$ 31,540	$ 60,283	$ 84,373[f]

[c]The $56,188 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $9,179 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $56,188 minus $9,179, or $47,009.

[d]The $93,552 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $9,179 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $93,552 minus $9,179 or $84,373.

[e]The $54,459 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $7,450 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $54,459 minus $7,450, or $47,009.

[f]The $91,823 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $7,450 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $91,823 minus $7,450, or $84,373.

NET REVENUE

Crops (610 acres): Winter wheat-fallow-grain sorghum-hay millet-(alfalfa establishment)-alfalfa/grass (6 years)-alfalfa/grass (break-up) rotation

* Gross revenue	$ 42,159
* Net revenue over direct costs of production	32,959
* Net revenue over all costs of production except management	10,619

Livestock (128 cows)

* Gross revenue	$ 62,192
* Net revenue over direct costs of production with raised feed valued at:	
- Market prices	15,204
- Production costs	16,933
* Net revenue over all costs of production except management and with raised feed valued at:	
- Market prices	180
- Production costs	1,909

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 62,192	Direct costs	$ 47,009[a]	Direct costs	$ 48,163
Crops sold	32,980	Fixed costs	37,364	Total costs except for management	10,799
TOTAL	$ 95,172	TOTAL	$ 84,373		

[a]The $47,009 direct costs includes the $24,412 pasture rental value.

"NEAR-ORGANIC" FARM, NORTH CENTRAL REGION
WHOLE-FARM ANALYSIS FOR 1993

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold		Crops sold and Gov't payments	
38 backgrounded steers	$ 25,803	453.5 tons alfalfa	$ 24,942
38 backgrounded heifers	24,237	4,200 bu spring wheat	13,230
38 cull cows	23,940	1,111 bu corn grain	2,500
39 weaned steer calves	22,303	Government payments	2,232
39 weaned heifer calves	19,459	1,092 bu oat grain	1,474
2.57 cull bulls	3,187		
4 cull yearling heifers	2,520	Sub-total	$ 44,378
Sub-total	$121,449	[Gross value of production, including raised feed fed to cattle:	$102,767]

TOTAL FARM GROSS REVENUE: $121,449 + $ 44,378 = $165,827 (73.2% livestock, 26.8% crops)

Total costs of production, except management (with raised feed valued at market prices)

Livestock enterprise	Cost	Crop rotation (540 acres): Spring wheat -corn silage/corn grain-oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up), plus harvest of 200 acres of native hay	
201 cows and calves	$116,172		
78 backgrounded cattle (excluding the initial value of feeder calves)	10,243	Sub-total:	$60,473
Sub-total	$126,415		

TOTAL FARM COSTS OF PRODUCTION: $126,415 + $60,473 = $186,888, of which $58,389 are common to both crop and livestock enterprises; thus, whole-farm total costs are $186,888 minus $58,389 = $128,499. Of these total costs, the following amounts are for:

* Land (rental value) $35,846 * Labor (family and/or hired) $15,875 *Other $76,778

Net revenue over total costs except management

Livestock enterprise	Net revenue	Crop rotation (540 acres): Spring wheat -corn silage/corn grain-oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up), plus 200 acres of native hay	
201 cows and calves	$ - 4,071		
78 backgrounded cattle	- 895		
Sub-total	$ - 4,966	Sub-total:	$42,294

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT: $ - 4,966 + $42,294 = $37,328

Total farm net revenue over all costs except:

Management	$37,328
Labor and management	53,203
Land, labor, and management	89,049

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to cattle Amount	Percent	Sold Amount	Percent
Pasture	1,460	895 AUMs	895 AUMs	100.0	0	0
Alfalfa	220	836 tons	382.5 tons	45.8	453.5 tons	54.2
Native hay	200	400 tons	400 tons	100.0	0	0
Spring wheat	140	4,200 bu	0	0	4,200 bu	100.0
Corn silage	110	1,045 tons	1,045 tons	100.0	0	0
Oat grain	40	2,600 bu	1,508 bu	58.0	1,092 bu	42.0
Corn grain	30	1,800 bu	689 bu	38.3	1,111 bu	61.7
Graze corn stubble	30	30 days	9,600 lb TDN	100.0	0	0
Total cropland	540	855 tons TDN	481 tons TDN	56.3	374 bu tons TDN	43.7
Total farmland	2,200	1,186 tons TDN	812 tons TDN	68.5	374 tons TDN	31.5

Livestock: 201 cow-calf units

* 99.0% calving percentage
* 1.49% calf death loss, based on exposed females
* 1.51% calf death loss, based on number of calves born
* 97.5% of cows weaned calves at 8 months (196 calves)
* 20.9% cow replacement rate (42 heifer calves)
* 78 calves sold at weaning; steers average 580 lb, heifers 560 lb
* 76 backgrounded cattle sold at 11 months; steers 805 lb, heifers 785 lb

COSTS OF PRODUCTION

Crops (540 acres): Spring wheat-corn silage/corn grain-oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation, plus harvest of 200 acres of native hay

* Direct costs	$ 21,905
* Fixed costs	38,568
* TOTAL CROP COSTS	$ 60,473

Livestock, by enterprise

Livestock enterprise	Fixed costs	Direct costs of production: Non-feed costs	Raised feed valued at: Market prices	Raised feed valued at: Production costs	Total direct production costs with raised feed valued at: Market prices	Total direct production costs with raised feed valued at: Production costs	Total production costs with raised feed valued at: Market prices	Total production costs with raised feed valued at: Production costs
201 cows	$ 25,512	$ 18,945	$ 71,715	$ 51,674	$ 90,660	$ 70,619	$116,172	$ 96,131
76 backgrouned cattle	1,063	44,656	5,216	2,708	49,872	47,364	50,935	48,427
TOTAL	$ 26,575	$ 22,909[a]	$ 76,931[b]	$ 54,382[c]	$ 99,840	$ 77,291	$126,415	$103,866

[a]The $63,601 sum of the above figures includes the initial $40,692 value of the 76 feeder calves that were retained and later sold as backgrounded cattle. Since the $40,692 was not actually expended by the producer, the reported cost total is $40,692 less than the $63,601, or $22,909.

[b]The $76,931 includes crop production costs of $58,389 and a pasture rental value of $18,542.

[c]The $54,382 includes crop production costs of $35,840 and a pasture rental value of $18,542.

Summary: Crops and livestock

Method of valuing raised livestock feed	Direct costs of production: Crops	Direct costs of production: Livestock	Direct costs of production: Total	Total costs of production: Crops	Total costs of production: Livestock	Total costs of production: Total
Market costs	$ 21,905	$ 99,840	$ 63,356[d]	$ 60,473	$126,415	$128,499[e]
Production costs	$ 21,905	$ 77,291	$ 63,356[f]	$ 60,473	$103,866	$128,499[g]

[d]The $121,745 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $58,389 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $121,745 minus $58,389, or $63,356.

[e]The $186,888 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $58,389 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $186,888 minus $58,389, or $128,499.

[f]The $99,196 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $35,840 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $99,196 minus $35,840, or $63,356.

[g]The $164,339 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $35,840 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $164,339 minus $35,840, or $128,499.

NET REVENUE

Crops (540 acres): Spring wheat-corn silage/corn grain-oat grain (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation, plus harvest of 200 acres of native hay

* Gross revenue	$102,767
* Net revenue over direct costs of production	80,862
* Net revenue over all costs of production except management	42,294

Livestock, by enterprise

Livestock enterprise	Gross revenue	Net revenue over direct costs of production with raised feed valued at: Market prices	Production costs	Net revenue over total costs of production with raised feed valued at: Market prices	Production costs
201 cows	$112,101	$ 21,441	$ 41,482	$ - 4,071	$15,970
78 backgrounded cattle	50,040	168	2,676	- 895	1,613
TOTAL LIVESTOCK REVENUE	$162,141	$ 21,609	$ 44,158	$ - 4,966	$17,583

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$121,449	Direct costs	$ 63,356[b]	Direct costs	$102,471
Crops sold	44,378	Fixed costs	65,143	Total costs except for management	37,328
TOTAL	$165,827	TOTAL	$128,499		

[b]The $63,356 direct costs includes the $18,542 pasture rental value.

"MAINSTREAM" FARM, NORTH CENTRAL REGION
WHOLE-FARM ANALYSIS FOR 1993

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold	
80 weaned steer calves	$ 42,630
39 cull cows	22,815
37 weaned heifer calves	17,414
2.86 cull bulls	3,458
4 cull yearling heifers	2,400
Sub-total	$ 88,717

Crops sold and Gov't payments	
7,050 bu spring wheat	$ 22,208
6,800 bu barley	13,600
Government payments	5,969
2,899 bu oat grain	3,914
Sub-total	$ 45,691

[Gross value of production, including raised feed fed to cattle: $92,319]

TOTAL FARM GROSS REVENUE: $ 88,717 + $ 45,691 = $134,408 (66.0% livestock, 34.0% crops)

Total costs of production, except management (with raised feed valued at market prices)

Livestock (172 cows) $101,061

Crops and native hay

Crop system	Cost
515 acres: Corn silage-oat grain-barley-spring wheat rotation	$ 40,562
170 acres: Spring wheat-barley (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation	10,997
80 acres native hay harvest	2,805
Sub-total	$ 54,364

TOTAL FARM COSTS OF PRODUCTION: $101,061 + $54,364 = $155,425, of which $46,628 are common to both crop and livestock enterprises; thus, whole-farm total costs are $155,425 minus $46,628, or $108,797. Of these total costs, the following amounts are for:

* Land (rental value) $34,828 * Labor (family and/or hired) $11,565 * Other $62,404

Net revenue over total costs except management

Livestock (172 cows) $-12,344

Crops and native hay

Crop system	Net revenue
515 acres: Corn silage-oat grain-barley-spring wheat rotation	$ 18,302
170 acres: Spring wheat-barley (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation	16,058
80 acres native hay	3,595
Sub-total	$ 37,955

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT:

$ - 12,344 + $37,955 = $25,611

Total farm/ranch net revenue over all costs except:

Management	$25,611
Labor and management	37,176
Land, labor, and management	72,004

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to cattle Amount	Fed to cattle Percent	Sold Amount	Sold Percent
Pasture	1,215	745 AUMs	745 AUMs	100.0	0	0
Spring wheat	235	7,050 bu	0	0	7,050 bu	100.0
Corn silage	160	1,200 tons	1,200 tons	100.0	0	0
Barley	136	6,800 bu	0	0	6,800 bu	100.0
Alfalfa	84	320 tons	320 tons	100.0	0	0
Native hay	80	160 tons	160 tons	100.0	0	0
Oat grain	70	4,550 bu	1,651 bu	36.3	2,899 bu	63.7
Total cropland	685	790 tons TDN	466 tons TDN	59.0	324 tons TDN	41.0
Total farmland	1,980	984 tons TDN	660 tons TDN	67.1	324 tons TDN	32.9

Livestock: 172 cow-calf units

* 95.9% calving percentage
* 2.91% calf death loss, based on exposed females
* 3.03% calf death loss, based on number of calves born
* 93.0% of cows weaned calves at 8 months (160 calves)
* 25.0% cow replacement rate (43 heifer calves)
* 117 calves sold at weaning; steers average 525 lb, heifers 505 lb

COSTS OF PRODUCTION

Crops, by system

Crop system	Direct costs	Fixed costs	Total costs
515 acres: Corn silage-oat grain-barley-spring wheat rotation	$ 16,982	$ 23,580	$ 40,562
170 acres: Spring wheat-barley (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation	3,467	7,530	10,997
80 acres: Native hay harvested	728	2,077	2,805
TOTAL CROP COSTS	$ 21,177	$ 33,187	$ 54,364

Livestock (172 cows)

Fixed costs	$ 23,868
Direct costs	
Non-feed costs	15,134
Feed costs with raised feed valued at:	
Market prices	62,059[a]
Production costs	44,346[b]

Total direct production costs with raised feed valued at:	
Market prices	$ 77,193
Production costs	59,480
Total production costs with raised feed valued at:	
Market prices	101,061
Production costs	83,348

[a]The $62,059 includes crop production costs of $46,628 and a pasture rental value of $15,431.

[b]The $44,346 includes crop production costs of $28,915 and a pasture rental value of $15,431.

Summary: Crops and livestock

Method of valuing	Direct costs of production			Total costs of production		
raised livestock feed	Crops	Livestock	Total	Crops	Livestock	Total
Market costs	$ 21,177	$ 77,193	$ 51,742[d]	$ 54,364	$101,061	$108,797[e]
Production costs	$ 21,177	$ 59,480	$ 51,742[f]	$ 54,364	$ 83,348	$108,797[g]

[d]The $98,370 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $46,628 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $98,370 minus $46,628, or $51,742.

[e]The $155,425 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $46,628 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $155,425 minus $46,628, or $108,797.

[f]The $80,657 sum of the two prior figures includes, in common to both crop and livestock enterprises, and the $28,915 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $80,657 minus $28,915, or $51,742.

[g]The $137,712 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $28,915 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $137,712 minus $28,915, or $108,797.

Crops, by system

Crop system	Gross revenue	Net revenue over: Direct costs	Net revenue over: All costs except management
515 acres: Corn silage-oat grain-barley-spring wheat rotation	$ 58,864	$ 41,882	$ 18,302
170 acres: Spring wheat-barley (alfalfa establishment)-alfalfa (4 years)-alfalfa (break-up) rotation	27,055	23,588	16,058
80 acres: Native hay harvested	6,400	5,672	3,595
TOTAL CROP REVENUE	$ 92,319	$ 71,142	$ 37,955

Livestock (172 cows)

* Gross revenue	$ 88,717
* Net revenue over direct costs of production with raised feed valued at:	
- Market prices	11,524
- Production costs	29,237
* Net revenue over all costs of production except management and with raised feed valued at:	
- Market prices	- 12,344
- Production costs	5,369

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 88,717	Direct costs	$ 51,742[8]	Direct costs	$ 82,666
Crops sold	45,691	Fixed costs	57,055	Total costs except for management	25,611
TOTAL	$134,408	TOTAL	$108,797		

[8]The $51,742 direct costs includes the $15,431 pasture rental value.

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to cattle Amount	Fed to cattle Percent	Sold Amount	Sold Percent
Pasture	220	154 AUMs	154 AUMS	100.0	0	0
Alfalfa	135	541.5 tons	77.5 tons	14.3	464 tons	85.7
Oat grain	115	6,325 bu	850 bu	13.4	5,475 bu	86.6
CRP grassland	110	n/a	n/a	n/a	n/a	n/a
Corn grain	100	6,000 bu	732 bu	12.2	5,268 bu	87.8
Native hay	70	140 tons	70 tons	50.0	70 tons	50.0
Sorgh sud silage	35	350 tons	350 tons	100.0	0	0
Corn silage	25	212.5 tons	212.5 tons	100.0	0	0
Total cropland	520	605 tons TDN	175 tons TDN	28.9	430 tons TDN	71.1
Total farmland	810	695 tons TDN	232 tons TDN	33.4	463 tons TDN	66 6

Livestock: 51 cow-calf units

* 98.0% calving percentage
* 3.90% calf death loss, based on exposed females
* 4.00% calf death loss, based on number of calves born
* 94.1% of cows weaned calves at 7 months (48 calves)
* 21.6% cow replacement rate (11 heifer calves)
* 24 calves sold at weaning; steers average 540 lb, heifers 500 lb
* 13 slaughter steers sold at 24 months (1,290 lb)

COSTS OF PRODUCTION

Crops, by system

Crop system	Direct costs	Fixed costs	Total costs
275 acres: Corn grain-corn silage-oat grain-sorghum silage rotation	$ 12,772	$ 15,458	$ 28,230
135 acres: Alfalfa establishment-alfalfa (10-15 years)-alfalfa (break-up)	6,166	8,624	14,790
70 acres: Native hay harvested	1,467	2,309	3,776
TOTAL CROP COSTS	$ 20,405	$ 26,391	$ 46,796

"NEAR-ORGANIC" FARM, CENTRAL REGION
WHOLE-FARM ANALYSIS FOR 1993

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold	
13 slaughter steers	$ 12,410
13 weaned heifer calves	6,094
11 weaned steer calves	6,029
10 cull cows	5,400
0.57 cull bulls	671
1 cull yearling heifer	570
Sub-total	$ 31,174

Crops sold and Gov't payments	
464 tons alfalfa	$ 25,520
5,268 bu corn grain	11,853
5,475 bu oat grain	7,391
70 tons native hay	2,800
Government payments	5,450
Sub-total	$ 53,014

[Gross value of production, including raised feed fed to cattle: $71,733]

TOTAL FARM GROSS REVENUE: $31,174 + $ 53,014 - $84,188 (37.0% livestock, 63.0% crops)

Total costs of production, except management (with raised feed valued at market prices)

Livestock	
Enterprise	Cost
51 cows and calves	$ 28,959
13 slaughter steers (excluding the initial value of feeder calves)	8,524
Sub-total	$ 37,483

Crops and native hay	
Crop system	Cost
275 acres: Corn grain-corn silage-oat grain-sorghum silage rotation	$ 28,230
135 acres: Alfalfa establishment-alfalfa (10-15 years)-alfalfa (break-up)	14,790
70 acres native hay harvest	3,776
Sub-total	$ 46,796

TOTAL FARM COSTS OF PRODUCTION: $37,483 + $46,796 - $84,279, of which $18,719 are common to both crop and livestock enterprises; thus, whole-farm total costs are $84,279 minus $18,719 - $65,560. Of these total costs, the following amounts are for:

* Land (rental value) $17,076 * Labor (family and/or hired) $9,481 * Other $39,003

Net revenue over total costs except management

Livestock	
Enterprise	Net revenue
51 cows and calves	$ - 3,070
13 slaughter steers (excluding the initial value of feeder calves)	- 3,239
Sub-total	$ - 6,309

Crops and native hay	
Crop system	Net revenue
275 acres: corn grain-corn silage-oat grain-sorghum silage rotation	$ 4,121
135 acres: Alfalfa establishment-alfalfa (10-15 years)-alfalfa (break-up)	14,992
70 acres native hay	1,824
110 acres CRP grassland	4,000
Sub-total	$ 24,937

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT: $ - 6,309 + $24,937 - $18,628

Total farm net revenue over all costs except:

Management	$18,628
Labor and management	28,109
Land, labor, and management	45,185

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Livestock, by enterprise

Livestock enterprise	Fixed costs	Non-feed costs	Direct costs of production: Raised feed valued at: Market prices	Production costs	Total direct production costs with raised feed valued at: Market prices	Production costs	Total production costs with raised feed valued at: Market prices	Production costs
51 cows	$6,327	$5,789	$16,843	$13,695	$22,632	$19,484	$28,959	$25,811
13 slaughter steers	1,389	9,040	5,220	3,552	14,260	12,592	15,649	13,981
TOTAL	$7,716	$7,704[a]	$22,063[b]	$17,247[c]	$29,767	$24,951	$37,483	$32,667

[a]The $14,829 sum of the above figures includes the initial $7,125 value of the 13 feeder calves that were retained and later sold as slaughter steers. Since the $7,125 was not actually expended by the producer, the reported cost total is $7,125 less than the $14,829, or $7,704.

[b]The $22,063 includes crop production costs of $18,719 and a pasture rental value of $3,344.

[c]The $17,247 includes crop production costs of $13,903 and a pasture rental value of $3,344.

Summary: Crops and livestock

Method of valuing raised livestock feed	Direct costs of production: Crops	Livestock	Total	Total costs of production: Crops	Livestock	Total
Market costs	$20,405	$29,767	$31,453[d]	$46,796	$37,483	$65,560[e]
Production costs	$20,405	$24,951	$31,453[f]	$46,796	$32,667	$65,560[g]

[d]The $50,172 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $18,719 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $50,172 minus $18,719, or $31,453.

[e]The $84,279 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $18,719 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $84,279 minus $18,719, or $65,560.

[f]The $45,356 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $13,903 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $45,356 minus $13,903, or $31,453.

[g]The $79,463 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $13,903 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $79,463 minus $13,903, or $65,560.

NET REVENUE

Crops, by system

Crop system	Gross revenue	Net revenue over: Direct costs	All costs except management
275 acres: Corn grain-corn silage-oat grain-sorghum silage rotation	$ 32,351	$ 19,579	$ 4,121
135 acres: Alfalfa establishment-alfalfa (10-15 years)-alfalfa (break-up)	29,782	23,616	14,992
70 acres: Native hay harvested	5,600	4,133	1,824
170 acres: CRP grassland	4,000	4,000	4,000
TOTAL CROP REVENUE	$ 71,733	$ 51,328	$ 24,937

Livestock, by enterprise

Livestock enterprise	Gross revenue	Net revenue over direct costs of production with raised feed valued at: Market prices	Production costs	Net revenue over total costs of production with raised feed valued at: Market prices	Production costs
51 cows	$ 25,889	$ 3,257	$ 6,405	$ - 3,070	$ 78
13 slaughter steers	12,410	- 1,851	- 182	- 3,239	- 1,571
TOTAL LIVESTOCK REVENUE	$ 38,299	$ 1,406	$ 6,223	$ - 6,309	$ - 1,493

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 31,174	Direct costs	$ 31,453[h]	Direct costs	$ 52,735
Crops sold	53,014	Fixed costs	34,107	Total costs except for management	18,628
TOTAL	$ 84,188	TOTAL	$ 65,560		

[h]The $31,453 direct costs includes the $3,344 pasture rental value.

FARM ENTERPRISES

Farmland

Farmland use	Acres	Total production	Disposition of production: Fed to livestock Amount	Fed to livestock Percent	Sold Amount	Sold Percent
Pasture	315	221 AUMS	221 AUMS	100.0	0	0
Spring wheat	230	7,360 bu	0	0	7,360 bu	100.0
Corn grain	120	9,600 bu	3,204 bu	33.4	6,396 bu	66.6
Winter wheat	100	4,500 bu	0	0	4,500 bu	100.0
Alfalfa	73	280 tons	102.3 tons	36.5	177.7 tons	63.5
Oat grain	67	3,685 bu	287 bu	7.8	3,398 bu	92.2
Soybeans	25	700 bu	0	0	700 bu	100.0
Graze corn stubble	100	30 days	32,000 lb TDN	100.0	0	0
Total cropland	615	718 tons TDN	144 tons TDN	20.1	574 tons TDN	79.9
Total farmland	930	754 tons TDN	180 tons TDN	23.9	574 tons TDN	76.1

Livestock:

32 cow-calf units

* 100.0% calving percentage
* 3.13% calf death loss, based on exposed females
* 3.13% calf death loss, based on number of calves born
* 96.9% of cows weaned calves at 6 months (31 calves)
* 25.0% cow replacement rate (8 heifer calves)
* 23 calves sold at weaning; steers average 525 lb, heifers 450 lb

COSTS OF PRODUCTION

Crops, by rotation

Rotation	Direct costs	Fixed costs	Total costs
340 acres: Spring wheat-corn grain-soybean rotation	$ 25,149	$ 15,177	$ 40,326
190 acres: Winter wheat-corn grain-oat grain rotation	9,976	8,355	18,331
85 acres: Oat grain (alfalfa establishment)-alfalfa (5 yr)-alfalfa (break-up) rotation	3,748	6,124	9,872
TOTAL CROP COSTS	$ 38,873	$ 29,656	$ 68,529

"MAINSTREAM" FARM, CENTRAL REGION
WHOLE-FARM ANALYSIS FOR 1993

WHOLE-FARM SUMMARY

Gross revenue

Livestock sold	
16 weaned steer calves	$ 8,526
7 cull cows	3,780
7 weaned heifer calves	2,971
0.67 cull bull	789
1 cull yearling heifer	570
Sub-total	$ 16,636

Hogs sold	
224 slaughter hogs	$ 26,550
18 cull sows	3,438
2 cull boars	396
Sub-total	$ 30,384

Crops sold and Gov't payments	
7,360 bu spring wheat	$ 23,184
6,396 bu corn grain	14,391
4,500 bu winter wheat	13,500
Government payments	9,970
177.7 tons alfalfa	9,774
3,398 bu oat grain	4,587
700 bu soybeans	3,990
Sub-total	$ 79,396

[Gross value of production, including raised feed fed to cattle: $92,619]

TOTAL FARM GROSS REVENUE: $16,636 + $30,384 + $79,396 = $126,416 (37.2% LIVESTOCK, 62.8% CROPS)

Total costs of production, except management (with raised feed valued at market prices)

Livestock enterprise	Cost
32 cows and calves	$ 19,428
18 farrow and finish sows	23,859
Sub-total	$ 43,287

Crops: Rotation	Cost
340 acres: Spring wheat-corn grain-soybean rotation	$ 40,326
190 acres: Winter wheat-corn grain-oat grain rotation	18,331
85 acres: Oat grain (alfalfa establishment)-alfalfa (5 yr)-alfalfa (break-up) rotation	9,872
Sub-total	$ 68,529

TOTAL FARM COSTS OF PRODUCTION: $43,287 + $68,529 = $111,816 of which $13,223 are common to both crop and livestock enterprises; thus, whole-farm total costs are $111,81 minus $13,223, or $98,593.

Of these total costs, the following amounts are for:

* Land (rental value) $19,671 * Labor (family and/or hired) $11,979 * Other $66,943

Net revenue over total costs except management

Livestock: Enterprise	Net Revenue
32 cows and calves	$ - 2,792
18 farrow and finish sows	6,525
Sub-total	$ 3,733

Crops: Rotation	Net revenue
340 acres: Spring wheat-corn grain-soybean rotation	$ 9,047
190 acres: Winter wheat-corn grain-oat grain rotation	8,608
85 acres: Oat grain (alfalfa establishment)-alfalfa (5 yr)-alfalfa (break-up) rotation	6,435
Sub-total	$ 24,090

TOTAL FARM NET REVENUE OVER ALL COSTS EXCEPT MANAGEMENT:
$3,733 + $24,090 = $27,823

Total farm net revenue over all costs except:

Management	$ 27,823
Labor and management	39,802
Land, labor, and management	59,473

NET REVENUE

Crops, by rotation

Rotation	Gross revenue	Net revenue over: Direct costs	Net revenue over: All costs except management
340 acres: Spring wheat-corn grain-soybean rotation	$ 49,373	$ 24,224	$ 9,047
190 acres: Winter wheat-corn grain-oat grain rotation	26,939	16,963	8,608
85 acres: Oat grain (alfalfa establishment)-alfalfa (5 yr)-alfalfa (break-up) rotation	16,307	12,559	6,435
TOTAL CROP REVENUE	$ 92,619	$ 53,746	$ 24,090

Livestock, by enterprise

		Net revenue over direct costs of production with raised feed valued at:		Net revenue over total costs of production with raised feed valued at:	
Livestock enterprise	Gross revenue	Market prices	Production costs	Market prices	Production costs
32 cows	$ 16,636	$ 1,893	$ 4,220	$ - 2,792	$ - 465
18 farrow and finish sows	30,384	8,937	10,187	6,525	7,775
TOTAL LIVESTOCK REVENUE	$ 47,020	$ 10,830	$ 14,407	$ 3,733	$ 7,310

Whole farm

Total gross revenue		Total production costs		Whole-farm net revenue over:	
Livestock sold	$ 47,020	Direct costs	$ 61,840[a]	Direct costs	$ 64,576
Crops sold	79,396	Fixed costs	36,753	Total costs except for management	27,823
TOTAL	$126,416	TOTAL	$ 98,593		

[a]The $61,840 direct costs includes the $4,788 pasture rental value.

Livestock, by enterprise

Livestock enterprise	Fixed costs	Direct costs of production: Non-feed costs	Raised feed values at: Market prices	Raised feed values at: Production costs	Total direct production costs with raised feed valued at: Market prices	Total direct production costs with raised feed valued at: Production costs	Total production costs with raised feed valued at: Market prices	Total production costs with raised feed valued at: Production costs
32 cows	$ 4,685	$ 3,941	$ 10,802	$ 8,475	$ 14,743	$ 12,416	$ 19,428	$ 17,101
18 farrow and finish sows	2,412	14,238	7,209	5,959	21,447	20,197	23,859	22,609
TOTAL	$ 7,097	$ 18,179	$ 18,011[a]	$ 14,434[b]	$ 36,190	$ 32,613	$ 43,287	$ 39,710

[a]The 18,011 includes crop production costs of $13,223 and a pasture rental value of $4,788.

[b]The $14,434 includes crop production costs of $9,646 and a pasture rental value of $4,788.

Summary: Crops and livestock

Method of valuing raised livestock feed	Direct costs of production: Crops	Direct costs of production: Livestock	Direct costs of production: Total	Total costs of production: Crops	Total costs of production: Livestock	Total costs of production: Total
Market costs	$ 38,873	$ 36,190	$ 61,840[c]	$ 68,529	$ 43,287	$ 98,593[d]
Production costs	$ 38,873	$ 32,613	$ 61,840[e]	$ 68,529	$ 39,710	$ 98,593[f]

[c]The $75,063 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $13,223 market value of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $75,063 minus $13,223, or $61,840.

[d]The $111,816 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $13,223 market value of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $111,816 minus $13,223, or $98,593.

[e]The $71,486 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $9,646 actual production cost of the crops produced that was fed to cattle. Therefore, the total direct whole-farm cost is $71,486 minus $9,646, or $61,840.

[f]The $108,239 sum of the two prior figures includes, in common to both crop and livestock enterprises, the $9,646 actual production cost of the crops produced that was fed to cattle. Therefore, the total whole-farm cost is $108,239 minus $9,646, or $98,593.