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THE BEEF CATTLE INDUSTRY: CHALLENGES AHEAD

John W. Ross, Executive Vice President
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In some ways, it is a little difficult to talk about challenges ahead. Most of us are just trying to survive the challenges today; As the old saying goes, it is tough to remember that your objective was to drain the swamp, when you are up to your _____ in alligators.

However, we must look ahead. We cannot afford to be reactive managers, responding to crises as they arise. Instead, we need to get "pro-active" and anticipate the changes coming at us. In some cases, we can head off some of the negative changes. Where changes are positive, we need to restructure our operations, our businesses, to take advantage of the changes.

In fact, our biggest challenge ahead is to keep pace with change--which we must do if we are to be survivors in this cattle business. I am going to talk about some of the specific changes and challenges we face as an industry--and in the California Cattlemen's Association. But first, let me make a few observations about our industry and our Association.

One fact remains after all the speeches--you must go home and run your operation successfully. You are responsible for the decisions to keep your operation current and competitive. Such ideas as Mel Potter's cooperative meat processing plant do offer alot of promise, but it cannot help producer's who will not sell cattle because the grass is not gone or feeder's who want to use all grain in storage.

Efficiency is the key, but we are all tired of talking about it. However, unless we are efficient producers, we will not be in a position to take advantage of the opportunities that will occur over the next few years. Some have argued that we need to stop production research because we are already in

a state of over-production--I cannot agree: Unless we use current technology, we will continue to lose ground to our competitors for the consumer's protein dollar. Our competitors are increasing their efficiency; we must do likewise.

Efficiency does not just apply to the production sector alone. At a recent U.C. Extension meeting I took part in, a significant question was raised: Do we have an obsolete feeding industry in California, because we have an obsolete packing industry? And is our retail distribution system as efficient as it needs to be? Are we losing market share to poultry and fish as much because of changing retail practices as because of consumer demand? These are not questions that we producers and feeders can answer, but we need to be aware of the questions.

Against this backdrop, let me turn to the specific challenges I see ahead for the beef cattle industry and for the CCA:

We can expect to see a continual increase in the degree of influence that Federal farm programs have on the beef cattle industry. I was hopeful that the 1985 Food Security Act signalled a change toward less government involvement in agriculture. That is not to say that the Act itself is more market oriented--with such jewels as the cotton, rice and dairy programs, it is an extremely expensive program. However, I had hoped that it was kind of the last hurrah of extremely expensive and discriminatory programs.

I recently had an opportunity to hear Dr. Wayne Angell, Governor of the Federal Reserve Board. I was dismayed by his comments. Governor Angell is of the opinion that farm programs will continue indefinitely. The only changes that will be made, will be to place stricter limits on the amount of payment any one farmer can receive. Others in Washington, D.C., tell the same story. The sad side of this is that we appear to be finally recognizing farm programs for what they are: Social welfare programs, akin to food stamps.

From our point of view at CCA, we must focus on two areas: (1) Vigorous efforts to minimize the adverse effects of these programs (e.g., to stop future dairy herd manipulations, grain stocks manipulations and haying and grazing on acreage idled under farm programs). (2) We must learn to manage around the farm programs, adjusting our operations to the vagaries of the farm programs.

I might also note that one imminent change that will have far-reaching effects, both positive and negative, is the recently passed tax bill. This will change the structure of the business: Purebred operators are likely to be most impacted, given the loss of capital gains, the pre-productive period expense rules and some restrictions on cash accounting. Commercial cow/calf producers will also feel the impact of these items, as well as the loss of income averaging. Cattle feeders will lose some tax-incentive customers and will shift their focus from outside investors more to arranging financing for joint ventures and retained ownership plans.

These changes are not all bad--we should emerge from the transition period as a stronger industry more oriented to the economics of our investment. However, as economist John Kenneth Galbraith said, "Everything works out in the long run, except that in the long run we are all dead."

A second area of challenge and change is in marketing. We really must look at two kinds of change here: Changes in consumer marketing and changes in live cattle marketing. Fortunately, we are in a position to do something immediately about the first point with the recent implementation of the Beef Promotion and Research Order.

The BPRA will raise in excess of 60 million dollars over the next eighteen months. This money will be used for promotion of beef to consumers; educational programs for consumers, educators and medical professionals, and for research into new products and new ways of marketing our product. This national 1.00 dollar per head checkoff may do more for the industry than any other single change we have ever seen.

We must restore consumer confidence in beef and in our industry. The BPRA gives us an opportunity to control our own destiny by promoting our product as a safe, wholesome and nutrient dense part of the diet.

However, we will have to change some of our own attitudes and production practices. Consumers are generally demanding smaller proportions of beef (and other foods) in their meals. That suggests that we may have to turn to producing cattle that have smaller ribeyes and finish at less than 1100 pounds.

Another area where we have the responsibility for restoring consumer confidence is on food safety. The biggest issue here is our production practices; We cannot, as an industry, tolerate the mis-use and abuse of the products we use to produce beef. As CCA President John Lacey has said many times, if we do not use these products right then we will lose them--and we will deserve to lose them. Consumer confidence in the wholesomeness of the beef they are eating cannot be subordinate to convenience or our own production practices.

The success of the BPRA will depend directly upon the involvement of the entire beef production and distribution chain. If consumers are concerned that the beef they eat contains chemical residues or was not processed properly, we do not have enough money in the entire industry to offset those concerns. We each need to do our part.

On live cattle marketing, I expect to see many changes over the next few years. It is entirely possible that we will see the cooperative beef marketing concept I mentioned earlier become a reality. It is difficult to envision it on a national basis, but certainly it may work on a strictly regional basis. This will help in marketing cattle, but it is not a cure-all. Inefficient producers and feeders will still lose money.

We will see--in fact, are already seeing--an effort to produce and feed more cattle under contract, a trend that is already entrenched in the poultry industry. Feedlots will offer joint venture arrangements to producers, and then will turn and contract cattle to packers, who will have longer-term contracts negotiated with retailers and the restaurant trade.

Smaller producers will likely pool cattle more frequently to put together enough cattle to have some effect in the market. The producer with only 100 steers to sell will probably have to find three or four like himself to put together enough cattle so that a buyer will bother to listen to him.

Again, the decision on when and how to market must remain with the producer and feeder. That is not something that an Association like the CCA can get involved in--that decision is the most basic business decision the producer or feeder must make. However, CCA can and will work with the membership to provide information and background support to enable our members to make the best marketing decisions possible.

We can expect a massive restructuring in how credit is provided to agriculture. The restructuring is occurring now, as the Farm Credit System consolidates and addresses its problems. One of the changes in Farm Credit will be the centralization of FCS operations--fewer branch offices, Districts combined, and more control. In fact, the Farm Credit System may move away from direct lending and instead discount agriculture loans from commercial banks. It may also become involved in loan guarantees, assuming some of the responsibilities of the Farmer's Home Administration.

Under any circumstances, your relationship with your lender is changing. You will be expected to assume more responsibility for financial information and decisions. You can expect to see lenders requiring you to provide more detailed, current financial data. As a result, you will get to know your bookkeeper alot better.

Finally, we will see a trend toward separation of production and asset ownership. Bureau of the Census data indicate that over sixty percent of the commercial agricultural producers are only part-owners of their operations--they lease at least part of their operation. Similarly, ownership of equipment will diminish; Instead, we will lease more equipment and we will use that equipment longer. Again, this will change our relationships with our lenders. They will be alot more bottom line oriented.

Finally, we face serious challenges to our private property rights. There will be a continued effort to encroach upon our use of the resources under our control and ownership. Here in California, we must contend with efforts to regulate management practices related to hardwood rangelands, with Fish & Game regulations for wildlife management and recreational access (even to private lands), with Federal regulations on use of public lands, and with local zoning pressures made worse by the rapid increase in the California population.

We have tremendous competition for control of the resource base we rely upon. Our competition is not agriculturally-oriented, and has a much more limited concept of private property--their homes and yards are theirs, but any open land is to be used for the public interest. For example, we now have a new word making the rounds: "viewshed", or the area that the public considers scenic for the views it provides.

The concept is disturbing; After all, we have been providing those views without compensation for decades. Now, however, we may lose all rights to manage those views in the name of the public interest.

In one sense, we have already conceded part of the debate. When we fought the issues of public lands we accepted the concept of multiple-use management. After all, the public owned the lands and the land should be managed for all possible uses. However, the multiple-use management idea is being perverted into areas where it does not properly apply. We are forced to stop production on some private lands because of the public interest; we cannot change our use of our private lands because of the public interest. The attack goes on.

This is a battle we can win--we can preserve many of our property rights. However, it will require our involvement in the political arena to a level that we have never achieved before. In the Bay area, landowners have joined together with the Citizen's Land Alliance to protect their rights. We must do this in every part of the state. The CCA is making a commitment to develop the expertise and the data bank to provide assistance to our local cattlemen's Associations to deal with these issues.

Let me conclude by discussing the role of the California Cattlemen's Association, and by our affiliation with them, the National Cattlemen's Association. The business of the CCA is to provide representation in Sacramento for the California cattle industry on legislative and regulatory matters. Working through the NCA, we also represent the industry in Washington, D.C. We are increasing our commitment to our direct representation in both Sacramento and in Washington, D.C.

However, for the CCA to be effective, we need to build the commitment of the membership to a personal involvement in the political process. We expect our members to work to establish relationships with legislators and agency staff. We must have the vocal and visible support of the grass-roots producer and feeder if we are to have any say in the political process.

This means that we will probably be more outspoken than we have been in the past. Some may characterize us as being more combative--but we must get the message across that we will not be crowded. We want to work with the legislature and the government, but we will not be worked over by them. That is the message that the members must provide.

As I noted earlier, we are building a resource base, both in our staff expertise and resources and in the awareness of our membership. The key to the process is member involvement.

The CCA will change to accommodate the change we now see in the industry--just as our members must change to take advantage of the opportunities that are forthcoming.

The cattle business here in California is the second largest segment of California agriculture. We earn just over ten percent of all gross receipts to agriculture in the state. It is the finest way of life anyone can live. We must learn to treat it like a business and make it profitable enough to be able to afford the way of life.

The California Cattle Industry: Situation and Update^{1/}

by

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Cattle are still one of the West's and U.S.' most important agricultural enterprises. The value of the 11 Western States' inventory amounted to nearly \$8.6 billion dollars on January 1, 1986 and the value of the inventory in California was estimated to be close to \$2.6 billion-- about the same as last year's. The value of the total state herd was down in most of the states, reflecting continuing forced reductions of inventories. Some of the states, most notably Montana and South Dakota, whose inventory dropped in value 18 percent and 17 percent respectively, have experienced substantial reductions in the worth of their herds.

The industry is at a particularly important point in its continued struggle for prosperity, particularly in California. Livestock operators have been beset by a continued set of institutional, political and natural shocks. These blows have made economic life difficult for all managers during the past 15 years. Memory may be refreshed by summarizing important events happening during the period.^{2/}

	<u>Time Period</u>	<u>Event</u>	<u>Net Effect</u>
(1)	1970-75	Consumer Boycotts Price Controls	Liquidation Trigger Price Dampener
(2)	1970-77	Oil Embargo Soybean Embargo Detente PRC Diplomatic Thaw	Costs Increased
(3)	1973-77	Drought	Production Inhibitor ^{2/} Costs Increased
(4)	1976-80	Second Oil Embargo	Costs Increased
(5)	1979-82	Grain Embargo Oil Embargo	Costs Increased

^{1/} Presented at California Bankers' Association Meeting, Fresno, October 15, 1986 and University of California Fall Beef Cattle Days, November 6-11, 1986.

^{2/} One must distinguish between the effect of the 1973-74 drought and its devastating effect and the 1974-77 local drought. The latter, localized primarily on the West Coast, was compounded by the effects of the cattle cycle liquidation of 1973-76. Falling prices, which accompanied the liquidation, reached a low point in 1974-75.

(6)	1970-	Subsidized Grazing	Costs Decreased
(7)	1970-85	Parity Pricing Adjustments	Costs Increased
(8)	1979-	Import Law Adjustment	Prices Enhanced
(9)	1983-	PIK Program	Costs Increased
(10)	1985-	FSA of 1985	Costs Increased
(11)	1986-	Dairy Buyout Grazing Program	Markets Disrupted

General Economic Policies'-Happenings' Impact

(1)	1970-80	Lax Monetary and Fiscal Policy War	Demand Increased Inflation
(2)	1980-82	Tight Monetary and Lax Fiscal Policy	Demand Reduced, Costs Increased
(3)	1980-85	Changing Demand	Loss of Market Share Prices Depressed

In the short term, not all of the events discussed in the previous section have been detrimental to the livestock industry. For example, a relatively high inflation rate during the 1970's translated into rising land values and increased demand for red meats, particularly beef. Changes in the import laws have inhibited market entry. Thus, these devices have augmented domestic producer's prices. However, the aggregate net effect of government interference in the market place has been negative.

^{3/} The program is assessed in J.H. Cothorn, et. al. Preliminary Estimate: Impact of the Dairy Herd Liquidation Program on the California Dairy Industry, Prepared as a working paper for California Cattlemen's Association, 116 pgs., Davis, July 6, 1986. It provides the basis for this presentation.

California livestock^{4/} producers have been suffering from steadily rising costs, deterioration of local markets and declining incomes for an extended period of time. During the same period, dairy producers have been insulated from market adjustments by parity pricing, subsidized feed grains and other programs which maintained commodity input prices above market clearing levels.^{5/}

Government programs of the past two decades have induced dairy producers to expand their herds beyond tolerable economic limits. This expansion culminated in the poorly contrived 1985 Food and Security Act bail out legislation. The combination of all this economic programming has resulted in unpleasant economic conditions for the remainder of the livestock industry.

Short Term Impact of the Dairy Buyout

The previous brief industry over view is necessary in order to understand the nature of livestock producers' distress. The following reasons are significant:

- (1) Cattle industry cost-returns have been unnecessarily decreased by economic engineering
- (2) The California situation is exacerbated by a relatively high loss of slaughter and feeding facilities (markets)
- (3) The optimal use of California's vast range and forage producing resource is adversely affected by arbitrary government action
- (4) To the present time, livestock operators have not been compensated for economic damages inflicted by increases in beef supplies. Dairy herd liquidation resulted in seasonally lower beef cattle prices and reduced returns emanating from subsidized dairy slaughter

^{4/} "Livestock" in this case are defined as beef cow, stocker and sheep and lamb producers, as opposed to dairy producers, who may also produce veal and beef as byproducts of their normal or major activities.

^{5/} Estimates of dairy cow numbers necessary to meet California's needs are arguable. But research completed in 1980 suggested about 950 thousand would be more than ample--given industry technical efficiency growth rates. The stimulus of parity pricing raised the number to more than 1.05 million. This may be attained again in less than five years. See J.H. Cothorn, C.W. Gray. et. al. **The Economics of Interrelated Industries: The Future of the Livestock Industry in California.** Cooperative Extension Mimeo. Three Volumes. June, 1980.

Given the nature of industry vulnerability and the immediacy of the problem, the following subjects will be discussed:

- (1) Provide a statistical-historical review of the economic structure of the industry and evaluate the present situation in light of prior industry supply-demand evaluations
- (2) Summarize the present supply-demand situation, based on normal market operation
- (3) Provide a preliminary estimate of the near and longer term situation facing the California industry

Cattle Industry Structural Change

The impact of the events of the past ten years may be shown by looking at several key indicators. These are: (1) relative temporal changes in cattle numbers-operations in major producing regions, (2) relative measures of changes in profitability and price-cost relationships over time.

Relative Changes in Cattle Numbers.

An evaluation of cattle industry economic events may be accomplished in a multitude of ways. Two important portions of the production sector are the cattle and feedlot divisions. Changes in those sectors may be mirrored by evaluating: (1) trends in cattle numbers over time and, (2) changes in numbers from respective points in time (before and after analysis), (3) changes in feedlot numbers and marketings.

Estimates of Long Range Cattle Numbers: U.S., 1974-90.

The nation's cattle herd, as measured by United States Department of Agriculture-Statistical Reporting Service (USDA-SRS), is composed of several different sub-categories:

- (1) Beef cows and replacement heifers
- (2) Dairy cows (Included since male calves may ultimately be part of the fed cattle population)
- (3) Calves under 500 pounds
- (4) Calves over 500 pounds not kept as replacements
- (5) Cattle placed in feedlots or kept as feedlot replacements

Trends in Total Cattle Numbers: The Cattle Cycle.

The ebb and flow in herd expansion and contraction provides the basis for tracking the cattle cycle. This biologic phenomena portrays producers' response to present price signals. Economic stress suffered by cattle producers is evident when the nation's cattle herd is viewed over time. The nation's cattle inventory of 132. million animals was at a peak on January 1, 1975 (Table 1). This was a time of greatest supply, due primarily to a war-time, demand fueled 1970's economy. It was also a time of historically low real cattle prices, caused by a severe herd reduction in 1974-75. The reduction was triggered by the faulty 1973 government price controls signals and their subsequent lifting. The cattle herd has declined since then, and on January 1, 1986 summed to about 105.1 million animals, down about 4.0 percent from 1985 (Figures 1-2). This also represents a precipitous overall descent in beef cow numbers since 1975 (Figure 3).

The total calf crop in 1985 amounted to about 41 million animals (Figure 4), a reduction of more than 18 percent from 1975 (Figure 5).

Nationally, dairy cow numbers have tended downward as well, but in specific states, like California, dairy herd expansion was artificially impelled by administered price increases (Figure 3).

Projecting Future Cattle Numbers.

Since inventory numbers mirror a count of all animals in the system, including replacements, present best estimates indicate the total herd will continue to decline for at least three more years under the best of conditions. An assessment of available replacements in the system leads to that conclusion. Using this sort of analysis, the nation's herd is projected to dip below 97 million animals on January 1, 1989.

Scrutinizing the balance sheet for 1989, reveals an industry situation with a national inventory nearing 90 million animals. This would mean the nation's beef herd would **continue to decline** during the next five years. The amplitude and frequency of the cycle may be altered by a number of other factors with which the cattle producer presently must deal. They include changes in the demand for beef, as well as changes in tax laws and a number of other factors.

Trends in Beef Cow Numbers: U.S. and California.

The annual enumeration of beef cow numbers, like the total cattle count, has moved steadily downward since 1975. The downward tendency was arrested briefly from 1978-80 (Figure 3), when prices briefly stabilized .

The January 1, 1986 **beef cow** count revealed an estimated 33.6 million animals in the national herd. About 20 percent were in the 10 Western "traditional" beef producing states. About 29 percent were in the six Corn Belt states of S. Dakota, Nebraska, Iowa, Kansas, Missouri and Oklahoma (Figure 6). The "calculated" beef crop amounted to nearly 31.1 million animals.^{6/}

Only five states increased **total** cattle numbers from 1985 to 1986—California, Delaware, South Carolina, Virginia and Ohio (Figure 2). Yet, four of these same five states suffered reductions in beef cow numbers due to unfavorable economic conditions (Figure 7).

Trends in California Beef Cow Numbers.

Inspecting trends in the California situation is useful, since, contrary to what one might first suspect, California's total cattle herd has actually expanded over the past ten years. The contraction of both the feeding and cow-calf industries was offset by expansion in the dairy industry. The California beef cow herd has fluctuated from about 850 thousand to more than 1 million animals during the past decade. Producers pared approximately 61 thousand animals from the state's inventory during the January 1, 1985 - January 1, 1986 period (Figure 7). While the number of commercial producers actually affected by this financial stress is unknown, SRS reported 2.9 percent fewer firms in 1985 than in 1984 and the loss will be even greater this past year.

^{6/} The Calf Crop is calculated from estimates, since the actual number is affected by death loss, conception rates and the like and is not part of the inventory "count."

The total 1985 California calculated beef calf crop was estimated to be about 866 thousand animals (Figure 8), a figure which was 70 thousand lower than a decade earlier (Figure 9).

Relative Changes in Feedlot Numbers and Output.

Another part of the cattle industry showing the effects of continued competition is the feeding sector. This may be demonstrated in several different ways: (1) changes in number of operations, (2) output from relevant feedlot size groupings and (3) average output per feedlot.

Changes in Feedlot Numbers and Marketings.

In 1968, more than 135 thousand feedlots were active in the 13 major cattle feeding states and they marketed about 19.6 million animals. In 1980, feedlot numbers had decreased to about 78 thousand, but the number marketed from these feedlots had increased to more than 21 million. The 1985 census indicated there were nearly 51 thousand feedlots, but marketings from them had increased to more than 22 million animals.

Growth in the cattle feeding industry has occurred in several states, most notably in Colorado, Kansas, Nebraska and Texas. Texas feedlots have increased output from about 2 million head in 1968 to 4.2 million head in 1980. All Texas feedlots combined to market more than 5 million head in 1985--about 22 percent of total U.S. output (Figure 10).

For each of these "winners" there were obvious "losers". Two of the largest "losers" illustrate this point. Iowa's fed cattle output dropped from a 1968 figure of 4.6 million to about 2.1 million in 1985. California's aggregate state marketings have declined from about 2 million head in 1968 to slightly more than 1 million in 1985 (Figure 10).

Regionally speaking, the eastern Corn Belt and Southern Desert feeding areas have lost market share over the past decade. The Western Corn Belt and the Southern High Plains have more than offset this loss. Thus, there has been a net gain in marketings (Figure 11). The tendency has been for the smaller, farmer-owned feedlot to be replaced by the large, specialized feedlot, and most of these are located in the Western Corn Belt and the Desert Southwest.

The preceding data is indicative of the geographic shifts happening in cattle feeding, but does not tell why feedlot size has increased. For example, Texas feedlots, greater than 32,000 head capacity, marketed about 2.9 million of the 5 million head marketed last year, and average marketings per feedlot amounted to nearly 5 thousand animals. This was evident in other regions, particularly in the Desert Southwest. Annual marketings amounted to more than 13 thousand per feedlot in California, and 20 thousand in Arizona. (Figure 12).

The California Cattle Feeding Situation.

The prior analysis furnishes information regarding events transpiring in the industry, but it does not explain why these shifts have happened, or their implications for California cattle producers. California feedlots have traditionally been markets for California cow-calf operators.

Traditionally, about one-half the California cattle feeding capacity has been in the Southern Desert, while the remainder existed in the San Joaquin and Sacramento Valleys. Unfavorable weather and failure of slaughter facilities has eliminated all but a very few, large specialized lots in the San Joaquin, and this has resulted in a loss of market opportunity for the Northern Cow-Calf and stocker operator. Presently, many cow-calf operators seek market outlets in other western states in order to augment their limited in-state opportunities.

Slaughter Activity and Numbers

Over time, about 2 million animals have been killed in California slaughter plants, but this number has been declining in recent years. In 1985, about 1.6 million animals were killed in California packing plants. (Figure 13). Cow slaughter, as a proportion of total slaughter, has varied from about 13 to more than 20 percent of slaughter during liquidation years. It averaged about 16 percent of total slaughter in 1985 (Figure 14). The biggest "if" in California livestock industry economic analysis relates to the minimum number of slaughter plants the industry will be able to maintain. Analysis suggests no more than three or four.

Changes in Cow-Calf Industry Economics

The previous analysis directs attention to the effect of the decade's grinding competition and the resulting geographic and structural change within the industry. An investigation of regional cow-calf production economics indicates changes in firm revenue over time, as well as changes determining ultimate net revenue. Budgetary data is useful because it provides a basis for measuring the net effects of changes in both prices and input costs.

The most important exogenous event affecting the industry relates to the continuing rise in feed grains production, average yield per acre and stocks. This may be encapsulated by the fact that 1986 corn average yield per acre will be more than 115 bushels per acre (Figure 15) production will exceed 8.2 billion bushels (Figure 16), and stocks will exceed 5.2 billion bushels. Expect market prices to approach the \$1 per bushel level during the next marketing year. Is this fact positive or negative for the industry. In the short run, it has the effect of allowing feeders to bid up the price of feeder cattle, but in the longer term it will increase the red meat supplies in a market that already has problems.

Evaluation of Cow-Calf Budgets: The U.S.

The economics of various cow-calf operations throughout the U.S. is simulated by a series of regional budgets depicting "typical" production units. This series, standardized and computed annually over time, adds to an overall comprehension of changes in input costs, technological change and product prices and their effect on the economics of particular firms.

A methodical review of cow-calf budgets for the 1976-84 period discloses negative returns for six of the nine years considered. More disturbing is the fact the negative gap between income and cost has been increasing over the past three years. Costs are disaggregated so that they may be examined in a variety of ways. For purposes of this discussion, net returns less cash expenses were the base chosen.^{7/}

The budget data illustrate a common industry operating law. Ranchers have tended to accept a relatively low return to labor, capital and management in the short run. They have depended on increased value of the inventory, land and other capital to provide a positive return, or savings, in the longer term. The use of monetary policy to control inflation also negatively influenced this operational pattern. The industry is left in an even weaker position when programs which assist other industry segments are implemented at the livestock industries' expense.

Evaluation of Cow-Calf Budgets: The West.

An examination of budgetary data, computed for the Western tier of states, discloses a regional technical superiority over the aggregate U.S. budgets. However, the same weakening financial tendencies are observed. Net earnings varied from -\$2.31 per cow in 1976 to -\$57.89 in 1984 (Table 2).

All of the Western budgets, including those computed for California situations, indicate rising fixed expenses, i.e. taxes, interest and general farm over head, increased costs for pasture and range and a general increase in machine related costs. Receipts, when comparing 1976 to 1984, increased by a factor of 1.92 while cash expenses increased 2.06 times. These computations exclude payments to fixed factors.

Evaluation of Cow-Calf Budgets: California.

Evaluation of a California budget leads to surprisingly similar results for the very short time period considered. Variable costs amounted to about \$285 per cow, as opposed to \$280 per cow for all Western operations, and \$280 per cow for all Western operations. While the direct comparison of particular cost items may show differences, overall budget results indicate cattle ranchers in the U.S., the West and in California are not earning a sufficient return to cover all costs under existing price-cost levels. Since land is a major component in the cost-of-production mix, continued pressure on cattle prices translates into lower land values. This in turn is changed into a declining net worth and lower salvage values. The latter is particularly true if disposal of assets is forced.

^{7/} Allocation of fixed costs, i.e. depreciation, returns to land and other factors is always arguable, so this more conservative approach was used.

Net returns appear to have been slightly higher than the national average, i.e. "the net loss was smaller..." but this may be due to primarily to operating assumptions in the budget.^{8/}

Evaluating Cattle Feeding Economics

Cattle feeders in the U.S. experienced many of the same economic pressures as those felt by cow-calf operators during the 1976-86 period. Major input costs and revenues remained about in balance, and some loss of equity in typical operations was experienced. An evaluation of "breakeven selling prices" over the period is revealing.

Feedlot Break Even Analysis.

Tabular and graphic presentations of breakeven selling prices (prices received for cattle necessary to cover costs) may be compared to actual prices received. The comparisons are indicative of the sensitivity of seasonal marketing patterns and profitability. A calculation of these relationships over ten years in Corn Belt and Great Plains Feedlots provides an interesting barometer of seasonal cost-returns. The results point to the crucial importance of appropriate market timing.^{9/}

Over the ten year period considered, 28 "profitable" months existed in Corn Belt feedlots and **20 of them were in the first six months of the year.** Similarly, Great Plains feedlots experienced 26 profitable months in the 120 months considered. **Twenty-one of the 120 were in the first half of the marketing year** (Table 3 and 4).

This review alludes to two important considerations important to managers: (1) A regular seasonal pattern exists in relation to feedlot marketings and prices, and (2) A simplistic approach to pricing cattle based on cash market pricing would have resulted in an overall unprofitable situation for the individual feeder, thus the need to implement appropriate risk management strategies is apparent.

^{8/} The computations in the particular budget included are based on an operation with 50 percent equity in the equipment, an 80 percent equity in the livestock, operating only cow-calf operation as a sole proprietor. Obviously, this sort of "bench marking" is arbitrary, therefore, economic analysis based on cash costs seems more appropriate.

^{9/} Admittedly, the model involves some naive considerations. It incorporates a simple average of monthly prices paid for feeders, an appropriate feeding period for particular type of animal and a simple average of prices sold for each of the respective months. It does not consider uses of the future market, forward contracts, use of options or any other more selective marketing strategy. However, the bias considered in this sort of analysis is recognizable and consistent over time.

The analysis demonstrates two important seasonal considerations. Over the past ten years, prices tended to dip slightly through the winter, swing higher through early spring, sink through the late spring and summer and recover in the fall. Net returns from feedlots tend to mirror this fact.^{10/}

Tax Reform and the Cattle Industry

A great deal of speculation exists concerning the impact of tax reform on the status and conduct of the industry. While little can be said in definitive terms, economic theory suggests general effects.

- (1) The retention of allowances for declaration of expenses in one year and deferral of income until the next will allow the feeding industry to continue to be a **relatively** attractive method of sheltering "one-time" windfalls, but one must remember an individual is "rolling" income into a substantially different net taxable situation in 1987-89 than during prior years
- (2) Loss of investment credit and capital gains will make the cow-calf industry a less attractive investment, particularly with more rigorous burden-of-proof participation-at-risk clauses
- (3) Longer term consequences tend to be positive, since the loss of those incentives in (2) will tend to restrict animal numbers thus restrict output

^{10/} The time series reviewed excludes California as part of the series modeled. However, prior research shows about the same performance rates and **overall** economic efficiency levels. There are some basic and fundamental differences, i.e. slightly higher feed costs and feeder cattle transportation costs offset by greater technical efficiency and retail market economics. J.H. Cothorn, C.W. Gray, et.al., **The Economics of Interrelated Industries: The Future of the Livestock Industry in California, op.cit.** Cooperative Extension Mimeo. Three Volumes, Davis: June, 1980. Some fundamental changes are occurring in these latter areas which are discussed in more depth in Cothorn et.al. **Preliminary Impact.....**

Table 1

ESTIMATES OF LONG RUN CATTLE NUMBERS 1974-1990
(50 States)

2/19/86

Year	Numbers ^{a/} Jan 1	Total cattle Jan 1	Net imports	Calf crop	Cattle supply	Total Slaughter cattle : calves		Death Losses cattle : calves		Unexp. appear	Total disap.	Total cattle end of yr.
						-1000 head-						
1974	54478	127788	364	50873 (93.4)	179025	37327	3172	3000	4100	+602	46997	132028
1975	56931	132028	193	50183 (88.1)	182404	41464	5406	2396	4596	-562	54424	127980
1976	54971	127980	779	47384 (86.2)	176143	43196	5528	1821	3369	+581	53333	122810
1977	52441	122810	1026	45931 (87.6)	169767	42381	5692	2000	4000	+681	53392	116375
1978	49635	116375	1131	43818 (88.3)	161324	39970	4302	1940	3860	-388	50460	110864
1979	47852	110864	666	42596 (89.0)	154126	34005	2927	1900	3700	-352	42884	111242
1980	47866	111242	615	44938 (93.9)	156795	34117	2679	1795	3618	-235	42444	114351
1981	49622	114351	571	44666 (90.0)	159588	35265	2886	1700	3359	-934	44144	115444
1982	50216	115444	947	44200 (88.0)	160591	36158	3106	1843	3586	-897	45590	115001
1983	48986	115001	865	43925 (89.7)	159791	36974	3162	1877	3617	-461	46091	113700
1984	48603	113700	682	42500 (87.4)	156882	37892	3367	1873	3602	-399	47133	109749
1985 ^{b/}	46174	109749	458	41045 (88.9)	151252	36650	3453	1760	3550	-371	45784	105468
1986 ^{c/}	44812	105468	750	39997 (89.3)	146215	35863	3430	1650	3400	-469	44812	101403
1987 ^{c/}	42308	101403	750	38077 (90.0)	140230	34070	3259	1600	3300	0	42229	98001
1988 ^{c/}	43000	98001	750	39130 (91.0)	137881	33389	3194	1550	3200	0	41333	96548
1989 ^{c/}	44500	96548	750	41385 (93.0)	138683	31052	2970	1500	3000	0	38522	100161
1990 ^{c/}		100161										

a/ Cow and heifers that have calved
b/ Estimates
c/ Projected 1986 forward

Western Livestock Marketing Information Project

Table 2
COW-CALF PRODUCTION COSTS, PER COW, ALL SIZES, WEST, 1976-84

3.121
New Table

Item	1976	1977	1978	1979	1980	1981	1982	1983	1984
	— dollars per cow —								
Cash receipts:									
Steer calves	29.24	31.88	61.12	96.14	81.07	66.55	68.11	65.95	68.88
Heifer calves	17.44	19.02	36.46	57.36	48.37	39.22	41.03	38.96	39.88
Yearling steers	40.89	44.59	69.17	103.44	98.01	85.26	84.41	75.71	83.44
Yearling heifers	24.65	26.88	41.70	62.35	59.08	52.72	52.61	45.54	50.46
Cull cows	31.95	34.84	45.57	55.47	38.46	32.79	33.85	31.51	33.41
Total	144.17	157.21	254.02	374.76	324.99	276.54	280.01	257.67	276.07
Cash Expenses:									
Feed—									
Grain	0.00	1.46	3.61	6.22	11.27	7.82	8.08	10.57	11.08
Silage	0.00	0.00	0.40	0.89	1.70	1.70	1.70	1.97	2.01
Protein supplements	2.99	3.46	4.87	7.08	12.66	11.94	12.26	11.18	12.12
Salt and minerals	1.19	1.65	1.79	1.94	1.56	1.73	1.85	1.89	1.86
Hay	39.35	45.46	36.86	27.28	30.49	36.78	38.39	33.74	35.85
Pasture	7.94	8.91	9.11	9.71	40.48	45.05	44.89	44.40	43.42
Public grazing	4.17	3.62	2.83	2.71	1.85	2.02	1.91	1.68	1.63
Total Feed Costs	55.64	64.56	59.47	55.83	100.01	107.04	109.08	105.43	107.97
Other—									
Veterinary and medicine	3.64	3.97	4.17	4.64	5.27	5.82	6.44	6.64	6.95
Livestock hauling	1.41	1.53	1.63	1.87	2.15	2.41	2.68	2.72	2.78
Marketing	2.01	2.16	2.31	2.57	2.92	3.22	3.59	3.70	3.86
Fuel, lube, and electricity	7.84	8.43	8.84	11.55	15.84	17.91	17.34	16.53	16.55
Machinery and building repairs	10.81	11.63	12.56	13.78	15.12	16.79	18.72	19.82	19.82
Hired labor	6.23	9.67	12.57	15.88	19.48	20.82	21.63	22.17	22.45
Total, Variable Expenses	87.58	101.95	101.55	106.12	160.79	174.01	179.48	177.01	180.38
General Farm Overhead	5.56	6.55	11.34	18.94	18.75	17.70	18.21	17.14	18.79
Taxes and insurance	20.76	18.34	19.59	22.54	17.05	14.62	15.24	15.40	15.40
Interest	22.03	23.10	38.27	63.67	63.49	59.44	58.19	61.64	65.96
Total, Fixed Expenses	48.44	47.99	69.20	105.15	99.29	91.76	91.64	94.18	100.15
Total, Cash Expenses	136.02	149.94	170.75	211.27	260.08	265.77	271.12	271.19	280.53
Receipts Less Cash Expenses	8.15	7.27	83.27	163.49	64.91	10.77	8.89	-13.52	-4.46
Capital Replacement	10.46	15.89	18.13	24.94	44.92	48.18	53.84	53.36	53.43
Receipts Less Cash Expenses and Replacement	-2.31	-8.62	65.14	138.55	19.99	-37.41	-44.95	-66.88	-57.89
Economic (Full Ownership) Costs:									
Variable Expenses	87.58	101.95	101.55	106.12	160.79	174.01	179.48	177.01	180.38
General Farm Overhead	5.65	6.55	11.34	18.94	18.75	17.70	18.21	17.14	18.79
Taxes and Insurance	20.76	18.34	19.59	22.54	17.05	14.62	15.24	15.40	15.40
Capital Replacement	10.46	15.89	18.13	24.94	44.92	48.18	53.84	53.36	53.43
Allocated Returns to Owned Inputs:									
Operating Capital	3.10	3.50	5.21	7.68	12.98	16.91	14.04	12.61	12.95
Other Nonland Capital	8.72	13.25	15.11	20.79	44.05	41.92	42.08	41.00	41.00
Land	54.40	58.53	65.38	68.41	75.54	83.15	85.94	80.76	80.68
Unpaid Labor	35.18	31.73	41.55	52.90	64.48	69.32	72.19	74.32	75.43
Total, Economic Costs	225.85	249.74	277.86	322.32	438.56	465.81	481.02	471.60	478.06
Residual Returns to Management and Risk	-81.68	-92.53	-23.84	52.42	-113.57	-189.27	-201.01	-213.93	-201.99
Net Returns to Owned Inputs	19.72	14.48	103.41	202.22	83.48	22.03	13.24	-5.24	8.07

Table 3

BREAKEVEN SELLING PRICE AT CORN BELT FEEDLOTS

6/3/86

3.119

(Replaces table dated 4/9/86)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
(dollars per cwt)													
1976													
Break-even	43.50	44.67	45.79	45.30	44.01	43.98	44.18	46.40	45.94	48.68	49.42	49.49	45.95
Selling Price	41.18	38.80	36.14	43.12	40.62	40.52	37.92	37.02	36.97	37.88	39.15	39.96	39.11
Returns/cwt	-2.32	-5.87	-9.65	-2.18	-3.39	-3.46	-6.26	-9.38	-8.97	-10.80	-10.27	-9.53	-6.84
1977													
Break-even	47.82	46.35	45.06	43.66	42.07	43.58	44.41	45.31	46.10	47.72	47.04	45.09	43.35
Selling Price	38.38	37.98	37.28	40.08	41.98	40.24	40.94	40.11	40.35	42.29	41.83	43.13	40.38
Returns/cwt	-9.44	-8.37	-7.78	-3.58	-0.09	-3.34	-3.47	-5.20	-5.75	-5.43	-5.21	-1.96	-4.97
1978													
Break-even	44.27	43.12	41.92	41.95	43.54	44.82	46.42	48.70	52.04	54.71	57.91	56.66	48.01
Selling Price	43.62	45.02	48.66	52.52	57.28	55.38	54.59	52.40	54.26	54.93	53.82	55.54	52.34
Returns/cwt	-0.65	1.90	6.74	10.57	13.74	10.56	8.17	3.70	2.22	0.22	-4.09	-1.12	4.33
1979													
Break-even	57.02	57.81	58.26	59.04	59.80	62.88	66.79	70.39	74.65	76.65	75.93	73.06	66.02
Selling Price	60.35	64.88	71.04	75.00	73.99	68.53	67.06	62.74	67.84	65.81	67.00	68.72	67.75
Returns/cwt	3.33	7.07	12.78	15.96	14.19	5.65	0.27	-7.65	-6.81	-10.84	-8.93	-4.34	1.73
1980													
Break-even	74.42	71.32	75.27	72.84	73.03	73.52	73.48	74.81	70.98	66.72	66.72	69.17	71.86
Selling Price	66.32	67.44	66.80	63.07	64.58	66.29	70.47	73.31	69.68	67.18	65.05	64.29	67.04
Returns/cwt	-8.10	-3.88	-8.47	-9.77	-8.45	-7.23	-3.01	-1.50	-1.30	0.46	-1.67	-4.88	-4.82
1981													
Break-even	70.49	73.90	75.37	74.24	73.75	74.20	74.46	73.32	71.85	72.63	69.59	69.46	72.78
Selling Price	63.08	61.50	61.40	64.92	66.86	68.26	67.86	66.37	65.37	61.45	59.81	59.24	63.84
Returns/cwt	-7.41	-12.40	-13.97	-9.32	-6.89	-5.94	-6.60	-6.95	-6.48	-11.18	-9.78	-10.22	-8.94
1982													
Break-even	68.58	68.63	66.88	65.09	64.97	62.72	63.06	64.84	66.65	67.46	68.69	66.95	66.21
Selling Price	60.75	63.54	65.80	69.11	72.10	70.18	66.18	65.14	61.25	58.78	58.91	58.92	64.22
Returns/cwt	-7.83	-5.09	-1.08	4.02	7.13	7.46	3.12	0.30	-5.40	-8.68	-9.78	-8.03	-1.99
1983													
Break-even	66.36	66.64	64.06	62.00	63.03	62.28	64.87	67.29	69.19	69.90	69.93	68.08	66.14
Selling Price	59.33	61.20	64.03	67.70	67.51	65.90	62.22	61.27	59.19	59.58	59.41	62.85	62.52
Returns/cwt	-7.03	-5.44	-0.03	5.70	4.48	3.62	-2.65	-6.02	-10.00	-10.32	-10.52	-5.23	-3.62
1984													
Break-even	65.47	66.15	66.44	66.91	67.73	69.38	70.63	71.24	72.89	73.19	72.19	69.93	69.35
Selling Price	67.08	67.07	68.60	67.86	65.89	64.28	65.79	64.36	62.68	60.85	64.29	65.32	65.34
Returns/cwt	1.61	0.92	2.16	0.95	-1.84	-5.10	-4.84	-6.88	-10.21	-12.34	-7.90	-4.61	-4.01
1985													
Break-even	69.76	68.75	67.56	66.71	66.53	67.14	68.44	68.60	67.76	68.46	67.25	65.74	67.72
Selling Price	64.35	62.80	59.58	58.72	57.58	56.69	53.26	51.95	51.29	58.02	63.30	62.94	58.37
Returns/cwt	-5.41	-5.95	-7.98	-7.99	-8.95	-10.45	-15.18	-16.65	-16.47	-10.44	-3.95	-2.80	-9.35
1986													
Break-even	62.48	62.10	60.44	60.87	62.04								
Selling Price	59.69	56.42	55.55	53.68	55.79								
Returns/cwt	-2.79	-5.68	-4.89	-7.19	-6.25								

Table 4

BREAKEVEN SELLING PRICE AT GREAT PLAINS FEEDLOT

(Replaces table dated 6/3/86
3.118
4/9/86)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
(dollars per cwt.)													
1976													
Breakeven	45.64	46.59	45.10	45.58	46.42	47.72	46.14	48.15	47.52	50.61	50.06	50.33	47.65
Selling Price	41.38	38.96	35.88	45.10	41.49	41.57	37.91	37.54	37.46	38.40	40.10	41.10	39.74
Returns/cwt	-4.26	-7.63	-11.22	-4.48	-4.93	-6.15	-8.23	-10.61	-10.06	-12.21	-9.96	-9.23	-7.91
1977													
Breakeven	49.82	47.97	45.12	44.27	43.30	44.28	44.98	46.34	46.46	48.53	47.50	45.09	46.13
Selling Price	38.40	38.36	37.91	41.17	43.35	40.87	41.25	40.14	40.52	42.20	42.10	43.69	40.83
Returns/cwt	-11.42	-9.61	-7.21	-3.10	0.05	-3.41	-3.73	-6.20	-5.94	-6.33	-5.40	-1.40	-5.30
1978													
Breakeven	45.07	43.93	43.93	44.00	45.64	47.36	48.84	51.33	55.31	56.00	59.61	57.90	49.91
Selling Price	43.72	44.75	49.21	53.10	58.23	55.94	54.48	51.96	54.19	53.98	53.70	56.85	52.50
Returns/cwt	-1.35	0.82	5.28	9.10	12.59	8.58	5.64	0.63	-1.12	-2.02	-5.91	-1.05	2.59
1979													
Breakeven	59.13	58.70	60.75	60.82	62.62	64.19	69.63	72.87	77.75	79.48	77.19	72.50	67.96
Selling Price	61.28	65.14	72.15	75.72	75.73	70.48	69.25	63.50	68.80	65.49	68.15	69.66	68.77
Returns/cwt	2.15	6.44	11.40	14.90	13.11	6.29	-3.38	-9.37	-8.95	-13.99	-9.04	-2.84	0.81
1980													
Breakeven	75.57	72.61	75.37	74.17	75.92	76.46	75.45	77.50	74.36	68.94	69.55	69.96	73.82
Selling Price	67.17	68.80	67.75	64.92	67.32	68.42	72.05	72.96	69.82	68.62	67.12	67.08	68.50
Returns/cwt	-8.40	-3.81	-7.62	-9.25	-8.60	-8.04	-3.40	-4.54	-4.54	-3.32	-2.43	-2.88	-5.31
1981													
Breakeven	72.27	75.50	75.95	78.09	78.66	79.33	78.85	78.13	76.52	74.62	70.86	71.53	75.85
Selling Price	66.08	63.99	62.02	66.98	69.04	70.60	68.53	66.96	67.47	63.97	63.09	61.14	65.82
Returns/cwt	-6.19	-11.51	-13.93	-11.11	-9.62	-8.73	-10.32	-11.17	-9.05	-10.65	-7.77	-10.39	-10.03
1982													
Breakeven	70.29	69.40	69.18	67.14	67.25	64.69	65.37	67.68	68.37	67.89	69.29	68.49	67.92
Selling Price	62.34	64.81	67.00	71.64	74.43	71.58	66.66	65.76	62.29	61.54	61.64	61.64	65.94
Returns/cwt	-7.95	-4.59	-2.18	4.50	7.18	6.89	1.29	-1.92	-6.08	-6.35	-7.65	-6.85	-1.97
1983													
Breakeven	69.26	68.41	65.46	64.65	64.69	66.04	68.03	70.30	72.29	72.13	69.00	68.94	68.26
Selling Price	61.80	62.77	65.68	71.36	69.17	67.03	63.76	62.37	59.68	60.71	61.31	67.16	64.40
Returns/cwt	-7.46	-5.64	0.22	6.71	4.48	0.99	-4.27	-7.93	-12.61	-11.42	-7.69	-1.78	-3.86
1984													
Breakeven	67.14	67.14	66.76	66.83	69.59	72.24	73.40	73.67	73.30	73.14	71.03	70.02	70.36
Selling Price	69.49	68.43	71.00	70.09	67.31	65.31	66.22	64.54	62.60	62.14	66.06	68.19	66.78
Returns/cwt	2.35	1.29	4.24	3.26	-2.28	-6.93	-7.18	-9.13	-10.70	-11.00	-4.97	-1.83	-3.58
1985													
Breakeven	71.21	70.39	68.95	68.20	69.74	70.29	71.21	71.87	69.29	68.22	66.59	64.54	69.21
Selling Price	66.13	64.81	61.36	61.43	60.94	58.68	54.52	53.89	53.80	61.11	66.39	65.86	60.74
Returns/cwt	-5.08	-5.58	-7.59	-6.77	-8.80	-11.61	-16.69	-17.98	-15.49	-7.11	-2.20	+1.32	-8.47
1986													
Breakeven	62.84	62.21	58.65	61.30	62.76								
Selling Price	60.81	57.75	57.43	55.91	57.95								
Returns/cwt	-2.03	-4.46	-1.22	-5.39	-4.81								

Table 5

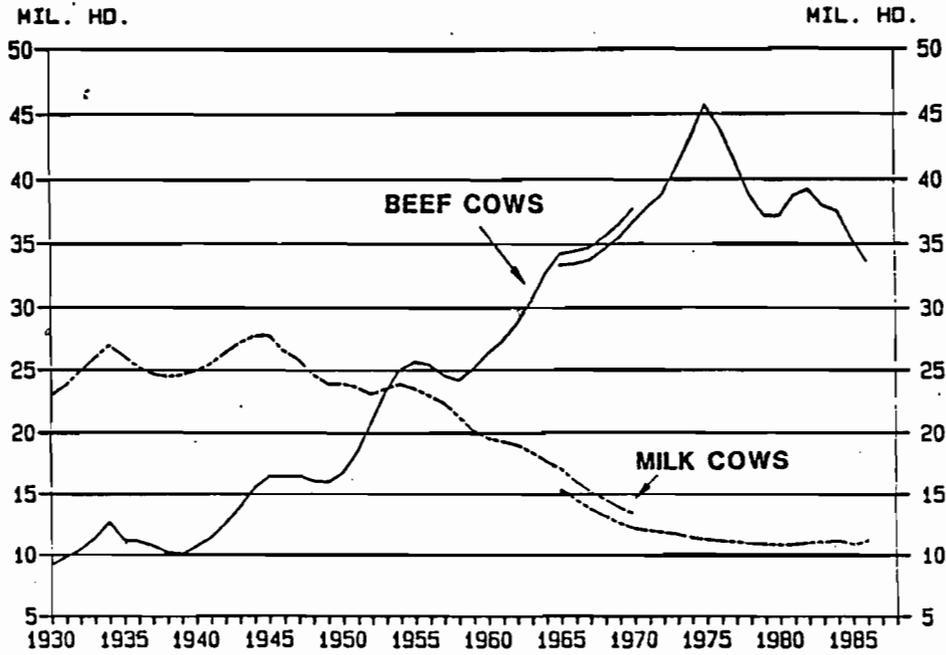
	A	B	C	D	E	F	G
1							
2	*****						
3	Beef Cattle Production Costs, Northern California, 1984						
4		550.00	Cows	.85	Calf Crop		
5			Stockers	.20	Rep. Rate		
6		151.00	Capital Days				
7	*****						
8							
9		Quantity	Weight	Price/U.	Total Value	Value/Ani.	Cost/Lb.
10							
11		-Number-	-Units-	-Dollars-	-Dollars-	-Dollars-	-Dollars-
12							
13	INVESTMENT						
14	Equipment-U.				15,000.00	27.27	
15	Cows-No.	550	1,000.00	.5000	275,000.00	500.00	
16	Calves-No.	468	550.00	.6200	159,417.50	289.85	
17	Bulls-No.	8	1,400.00	1.5700	18,133.50	32.97	
18	Horses-No.	2		500.0000	1,000.00	1.82	
19	Land-Acres						
20							
21	TOTAL INVESTMENT				468,551.00	851.91	
22	-----						
23	INCOME						
24	Steers-No.	234	625.00	.6700	97,882.81	177.97	
25	Steers-Purchased-No.	0	650.00	.6500			
26	Heifers-No.	124	550.00	.5700	38,795.63	70.54	
27	Cull Cows-No.	110	1,000.00	.4800	52,800.00	96.00	
28	Cull Bulls-No.	3	1,400.00	.5700	2,194.50	3.99	
29	Cull Heifers-No.	22	850.00	.4800	8,976.00	16.32	
30	SUB-TOTAL: WEIGHT						
31	TOTAL INCOME		346,706.25		200,648.94	364.82	.5787
32	-----						
33	EXPENSE						
34	Cash Costs						
35	Stockers-No.	0	350.00	.6000			
36	Hav, Cow Herd Maint.-T.	550	.75	85.0000	35,062.50	63.75	
37	Hav, Stockers-T.	0	.50	85.0000			
38	Range, Winter-AUM.	550	5.50	10.0000	30,250.00	55.00	
39	Range, Summer-AUM	550	5.00	10.0000	27,500.00	50.00	
40	Cotton Seed, Min.- Per AU.	550		13.2400	7,282.00	13.24	
41	Salt Blocks-Blocks Per AU.	550	.44	3.5000	847.00	1.54	
42	SUBTOTAL: FEED EXPENSE				100,941.50	183.53	.2911
43	General Expense						
44	Vet. Med.-Per Hd.	550		4.0000	2,200.00	4.00	
45	Gas, Propane and Fuel- Per Hd.	550		12.5700	6,913.50	12.57	
46	Repair and Maintenance- Per Hd.	550		11.0300	6,066.50	11.03	
47	Labor, Men per Month	1	12.00	850.0000	10,200.00	18.55	
48	Employee Ins., FICA-Pct of Base	1	12.00	.1340	1,366.80	2.49	
49	Liabl, Heal. Ins, Comp-Pct of Bas	3	12.00	.1751	5,358.06	9.74	
50	Range Improvement- Per AUM.	550	5.50	1.5000	4,537.50	8.25	
51	Fertilizer- Units Per Ac.	100	130.00	.2600	3,380.00	6.15	
52	Telephone- Per Hd.	550		.9200	506.00	.92	
53	Power and Electricity- Per Hd.	550		1.7700	973.50	1.77	
54	Livestock Transport.- Per Hd.	550		10.0000	5,500.00	10.00	
55							
56							
57	Interest on Oper. Capital	147943		.1450	8,874.57	16.14	
58	TOTAL VARIABLE COSTS				156,817.93	285.12	.4523
59	-----						
60	OVERHEAD COSTS: CASH						
61					2,500.00	4.55	

63	Land	0		.1250		
64	Equipment	15000	.50	.1450	1,087.50	1.98
65	Livestock	453551	.20	.1450	13,152.98	23.91
66						
67	TOTAL OVERHEAD COSTS				16,740.48	30.44 .0483
68	-----					
69	TOTAL VARIABLE PLUS					
70	CASH OVERHEAD COSTS				173,558.41	315.56 .5006
71	-----					
72	OVERHEAD COSTS: NON-CASH					
73	Depreciation					
74	Equipment- 3 Years	15000	.33		4,950.00	9.00
75	Bulls, Horses, Cows- 5 Years	294134	.20		58,826.70	106.96
76	Interest					
77	Land	0		.1050		
78	Equipment	15000	.50	.1050	787.50	1.43
79	Livestock	453551	.80	.1050	38,098.28	69.27
80	TOTAL NON-CASH OVERHEAD COSTS				102,662.48	186.66 .2961
81	-----					
82	TOTAL: ALL COSTS				276,220.90	502.22 .7967
83	-----					
84	INCOME MINUS CASH COSTS				27,090.52	49.26 .0781
85	-----					
86	INCOME MINUS ALL COSTS				-75,571.96	-137.40 -.2180
87	-----					
88	COST PER POUND SOLD AND B.E.		BASED ON	SALE WT. =	346706	
89	-----					
90	BREAK EVENS AT VARIOUS	PRICE	QUANTITY	PRICES AND	PRICE	QUANTITY
91	PRICES AND QUANTITIES	.4787	362540	QUANTITIES	.4787	576988
92	CASH COSTS	.5287	328256	TO COVER	.5287	522424
93		.5787	299896	ALL COSTS	.5787	477289
94		.6287	276046		.6287	439332
95		.6787	255711		.6787	406968
96		.7287	238166		.7287	379045
97	-----					
	EWE-CALF STOCKER OPERATION- 1ST YEAR OF A YEAR CYCLE					
98	cc1.sc2					

Figure 3

JANUARY 1 COW NUMBERS

50 STATES



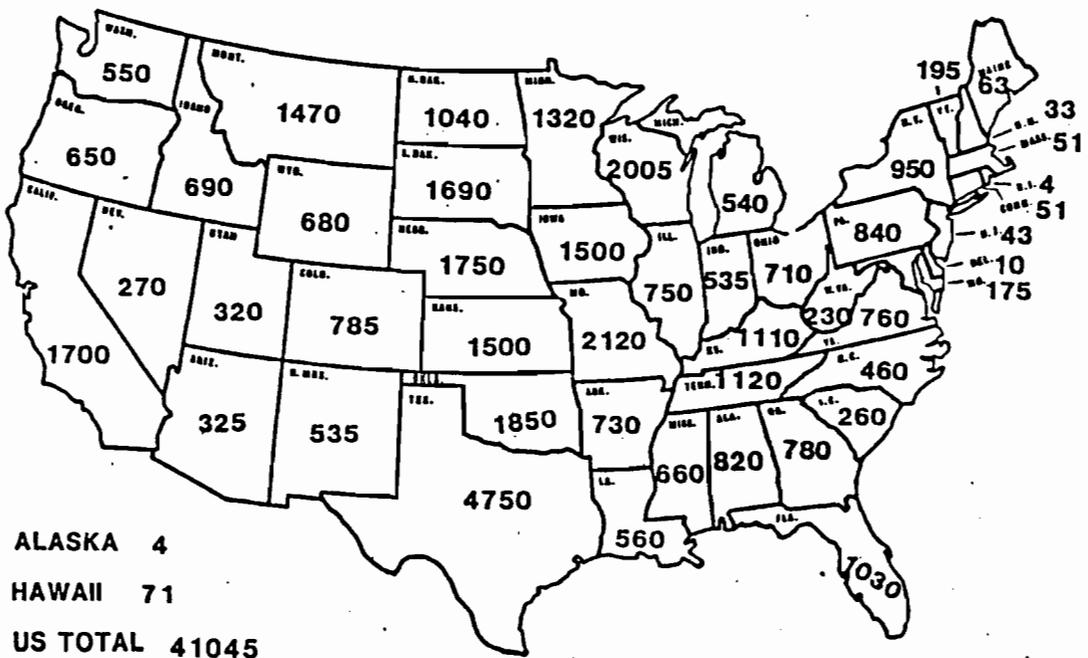
C-N-2
2-20-86

Western Livestock Marketing Information Project

Figure 4

TOTAL CALF CROP 1985

1000 HEAD



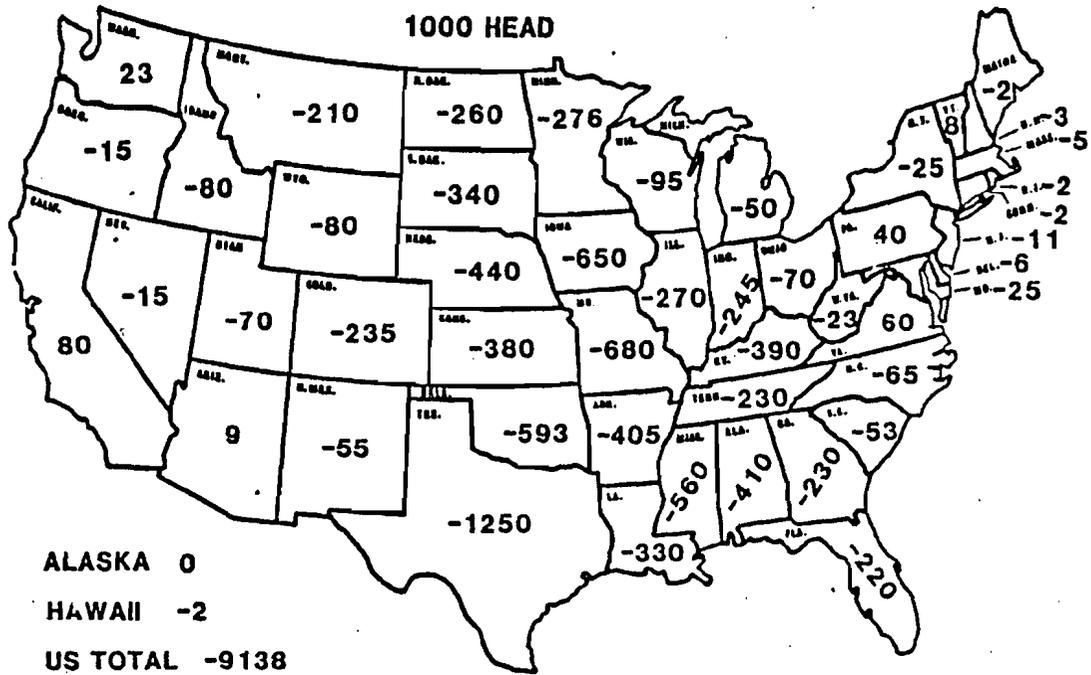
Western Livestock Marketing Information Project

C-N-18
2-20-86

Figure 5

**CHANGE IN TOTAL CALF CROP
1975 - 1985**

1000 HEAD



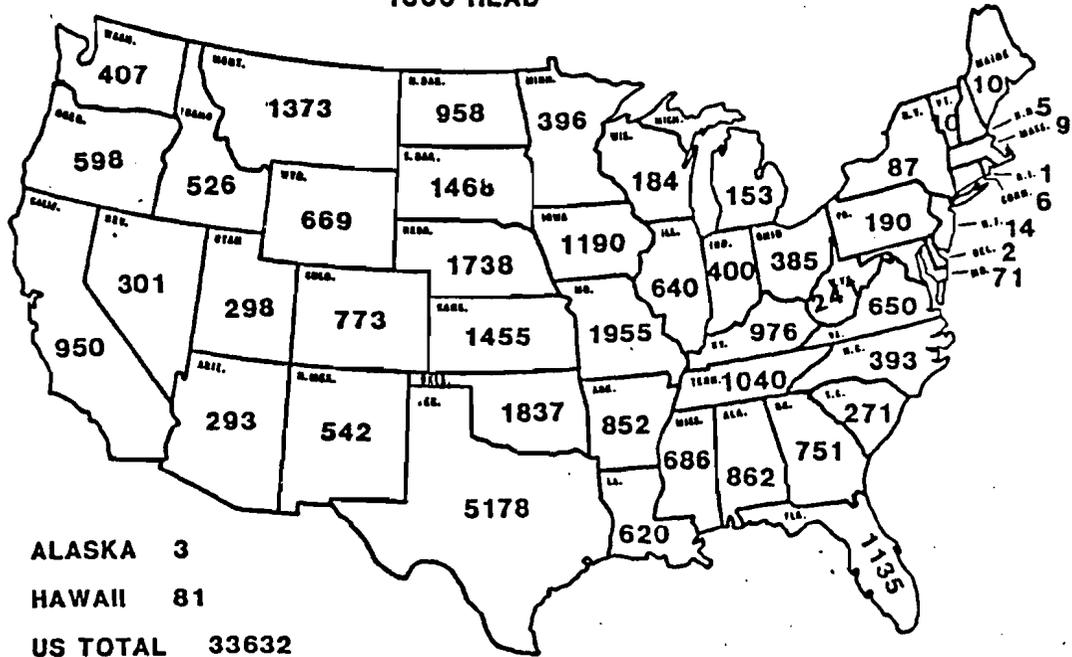
Western Livestock Marketing Information Project

C-N-21
2-20-86

Figure 6

**BEEF COWS THAT HAVE CALVED
JAN. 1, 1986**

1000 HEAD



Western Livestock Marketing Information Project

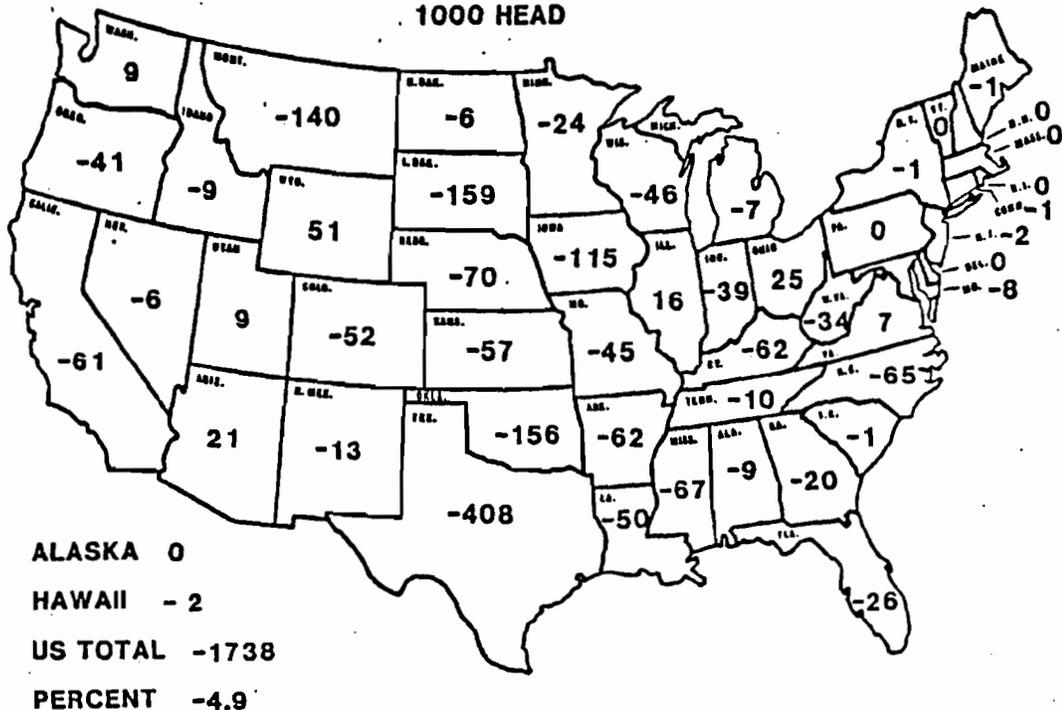
C-N-15
2-20-86

Figure 7

CHANGE IN BEEF COW NUMBERS

JAN. 1, 1985 to JAN. 1, 1986

1000 HEAD



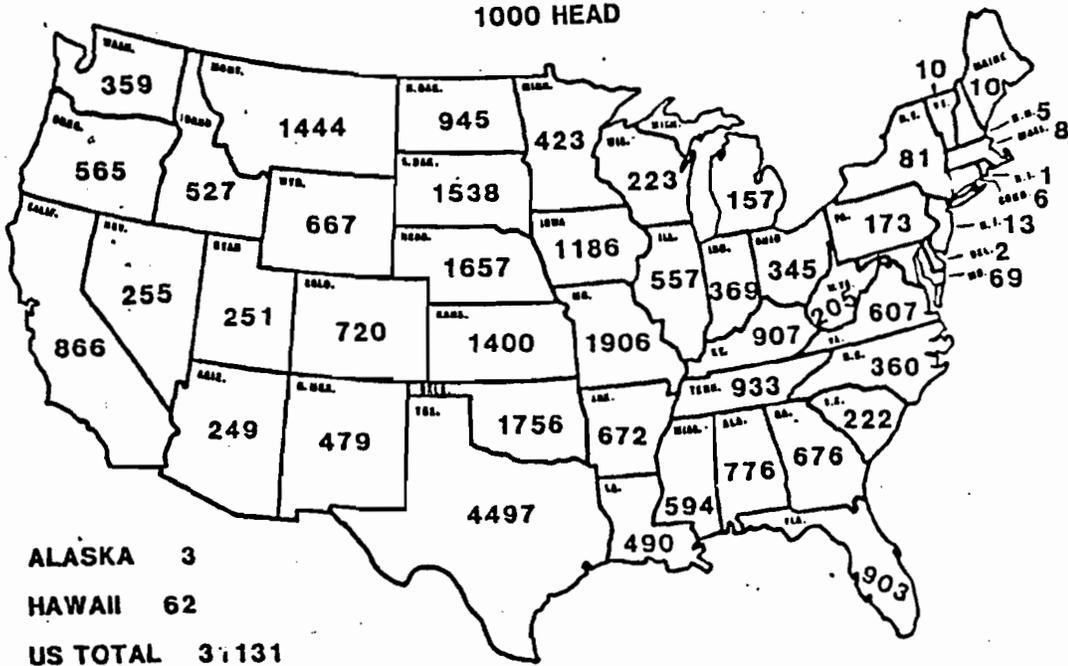
Western Livestock Marketing Information Project

C-N-28
2-20-86

Figure 8

CALCULATED BEEF CALF CROP 1985

1000 HEAD

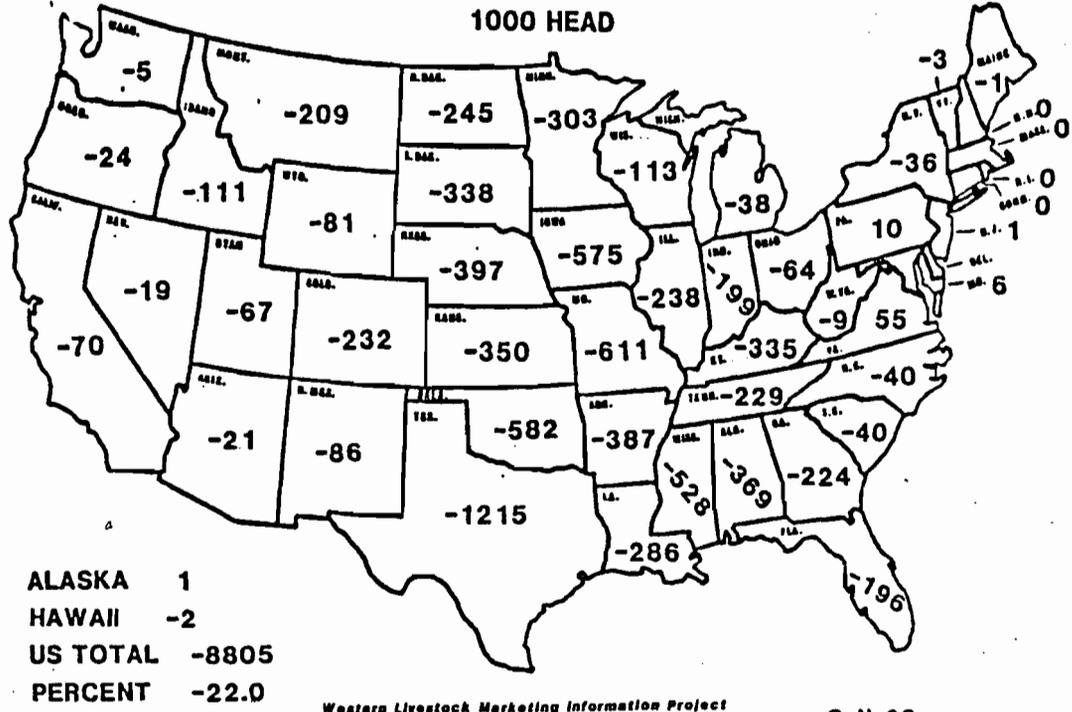


Western Livestock Marketing Information Project

C-N-17
2-20-86

Figure 9

**CHANGE IN BEEF CALF CROP
1975 - 1985
1000 HEAD**

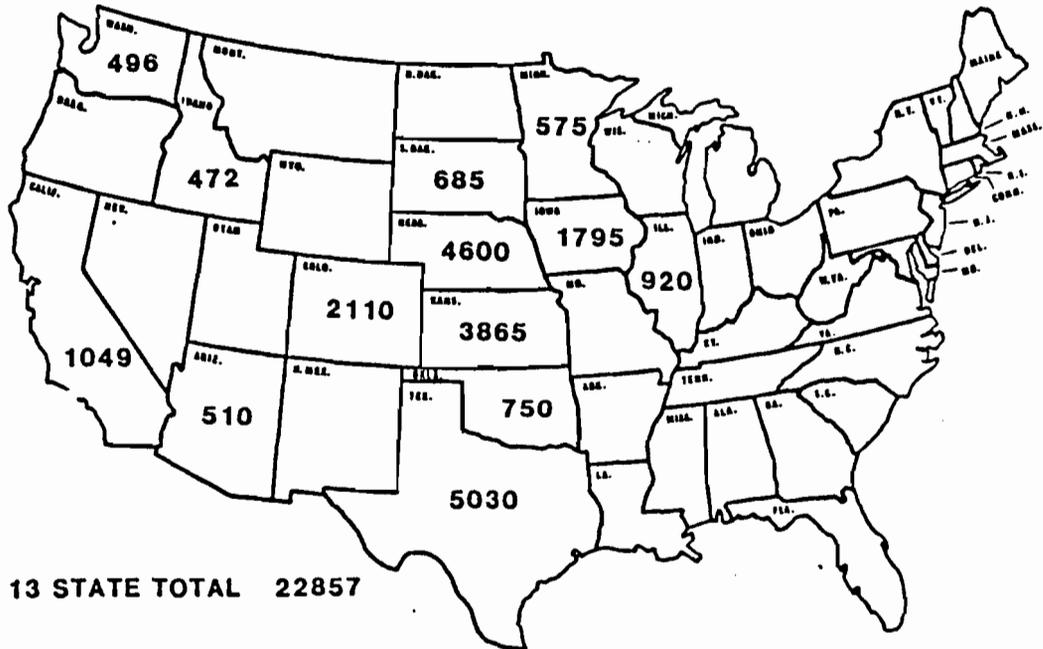


Western Livestock Marketing Information Project

C-N-20
2-20-86

Figure 10

**FED CATTLE MARKETINGS 1985
1000 HEAD**



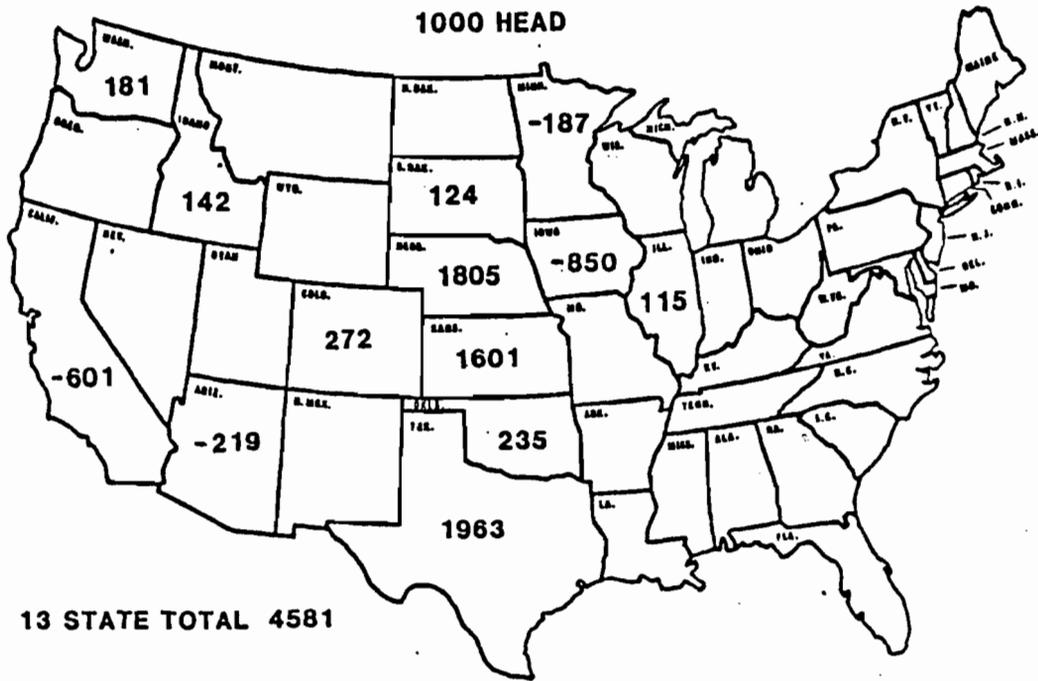
Western Livestock Marketing Information Project

C-M-18
2-20-86

Figure 11

CHANGE IN FED CATTLE MARKETINGS 1975 - 1985

1000 HEAD



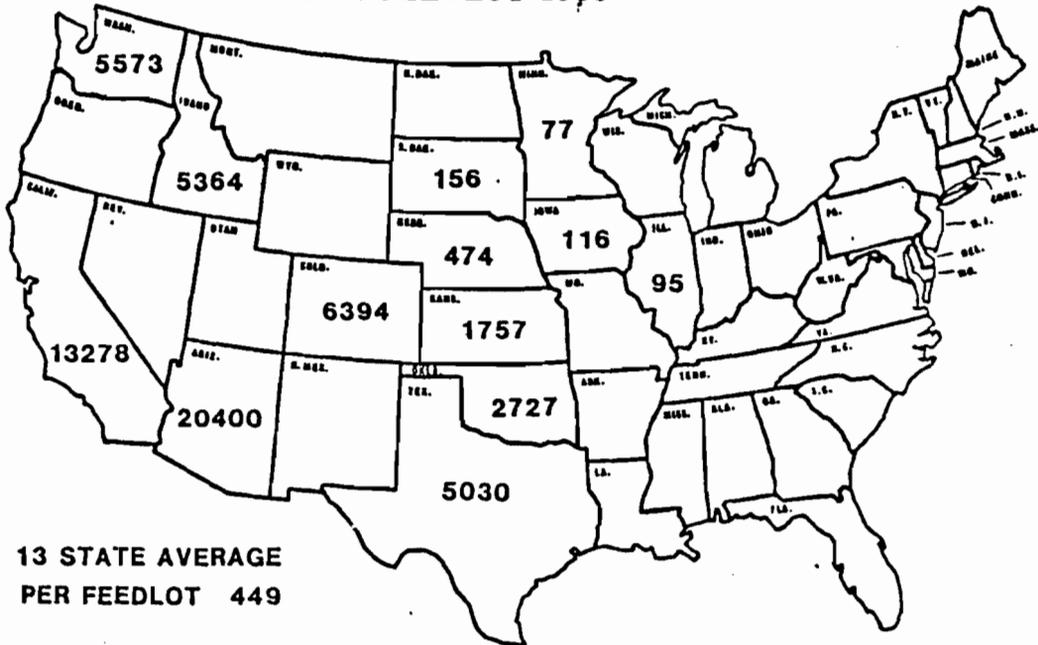
13 STATE TOTAL 4581

Western Livestock Marketing Information Project

C-M-19
2-20-86

Figure 12

AVERAGE NUMBER OF CATTLE MARKETED PER FEEDLOT 1985



13 STATE AVERAGE
PER FEEDLOT 449

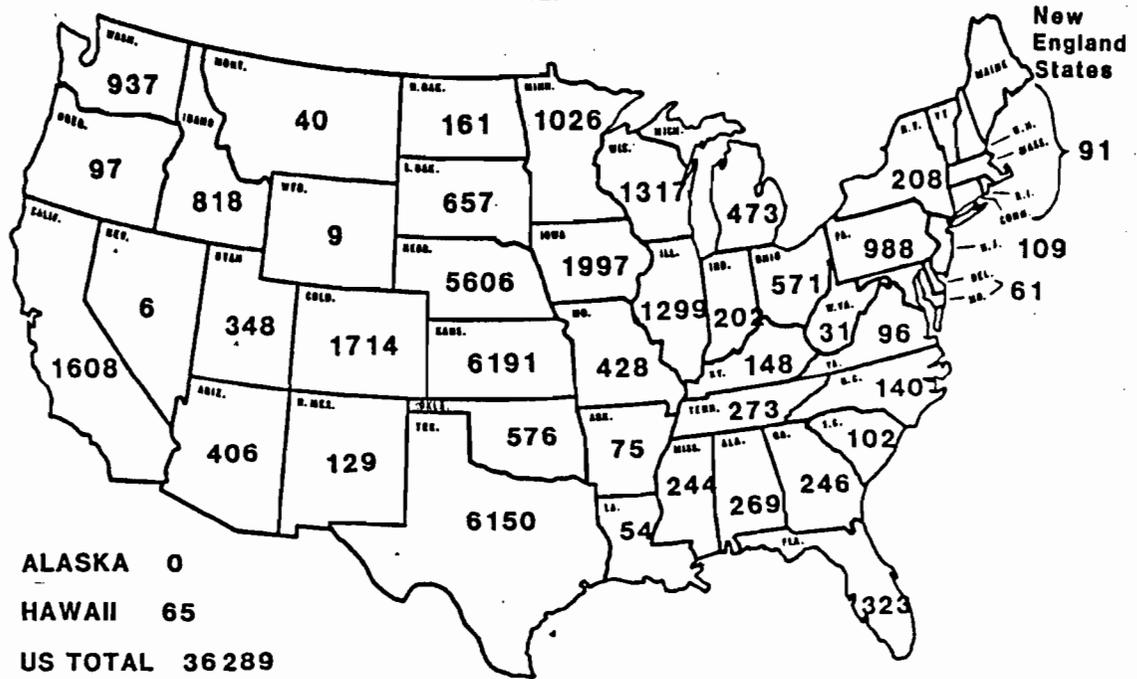
Western Livestock Marketing Information Project

C-M-17
2-20-86



Figure 13

COMMERCIAL CATTLE SLAUGHTER 1985 1000 HEAD



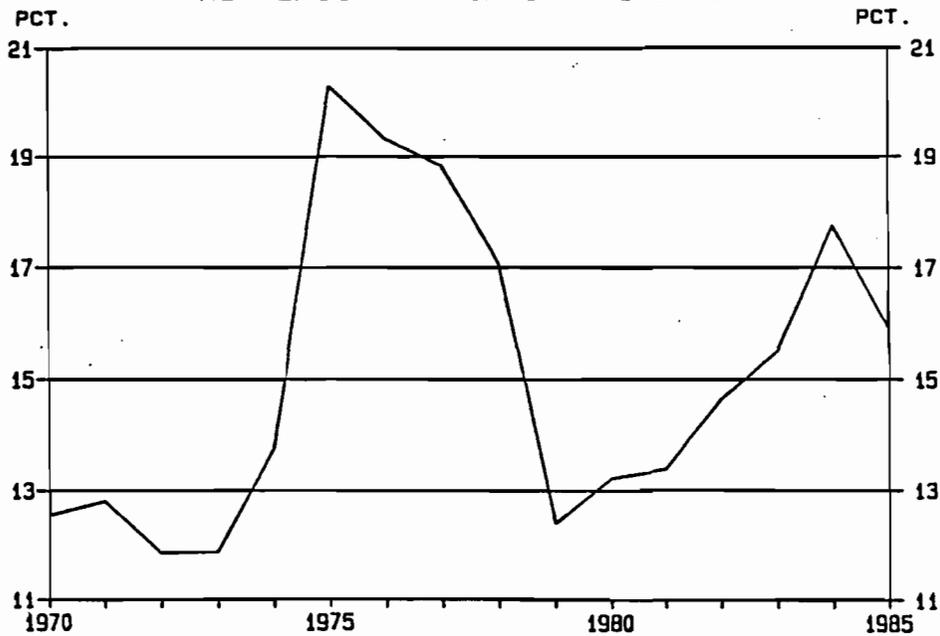
Western Livestock Marketing Information Project

C-S-25
2-20-86

Figure 14

COW SLAUGHTER

AS PERCENT OF JANUARY 1 COWS



Western Livestock Marketing Information Project

2-20-86
C-S-27

Figure 15

AVERAGE YIELDS OF CORN

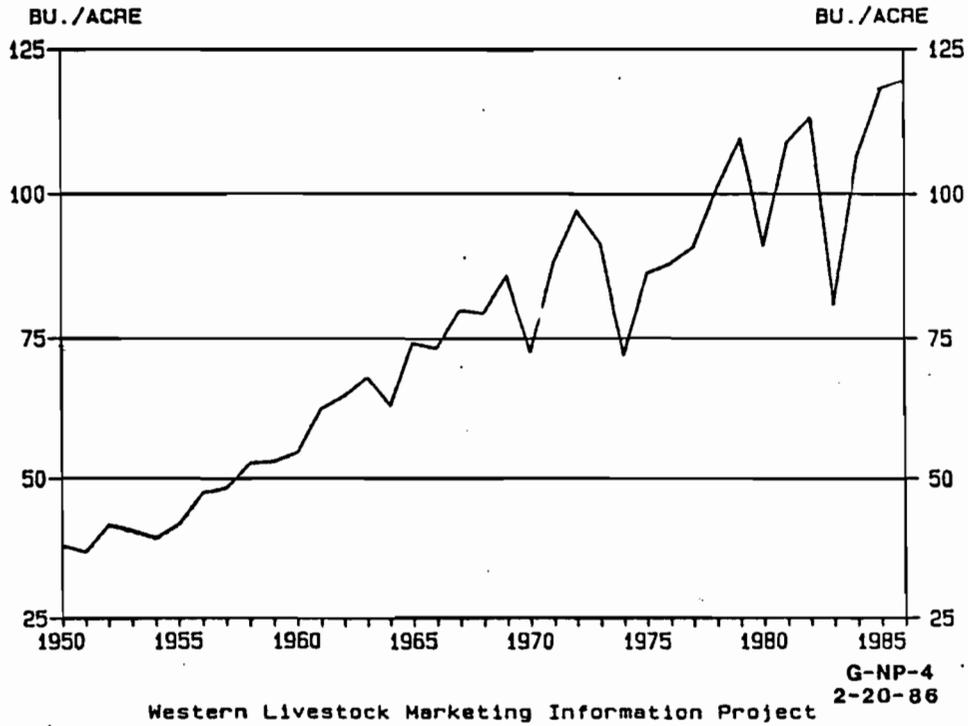
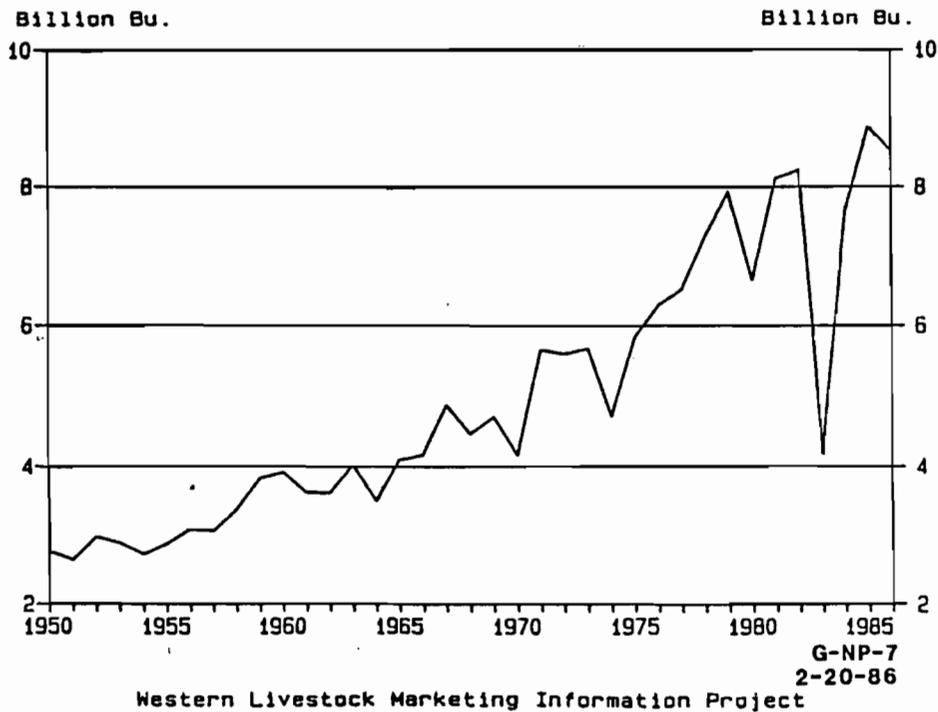


Figure 16

U.S. CORN PRODUCTION



Fall Cattle, Hog and Poultry Situation: Will the Inventories Stabilize?^{1/}

by

James H. Cothern, Extension Economist
University of California, Davis

Cattle

Cattle and calves on farms and ranches on July 1 numbered 112.2 million head--down 4 percent from a year ago and the lowest inventory since this series began in 1973. The January 1, 1986, inventory of 105.5 million head was the lowest since 1963, and if it continues to decline near the 4 percent pace through January 1, 1987, could approach 101 million head. The Cattle report indicates that the liquidation may be nearing an end, but inventories will continue to decline through 1987 and increased production is unlikely before at least 1988/89. Very favorable forage conditions in much of the country in 1985 and first-half 1986 plus lower feeding costs have helped stabilize beef cattle numbers, even as dairy cattle inventories decline due to the Dairy Termination Program (DTP).

Although the mid-year inventory does not contain State data, it appears that producers in some areas have already stabilized their herds or perhaps begun to expand them. Severe drought in the Southern and Central Great Plains in 1983 and 1984 forced sharp reductions in the area's beef herds. Many of the established herds are likely being expanded toward fuller, though unlikely full, utilization of available forage supplies. It is unlikely that many producers who exited the beef sector during the 1980's because of financial problems will be able to generate sufficient cash flow to justify the investment necessary to reestablish a beef herd in the foreseeable future.

Most of the country has abundant forage supplies and another bumper hay crop, but the Southeast is suffering through the severest drought in over a century. While Alabama, Georgia, South Carolina, North Carolina, and Virginia were the hardest hit through late July, the entire Southeast region had near record temperatures in late July. Cooler temperatures and rainfall in early August provided some relief. These five States comprise nearly 9 percent of the beef cow inventory, while the 11 States in the Southeastern region, accounted for 24 percent of the inventory at the beginning of the year. Livestock sales in this region have been running at near capacity as parched pastures and dwindling hay stocks forced cattle on the market early. However, prospects of reduced cattle and beef supplies have strengthened demand for cattle to be placed on pastures in other areas.

^{1/} Presented at a California Banker's Association Meeting, Fresno, October 15, 1986 and California Beef Cattle Days, November 6-11, 1986. Much of the material is extracted from the **Livestock and Meat Situation**, Electronic edition, ERS-USDA. Their contribution is gratefully acknowledged,

Consequently, demand and prices for medium to thinly fleshed stocker-feeder cattle in this area have been good. However, many fleshy feeder-cattle have already gone to slaughter. In addition, many of the cows being sold are going to slaughter because of the poor financial position of producers in other areas.

DTP Program Impact.

Contract modifications in the first disposal period, April 1 through August 31, smoothed out dairy cattle slaughter patterns, particularly in August. Producers originally intended to slaughter nearly 229,000 cattle in August, second only to the 275,000 head intended for April. A compromise with several cattle groups permitted DTP producers to modify contracts to shift cattle from the first period to the second or third period for disposal. A total of 1,116 participants modified their contracts. Nearly 172,000 DTP cattle were probably disposed of during August. The expected number and reductions in thousands of head (in parentheses) were as follows in thousand of head: cows 98 (35); heifers 39 (11); and calves 35 (11).

While this shift could reduce the slaughter at the end of period one, other factors offset the DTP adjustment. The drought in the Southeast resulting in loss of forage, higher feed costs, and water scarcity probably encouraged some DTP participants to move up the disposal schedule. Producers must have only half of the number of cows on their farms at the beginning of the disposal period, that they had when they signed up for the program. Thus a number of dairy cattle in the Southeast designated for slaughter in the second or third periods were probably slaughtered in August as conditions continued to deteriorate.

Red meat purchases for domestic use and export under provisions of the Food Security Act of 1985 were an offset to the impact of increased dairy cattle slaughter under the Dairy Termination Program. Large domestic red meat purchases in addition to normal purchases have already been made. In addition, large purchases are continuing for export. Purchases for additional domestic use and export through August 1 were 247.4 million pounds, product weight. Export purchases particularly, for Brazil, remained large through late summer.

Inventory Decline Continues

During first-half 1986, cattle slaughter rose 3 percent over a year earlier and calf slaughter increased 7 percent. The sharpest year-to-year increase was cow slaughter, up 11 percent, due to higher dairy cow slaughter. Steer slaughter rose 2 percent, while heifer slaughter remained large, but unchanged from a year ago. Bull and stag slaughter dropped 4 percent.

Increased cow slaughter and low heifer retention reduced the cow herd 3 percent, with the beef and dairy herds dropping 3 and 2 percent, respectively. The sharpest decline in the dairy herd occurred in the second quarter and the trend is likely to continue through the remainder of

1986 due to the DTP. Through early July, cumulative weekly dairy cow slaughter was 35 percent above a year ago. Beef cow slaughter was 3 percent below the same period a year ago.

Although beef cow slaughter has declined, it remains large, and as a proportion of the beginning inventory is actually above a year ago. While the number of beef heifers being saved for possible herd expansion on July 1 had declined 2 percent, the number of beef and dairy heifers calving and entering the cow herd had risen by over 400,000 head from the low 1985 first-half level. There is still no indication of expansion, but it does appear that the beef herd could stabilize at about 100 million head in 1987. Stronger prices, good forage conditions, except in the Southeast, lower feeding costs, and falling interest rates are moderate expansionary factors, but are offset by a continuing overall weak industry financial position.

Calf Crop-Feeder Cattle Supplies Drop

Surprisingly, the estimated calf crop for 1986 dropped only 2 percent to 40.1 million head--the lowest since 1960. More heifers calving and entering the herd helped hold up the calf crop. However, given the large first-half calf slaughter the feeder-cattle supply continued to decline. It declined 3 percent as the number of calves available to go on feed dropped 4 percent. The yearling supply declined 1 percent. The supply of yearling feeder cattle continues to be buoyed by the reduced number of heifers being retained for the beef breeding herd. **Even a moderate increase in heifer retention** would sharply reduce feeder cattle supplies, particularly the yearling supply. Feeder cattle supplies were also helped by continued lower placements on feed during the second quarter.

Cattle on Feed Decline; Weights Remain Heavy

Cattle on feed in the 13 major feeding States on July 1 were 8 percent below a year earlier--the lowest for this date since 1975. Second-quarter placements were the fewest for this period since 1972. Second-quarter marketings were 5.77 million head, slightly below a year ago. However, since 1970, this level of marketings was exceeded only by the 5.79 million in 1985 and the 5.99 million in 1978. Feedlots were current in their marketings and producers expected to market 5 percent fewer cattle this summer than a year ago. While fewer cattle are on feed, they continue to be placed in lots at heavier weights. Because of the heavy placement weight, slaughter weights will likely remain heavy in spite of the good marketing pace. Slaughter weights this spring dropped below the record pace of spring 1985. Although reduced, the supply of yearlings coming off very good grass weight gains in most areas will continue to provide adequate supplies of yearlings through fall for large fed cattle marketings through first-half 1987.

Profit prospects for cattle feeders have improved markedly for cattle marketed through fall. However, rising feeder cattle prices and falling feed costs may be somewhat offsetting. Large movements of cattle out of the Southeast likely added to placements in July, August and September.

Beef Production To Decline

Despite the DTP, beef production is likely to drop in second-half 1986 from a year earlier and first-half 1986 levels. Beef production may remain about unchanged this summer, as dairy cow slaughter continues large. However, even with slaughter levels approximating those of a year ago, slaughter weights may be 8 to 10 pounds below the record 659 pounds of a year ago. Although production remains large, continued sizable purchases of beef for domestic and export use to offset the impact of the DTP on meat producers will likely reduce supplies available for "normal" domestic consumption 1 to 3 percent, particularly with the large export sales to Brazil.

Fourth-quarter beef production is likely to drop 5 percent from a year ago as nonfed slaughter, particularly dairy cows, drops sharply. The last of the sizable DTP cow slaughter is expected to occur as the first period ends in August and as the second period begins in September. Because of the large April-September dairy cow slaughter, and the resulting lower inventory, fourth-quarter cow slaughter is likely to be reduced. Culling by non-program dairy farmers may be lower because of a reduced number of dairy replacement heifers. If the drought subsides in time for the Southeast to generate pasture growth for fall and winter grazing, beef cow slaughter should continue to drop this fall. Lower grain prices will increase the average price paid for cattle by feedlot operators. Satisfactory regional grazing conditions could encourage more over-wintering programs and even greater competition among stocker operations and cattle feeders, particularly for lighter weight, thinner calves. Lower feed costs and cost of gain on calves will make them increasingly more attractive for feeding.

Prices To Rise Through Fall

Prices for Choice fed steers at Omaha rose from \$52.50 per hundred weight in early June to \$58 in mid-July, prior to release of the mid-year cattle inventory and quarterly cattle on feed reports. Prices in late July averaged \$59 per hundred weight before correcting to near \$58 in early August. The \$5.50-rise from June to July would translate to a 13-cent or 5.7-percent rise in retail prices, assuming the byproduct credit and farm-to-retail spread remained unchanged. While the spread is likely to narrow, the already higher beef prices relative to other meats and the sluggish economy suggest such increases will be difficult to achieve. Choice fed steer prices are likely to average near \$60 this summer, moving up in late summer and fall to the low-to-mid \$60's.

Yearling feeder steers at Kansas City traded at a premium of nearly a dollar per hundred weight compared to fed cattle in late June and \$4 to \$5 in late July. Lower feed costs and good stocker-feeder cattle demand should support prices for yearling steers at a \$3 to \$5 premium to fed cattle. If corn prices fall below \$1.25 per bushel, feeder cattle prices could move above \$70.

Prices for utility cows at Omaha have averaged in the upper \$30's throughout the DTP slaughter period, except the first couple of weeks when they dropped to the low \$30's. Prices are expected to remain near these levels until cow slaughter declines seasonally in late fall. Prices could rise to the low \$40's.

1987 Beef Supplies To Drop; Prices To Strengthen

A beginning 1987 cattle inventory of 100 to 101 million head alone would suggest sharply reduced beef supplies even if 35 to 36 percent of the herd is slaughtered. Fed cattle marketings are likely to remain near this year's level at least through mid 1987. However, given the expected reduced nonfed slaughter levels, a stabilization of the cattle inventory would result in lower beef supplies, and a drop in per capita consumption to near 73 pounds. Sharpest declines would occur in hamburger and processing beef supplies.

Although beef prices are likely to rise in 1987, total red meat and poultry supplies will remain large. Sharpest year-to-year declines in per capita meat supplies are likely in first-half 1987. Expanding pork supplies together with continued poultry expansion will result in larger meat supplies and moderating prices by late 1987. Large supplies of the relatively lower priced competing meats, particularly poultry, will hold down price gains for beef.

Prices for Choice fed steers at Omaha in 1987 may peak in late spring to early summer when red meat supplies show the sharpest year-to-year declines. Very sharp gains in poultry supplies will continue to provide an attractive alternative for red meat consumption at even more favorable relative prices. Continued economic growth in 1987 could influence consumers to buy the more expensive red meat cuts, particularly beef. Retail beef prices may rise 4 to 7 percent. However, supplies of steaks and roasts from large fed cattle marketings will remain near current levels, thus much of the price increase will occur in the hamburger and processing meat products where supplies are expected to drop sharply.

For the year, fed steers could average in the lower to mid \$60's. Yearling feeder steers are likely to average \$2 to \$4 per hundred weight over the fed price. Higher than anticipated retention of heifers for the breeding herd or lower grain prices would push the premium near the upper range or higher. Given the potentially relatively low supply of processing beef, utility cow prices will likely average in the low \$40's, with strongest prices also occurring in the spring.

The Hog Situation

In July, farrow-to-finish producer returns were the highest since 1982 with \$61 per hundred weight barrows and gilts at the 7 major markets and low feed costs. The U.S. farm price of corn in mid-July was at \$1.99 per bushel, the lowest price since October, 1982. Since then corn prices have declined, further reducing the cost of producing hogs. Hog prices are expected to average in the mid to high \$50's in second-half 1986. (This was issued before the negative September, **Hogs and Pigs Report** which had negative repercussions on the market.) So producers' returns are expected to be the highest since 1982.

The continuing cutbacks in herd size and farrowing intentions indicated by the June 1 Hogs and Pigs report reflected continued poor returns and financial stress from early 1983 to early 1986. Although producers' returns improved greatly during May-July, and look favorable for the remainder of the year, the relatively high percentage of sows in the total slaughter in early July suggests that producers are not immediately responding. Some are taking advantage of relatively high prices to sell older sows to improve cash flow while others may have left the industry.

For example, a 470-pound sow would have sold in early July for \$50 per hundred weight, while a 235-pound gilt ready to be marketed or enter the breeding herd would have sold for about \$61 per hundred weight. A strategy of selling sows and retaining gilts to farrow in a winter situation of lower hog and corn prices would generate over \$90 in added cash to the operation.

Hog Inventory Down

The U.S. inventory of all hogs and pigs was estimated at 48.8 million head on June 1, down 7 percent from a year ago and the lowest for the date since 1975. The breeding inventory at 6.39 million head was 9 percent below a year ago and the smallest since June 1 estimates started in 1964. The market hog inventory totaled 42.5 million head, 6 percent below a year ago and the lowest since 1975. Sows farrowing during December 1985-May 1986 totaled 5.31 million head, down 5 percent from the previous year. In December, producers indicated intentions of having about the same number of sows farrow as a year ago. Pigs saved per litter were a record high 7.73, slightly above the record 7.64 set last year. The pig crop totaled 41.1 million head, 3 percent below last year.

The record pigs per litter was due, at least in part, to the development of cross bred gilts for the breeding herd and better management. In addition, a general rise in management standards occurred as many marginal producers left the industry.

Producers as of June 1, both nationally and in the 10 quarterly reporting States, intended to have 9 percent fewer sows farrow during June-November. Pigs per litter may drop from the record-setting pace as hot weather breeding problems and a possible high proportion of gilt farrowings begin to show up in the latter part of the period. Intentions in the 10 quarterly States for June-August were 8 percent below a year ago, while September-November intended farrowings were down 10 percent.

During February-April, the breeding period for sows farrowing in June-August, producers' returns were poor and those with mixed crop and livestock enterprises needed cash for planting expenses. As a result, producers marketed a larger proportion of gilts than normal, continuing a year-over-year reduction in the breeding hog inventory. So it is expected that producers will carry out their June 1 intentions.

Hog prices (both cash and futures) have risen sharply since the release of the Hogs and Pigs report on June 23, because inventory cutbacks were larger than the industry expected. Expectations of sharply higher returns usually would result in smaller cutbacks than previously planned. But, because of the long period of financial stress, producers need the improved returns before expanding their herds and facilities. Producers had time to modify some breeding decisions as the breeding season for sows farrowing during September-November is from May to July. In addition, actual farrowings were affected by hot weather breeding problems.

Abnormal Hot Weather Effects

Packers were willing to bid aggressively for the limited supply of hogs with prices reaching the low to mid \$60's per hundred weight in July. However, because of the abundant supplies of other meats and rising retail pork prices, hog prices above \$60 per hundred weight were not sustainable. Given more normal weather, hog prices averaged in the high \$50's per hundred weight during August and declined seasonally in September.

Although the Southeastern United States accounts for only about 15 percent of the Nation's hog production, this production is important to local slaughterhouses and retailers. Drought and abnormally hot weather since late June reduced supplies of local grains and increase breeding problems. Hot weather reduces a boar's fertility for 4 to 6 weeks after the heat stress subsides. In females, hot weather delays or prevents the occurrence of the estrus cycle, reduces ovulation rates, and increases embryonic deaths. Heat stress not as severe as in the Southeast also occurred briefly in mid-July in the North Central States, where about 80 percent of the hogs are produced. The heat stress in both areas may moderate the rise in pigs per litter over the past few years.

Pork Production To Decline

Commercial pork production in the third quarter is projected at 3,425 million pounds, down 4 percent from a year ago. Third-quarter slaughter is largely drawn from the inventory of market hogs weighing 60-179 pounds on June 1, and that inventory was down 4 percent from a year ago. Third-quarter 1985 slaughter was abnormally high in relation to the market hog inventory and the December-February pig crop. The December 1985-February 1986 pig crop was 1 percent higher than in that period a year earlier. Commercial slaughter is projected to be 3 to 5 percent below a year ago, and the average dressed weight is expected to be about the same as last year's 173 pounds. The slaughter estimate is high compared to historical relations between third-quarter slaughter and the 60-179 pounds market hog inventory but is within the relationship between slaughter and the December-February pig crop.

Commercial pork production in fourth-quarter 1986 is forecast at 3,600 million pounds, down 6 percent from a year ago. This slaughter will be drawn principally from the inventory of market hogs weighing under 60 pounds on June 1, which was down 7 percent from a year ago. Commercial slaughter is projected to be down 5 to 7 percent from a year ago. The

projected slaughter rate indicates little buildup of the breeding herd in the fourth quarter and imports of Canadian hogs for slaughter will remain near last year's level. The average dressed weight is expected to be about the same as last year's 176 pounds.

For all of 1986, commercial pork production is expected to total 14.1 billion pounds, down 4 percent from last year. Commercial slaughter may total nearly 81 million head, also down 4 percent, while the average dressed weight may be slightly higher than 1985's 174 pounds.

Although producers intended to have 9 percent fewer sows farrow in June-November, the U.S. breeding inventory would support a smaller reduction. If producers in the 10 quarterly reporting States follow their intentions, and considering the breeding inventory outside those States, U.S. producers may have about 7 percent fewer sows farrow. The trend is for a small increase in pigs saved per litter, which may be moderated late in the period because of heat stress during the latter part of the breeding season. So, the June-November pig crop may be down 5 to 7 percent. This would mean commercial production would drop 4 to 6 percent in first-half 1987.

Due to improving returns and abundant corn supplies in second-half 1986 and early 1987, the number of sows farrowing during December 1986-February 1987 is expected to increase moderately over the comparable period in 1985/86. The number of pigs per litter is expected to be about the same because there will probably be a higher proportion of gilts farrowing. The pig crop may increase 4 to 6 percent. Commercial pork production may increase 4 to 6 percent in second-half 1987 over the comparable period in 1986. But for all of 1987, pork production is expected to be about the same as in 1986. Although the hog cycle will be in an expansionary phase in 1987, the year-to-year buildup is likely to be modest compared to previous cycles because producers will generate needed cash by selling rather than retaining gilts.

Pork Stocks Lowest Since 1977

Pork in cold storage totaled 247 million pounds on June 30, down 36 percent from a year earlier and the lowest for the date since 1977. Frozen bellies were down 30 percent and ham stocks 47 percent. The smaller frozen pork stocks will tighten supplies this summer and fall.

Feeding Margins Mixed in First-half 1986

Feeding margins for Corn Belt hog finishers were mixed during first-half 1986. Feed costs were steady, while the feeder pig price fluctuated. Positive margins were realized in the months with the highest hog prices.

Prices for 40- to 50-pound No. 1 and No. 2 feeder pigs in southern Missouri averaged nearly \$40 per head during February-June 1986. In late June, prices rallied and reached an average in mid-July of \$50 per head.

Pork Imports Decline

Pork imports totaled 526 million pounds, carcass weight, during first-half 1986, down 12 percent from a year ago. Canada, the largest exporter to the United States, increased its sales 17 million pounds or 8 percent. The Canadian dollar was slightly weaker against the U.S. dollar during first-half 1986 than a year ago. The second largest exporting country to the United States, Denmark, reduced exports by 68 million pounds, down 28 percent. The Danish krone has appreciated sharply against the dollar in recent months. However, the European Community has recently increased its export subsidy for pork exported to the United States by 80 percent and is currently considering further increases. Some increases in Danish exports to the U.S. are expected in the coming months.

The number of live hogs imported from Canada totaled 244,000 head during January-June 1986, down 72 percent from a year ago. Countervailing duties of \$Can4.386 per hundred weight were levied last summer. Weekly reports from Agriculture Canada indicate that live hog exports to the United States are picking up. Prior to June, these reports indicated live hog exports were running about 5,000 head per week. Since then, these exports have about doubled as U.S. hog prices have risen sharply. For all of 1986, hog imports from Canada may total 500,000 to 700,000 head.

Hog Prices To Average Above a Year Ago

Hog prices averaged about \$61 per hundred weight in July and may remain near that level through most of August when pork production is seasonally low. In September when production increases seasonally, prices may fall to the mid-\$50's. The relatively high prices are due to a reduced rate of slaughter, low stocks of frozen pork, and fewer imports of pork products and live hogs. Higher poultry production is tempering hog price gains. Also, real disposable per capita income is expected to continue to grow sluggishly. Prices are expected to average \$56 to \$60 in the third quarter then drop slightly as production picks up this fall. In the fourth quarter, prices are expected to average \$53 to \$57 per hundred weight at the 7 major markets.

Hog prices are projected to average in the low to mid-\$50's in 1987 compared to near \$51 in 1986. Red meat supplies may be moderately lower in 1987, strengthening hog prices. However, poultry is expected to continue its long term rise, tempering hog price increases. The likelihood of a slow growing economy does not imply much strength to hog prices.

The Broiler Situation

Broiler meat output will continue to increase during the remainder of 1986 and throughout 1987. Reduced red meat supplies will likely strengthen broiler prices during the remainder of 1986 and through much of 1987. In addition, the supply of lower priced red meat cuts and hamburger may be down more than all red meat, providing additional strength for broiler prices. Many restaurants are adding chicken products to their menus, helping to increase demand for broilers. New product introductions have been particularly strong in the fast-food sector.

Broiler Meat Production To Rise

Production of broiler meat from federally inspected plants during the first 6 months of 1986 totaled 7.1 million pounds, up 5 percent from 1985. Favorable net returns have encouraged producers to expand production. In fact, the positive net returns would have been expected to encourage a larger increase than actually resulted. This suggests that the industry may have been operating near grow-out capacity this spring, when production typically peaks. There have been reports of leasing arrangements to build additional grow-out houses. In addition, the size of the hatchery supply flock may have been limiting the expansion. Data are not collected on the size of the hatchery supply flock, but the cumulative pullet chick placements 7 to 14 months earlier are used as an indication. Cumulative placements in 1984-85 caused the supply flock in first-half 1986 to rise an estimated 2 percent from a year earlier. Placements made for second-half 1986 will push the cumulative placements 4 to 5 percent above last year.

The number of chicks hatched in May and June for third-quarter slaughter was up 3.8 percent from last year. Weekly placements in July suggest hatch may be nearly 5 percent above last year. However, the hot weather in July caused some loss of broilers and lower slaughter weights. Therefore, third-quarter output will likely be up 4 percent from last year. Producers are expected to continue expanding production in the fourth quarter and output may be 6 percent above last year. Producers probably have facilities to increase fourth-quarter production by 9 to 10 percent. To do this, they would have to produce near the summer-quarter level, which appears possible with cooler weather. The hatching flock may limit this type of increase. If fast food demand remains strong, fourth-quarter production could remain near second-quarter levels.

The broiler industry will continue to expand production in 1987. Broiler-type pullet chick placements for hatchery supply flocks in June were up 11 percent from last year. These pullets will be providing hatching eggs for use in January 1987. The actual size of the expansion will depend in part on general economic conditions and the resulting demand for chicken. For first-half 1987, producers appear to be planning to increase production 6 to 7 percent over 1986. With the current demand for chicken, reduced red meat supplies, and expected lower feed costs, prospects for profitable operations appear favorable even with this amount of expansion. Grow-out houses may provide a capacity limitation in the second quarter, if incentives are not there to stimulate construction. Current grower payments may not cover financial obligations on a new broiler house and meet their other cash expenses. Payments may have to be increased to stimulate investment. In addition, bankers may be reluctant to loan funds for more houses.

Broiler Prices Above Last Year

The demand for broiler meat has strengthened in recent months as more restaurants have added chicken entrees, export enhancement programs have resulted in more exports, and supplies of pork have declined. The stronger demand more than offset increased production in second-quarter 1986. The price for a composite of whole bird with and without giblets plus branded broilers in the 12 cities in second-quarter 1986 averaged 54 cents per pound, up from 51 cents in 1985. The heat and humidity in July caused

broiler losses to be above normal in the Southeast. These losses, plus a slower rate of growth, held down broiler supply increases and boosted prices even further. As a result, prices during July averaged 69 cents per pound, up sharply from 1985's 50 cents. During the third quarter, prices are expected to average 64 to 68 cents per pound, up from 51 cents last year. With additional output in the fourth quarter and a normal seasonal slackening in demand, broiler prices would be below last year. However, smaller red meat supplies, especially lower priced cuts and hamburger, plus continuing demand from fast-food restaurants may result in prices averaging 55 to 59 cents per pound, up from 50 cents last year.

In first-half 1987, prices of broilers in the 12 cities may average near 53 cents per pound, near 1986's 52 cents, as sharply larger supplies offset the price-boosting effects of strong restaurant and export demand and smaller red meat supplies.

Young Chicken Exports Above 1985

U.S. exports of young chickens (primarily broilers) and chicken parts during the first 6 months of 1986 totaled 256 million pounds, 27 percent more than in 1985. The increase was in both whole birds and parts, but parts were up 24 percent to 236 million pounds and whole birds were up 71 percent to 20 million. During the second quarter, Japan was the major importer of young chicken, followed by Hong Kong and Jamaica. The stronger yen in relation to the dollar probably helped increase exports to Japan.

The Turkey Situation

Turkey production is expected to increase through 1986 and 1987 but prices will likely remain strong, resulting in favorable returns.

Turkey Production Continues To Rise

Output of turkey meat from federally inspected plants during January-June totaled 1,268 million pounds, up 14 percent from 1985. The increase was mainly from larger slaughter, because the average weight was nearly the same. In addition, more turkey is being further processed and cut-up. During first-half 1986, 694 million pounds were further processed, up 15 percent from 1985. Whole carcass turkey basted, barbecued, marinated, smoked, etc. was up 11 percent from last year and cut-up was 35 percent higher.

Good demand for turkey and lower production costs are encouraging producers to expand production. During 1986, poults placed that could be slaughtered during the third quarter suggest output could be up 12 percent from a year earlier. If producers continue the expansion currently under way, fourth-quarter output may be 15 percent above 1985's 935 million pounds.

The stage is set for another surge in turkey production in 1987. Producers have had favorable returns for 3 years. Consumers are finding new ways to use turkey; processed products in particular are providing an alternative to the traditional roasted bird. Other turkey forms, especially further processed products, are replacing other meats. With all of these favorable factors, turkey producers may expand output by 15 percent in 1987. However, more sluggish growth in the general economy could slow the increase.

Turkey Stocks Rise

Although up from last year, cold storage stocks of frozen turkey have been low relative to trade needs thus far in 1986 and stocks have helped to firm prices even though production has been up sharply. Cold storage stocks on July 1 were up 42.4 million pounds from 1985. Stocks of whole turkeys were up 36.8 million pounds, while other turkey was up only 5.6 million pounds. After 2 years of high fourth-quarter prices, retailers are lining up their turkey needs early this year. At least part of the whole turkey in storage is committed to retailers.

Prices To Remain Strong

Prices of commodity pack 8- to 16-pound hen turkeys in the Eastern region during second-quarter 1986 averaged 69 cents per pound, up from 65 cents in 1985. Prices rose throughout the quarter as turkey moved to storage and retailers lined up supplies. These factors continued to strengthen prices during July when prices averaged 78 cents per pound, up from 73 cents in 1985. Prices in the third quarter are expected to average 78 to 82 cents per pound, up from 78 cents last year. Turkey is expected to move very well this fall because of smaller supplies of ham and beef. Unless the general economy slows, fourth-quarter prices may average 88 to 92 cents per pound, about the same as last year.

Turkey prices in 1987 may average in the upper 60 cents range, off from the estimated mid-70's this year. If feed prices drift lower as expected, while other costs increase slightly, net returns would still be very favorable. A sharp increase in production plus expanding pork production late in 1987 may combine to hold turkey prices below 1986.

Exports Down from 1985

Exports of turkey and turkey parts during January-June 1986 totaled 10 million pounds, down 5 percent from 1985. Parts accounted for 83 percent of the total, about the same as last year. Even with the weak dollar relative to the Federal Republic of Germany's Deutsche mark, exports have not risen. Egypt is the major importer of U.S turkey and turkey parts. Western Samoa and West Germany were the second and third major importers in the second quarter. Shipments to Puerto Rico and the Virgin Islands during January-May totaled 409,000 pounds, down from 1,327,000 in 1985.

Red and White Meat Production Remains Stable

Despite seeming unprofitability in the animal industry, total red and white meat production will be at or near record levels in 1986 and 1987. Much of this is due to the rapid expansion in poultry production. Red meat production has stabilized at about 39-40 million pounds, but poultry production has increased from about 16.8 million pounds in 1985 to an expected 19.2 million pounds in 1987 (Figure 1 and Table 1).

Quarterly production for the red and white meat complex shows the same tendencies--rising during the second and third quarters and falling during the first and fourth (Figure 2 and Table 2). First quarter 1987 production is expected to amount to about 13.6 million pounds, down about 300 thousand pounds from that of the last quarter this year.

Changes in Per Capita Consumption

Academicians continue to debate whether the dramatic changes occurring in the red and white meat mix are a temporary function related to relative price changes or a more permanent function of changes in tastes and preferences, but changes in tastes and preferences occur subtly over time, usually as a function of relative prices, and one only has to look at the long term competitive struggle between butter and oleo to recognize this fact. This change in relative prices has primarily been brought about because the white meat species convert grain to meat more efficiently than do the red meat animals, and this fact is not likely to change in the foreseeable future. This grain conversion advantage is more of a detriment to the grain intensive red meat complex than to those more extensively utilizing forages, or to the more grain efficient white meat complex, and is very real, continuing problem with which industry leaders and professionals must recognize and cope. Thus far, the prognosis is not favorable.

Total red and white meat consumption has stabilized at or near 210 pounds per capita, with beef per capita consumption dropping about 6 pounds during the past four years, broiler consumption rising 8 pounds and turkey consumption increasing 5 pounds (Figure 3).

Much has been said and written about this prior phenomena, but the implications are very clear--the red meat complex is locked in a competitive struggle with the white meat industry for a relatively fixed "pie." And all of the data over the past 12 years suggest the poultry industry is gaining market share rapidly.

Fall and Winter Price Situation

As compared to the remainder of the industry, California cow-calf, pork and poultry producers tend to be in a relatively enviable position for the following reasons:

- (1) The fall and winter grain and forage situation portends relatively low input costs for the red and white meat complex

- (2) Proximity to reasonably affluent consumer markets offers relatively strong product demand
- (3) Other input costs, primarily energy and capital costs continue to decline

Seasonal low prices should be reached during the fourth quarter of this year and should move up slightly during 1987 (Table 2 and Figure 4). limited mainly by the rate of overall national economic growth and health.

Finally, we can answer the rhetorical question asked at the outset of the presentation regarding inventory stability. While hog and poultry inventories will likely stabilize in 1987, barring unforeseen economic contingencies, the poultry industry will continue to grow vigorously into the foreseeable future.

Table 1
U.S. Meats Supply and Use

Item	Supply			Total Supply	Use			Civilian Consumption	Per Capita
	Begin Stocks	Production	Imports		Exports and Shipments	Military Consumption	Ending Stocks		
---Million Pounds---									
Beef:									
1984	325	23598	1823	25746	376	112	358	24900	78.5
1985	358	23728	2068	26154	379	115	317	25343	79.1
1986	317	23912	2125	26354	553	118	350	25333	78.1
1987	350	22521	2100	24971	510	110	325	24026	73.6
Pork:									
1984	301	14812	954	16067	311	86	274	15396	61.8
1985	274	14807	1128	16209	259	76	229	15645	62.1
1986	229	14086	1080	15395	260	76	225	14834	58.8
1987	225	14205	1050	15480	260	80	225	14915	58
Lamb and Veal									
1984	20	874	44	938	12	4	21	901	3.3
1985	21	873	56	950	8	7	24	911	3.3
1986	24	924	61	1009	17	7	18	967	3.2
1987	18	752	58	828	8	7	15	798	2.9
Total red meat:									
1984	646	39284	2821	42751	699	202	653	41197	143.6
1985	653	39408	3252	43313	646	198	570	41899	144.5
1986	570	38922	3266	42758	830	201	593	41134	140.1
1987	593	37707	3208	41279	778	197	565	39739	134.5
Broilers:									
1984	21	13016	0	13037	552	34	20	12431	52.9
1985	20	13762	0	13782	560	34	27	13161	55.5
1986	27	14439	0	14466	632	33	25	13776	57.6
1987	25	15263	0	15288	660	36	25	14567	60.3
Turkeys:									
1984	162	2685	0	2847	34	13	125	2675	11.4
1985	125	2942	0	3067	34	13	150	2870	12.1
1986	150	3349	0	3499	34	16	220	3229	13.5
1987	220	3846	0	4066	29	16	150	3871	16
Total poultry:									
1984	275	16373	0	16648	613	49	264	15722	66.9
1985	264	17339	0	17603	616	49	321	16617	70.1
1986	321	18436	0	18757	689	50	355	17663	73.8
1987	355	19749	0	20104	713	53	285	19053	78.9

Red Meat & Poultry									
1984	921	55657	2821	59399	1312	251	917	56919	210.5
1985	917	56747	3252	60916	1262	247	891	58516	214.6
1986	891	57358	3266	61515	1519	251	948	58797	213.9
1987	948	57227	3208	61383	1491	250	850	58792	213.3

Table 2

U.S. Quarterly Animal Product Production and Prices

Item	1985		1986					1987	
	IV	Annual	I	II	III	IV	Annual	I	Annual
-Million Pounds-									
PRODUCTION									
Beef	5775	23557	5769	6247	6175	5550	23741	5575	22350
Pork	3814	14728	3564	3567	3275	3600	14006	3400	14125
Lamb and Veal	225	851	218	207	207	197	829	182	730
Red meat	9814	39136	9551	10021	9657	9347	38576	9157	37205
Broilers	3344	13569	3414	3664	3620	3500	14198	3660	15050
Turkeys	835	2800	556	712	960	960	3188	665	3660
Total Poultry	4293	16871	4107	4520	4895	4630	18152	4445	19215
Redmeat & poultry	14107	56007	13658	14541	14552	13902	56653	13602	56420
Milk	35590	143667	36232	38517	35900	34400	145049	34800	141600
-Million Dozen-									
Eggs	1442	5688	1421	1418	1430	1470	5739	1450	5790
PRICES									
-Dollars Per Hundredweight-									
Ch. Strs., Omaha:									
900-1100 lbs.	61.42	58.37	57.22	54.52	59.00	63.00	58.50	63.00	65.00
Barrows & gilts, 7 markets	45.05	44.77	43.30	47.23	58.00	55.00	51.50	55.00	54.00
All milk, rec'd by farmers	12.60	12.73	12.37	11.97	12.20	13.20	12.40	12.40	12.45
--Cents Per Pound-									
Broilers, wholesale:									
12-city average:	50.20	50.80	50.30	54.30	71.00	57.00	58.50	54.00	54.00
Turkeys, wholesale:									
NY 8-16 lb. young hens	90.10	75.50	62.00	0	80.00	90.00	75.00	59.00	67.00
Eggs, Grade A lg:									
NY vol. buyers	75.90	66.50	74.20	63.40	75.00	70.00	71.00	64.00	66.00

Table 3
U.S. Feed Use, Animal Product Output and Commodity Prices

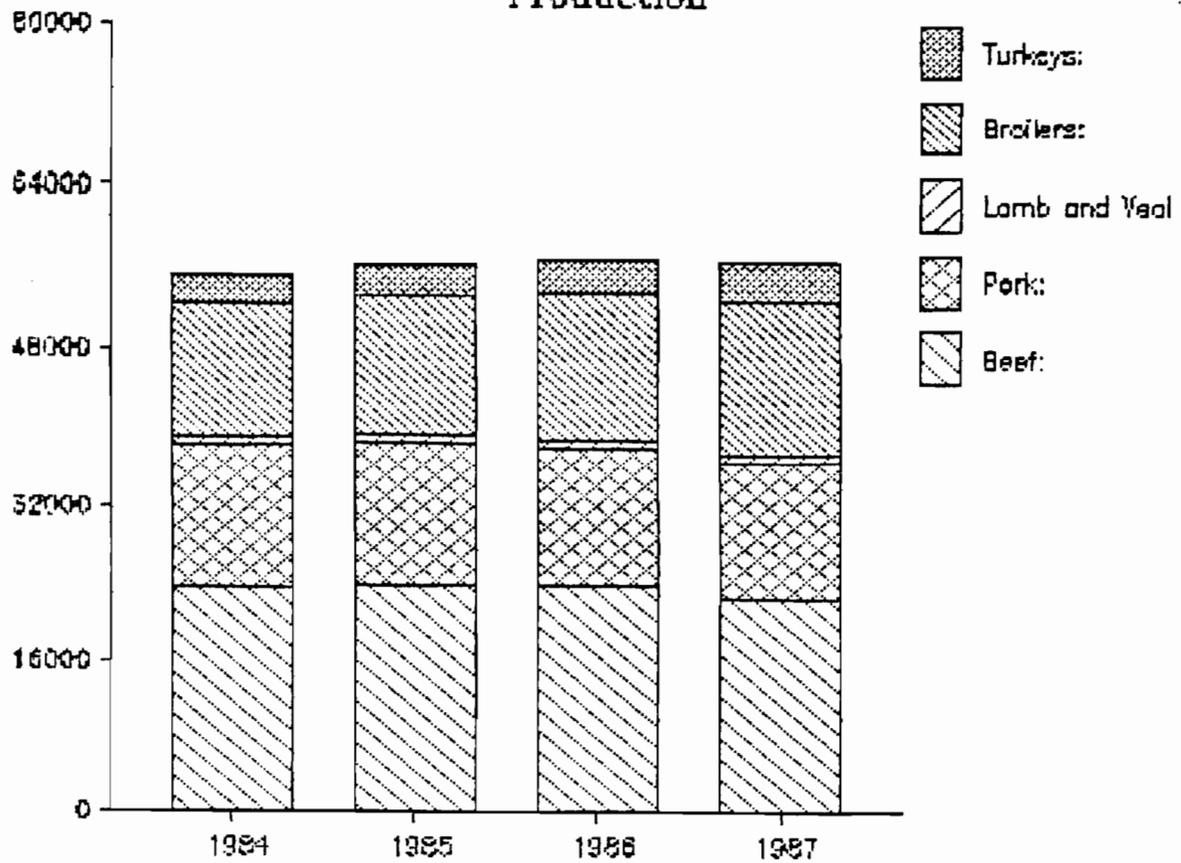
Item	82/83	83/84	84/85	85/86	86/87
Feed & residual- MMT					

Selected Feed Grains					
Corn	114.8	97	104.5	105.4	108
Sorghum	12.6	9.8	13.7	16.5	14.6
Total	127.4	106.8	118.2	121.9	122.6
Wheat	7.1	12.3	9.9	8.1	8.2
Total above	134.5	119.1	128.1	130.1	130.7
Meals					
Soybeans	17.5	16	17.7	17.1	17.4
Other	2	1.5	2.1	2	1.8
Total	19.5	17.5	19.8	19.1	19.2
Total					
Grains and Meals	154	136.6	147.9	149.2	149.9
% Change From					
Year Previous	11.6	-11.3	8.3	.9	.5
Animal Product Output					

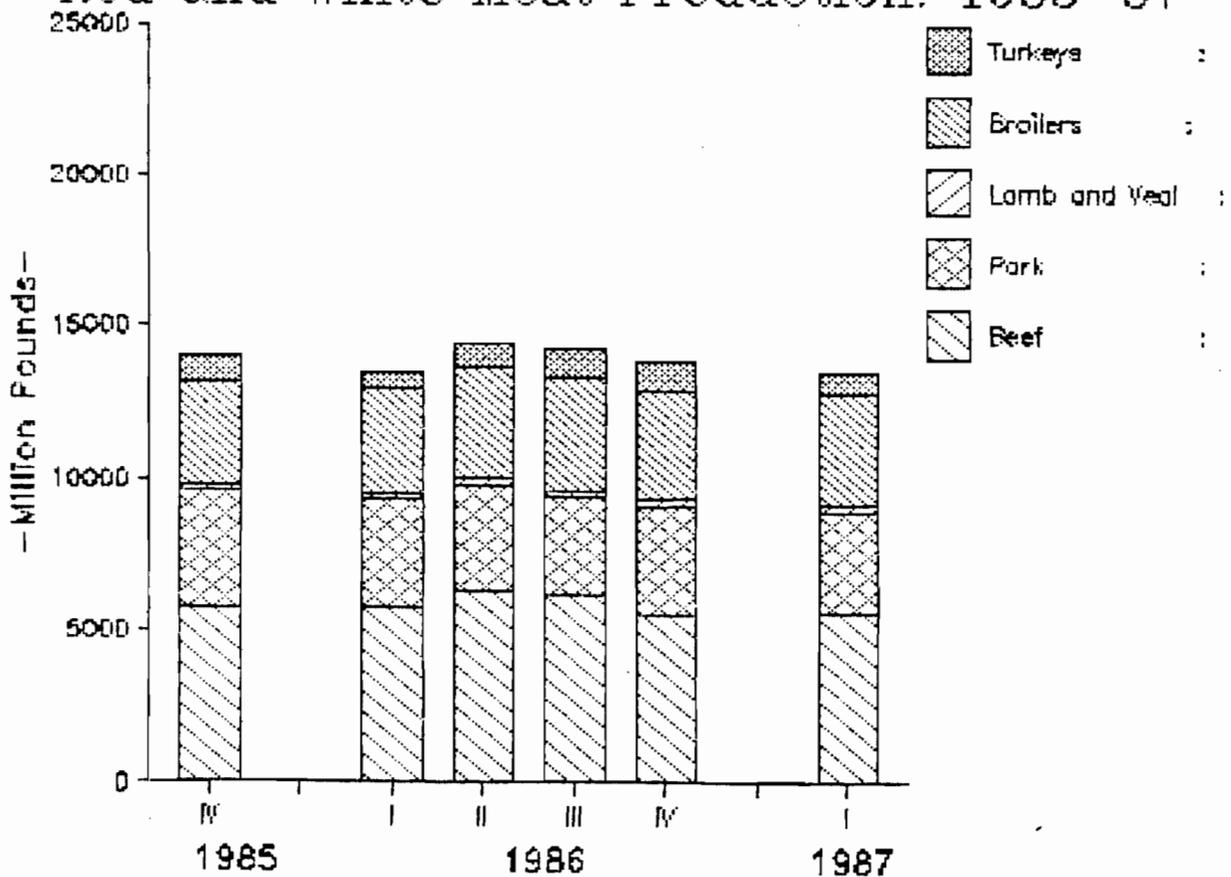
% Change From Year Previous					
Beef	3.1	2.3	1.2	1.1	-6.4
Pork	-.6	2.9	-.7	-3.4	-3.3
Total poultry	2.8	1.4	6.9	5.6	7.7
Total red mea					
poultry	2	2.2	2.4	1.3	-1.3
Milk	3	-1.5	2.8	4.1	-2.9

U.S. Meats Supply and Use

Production

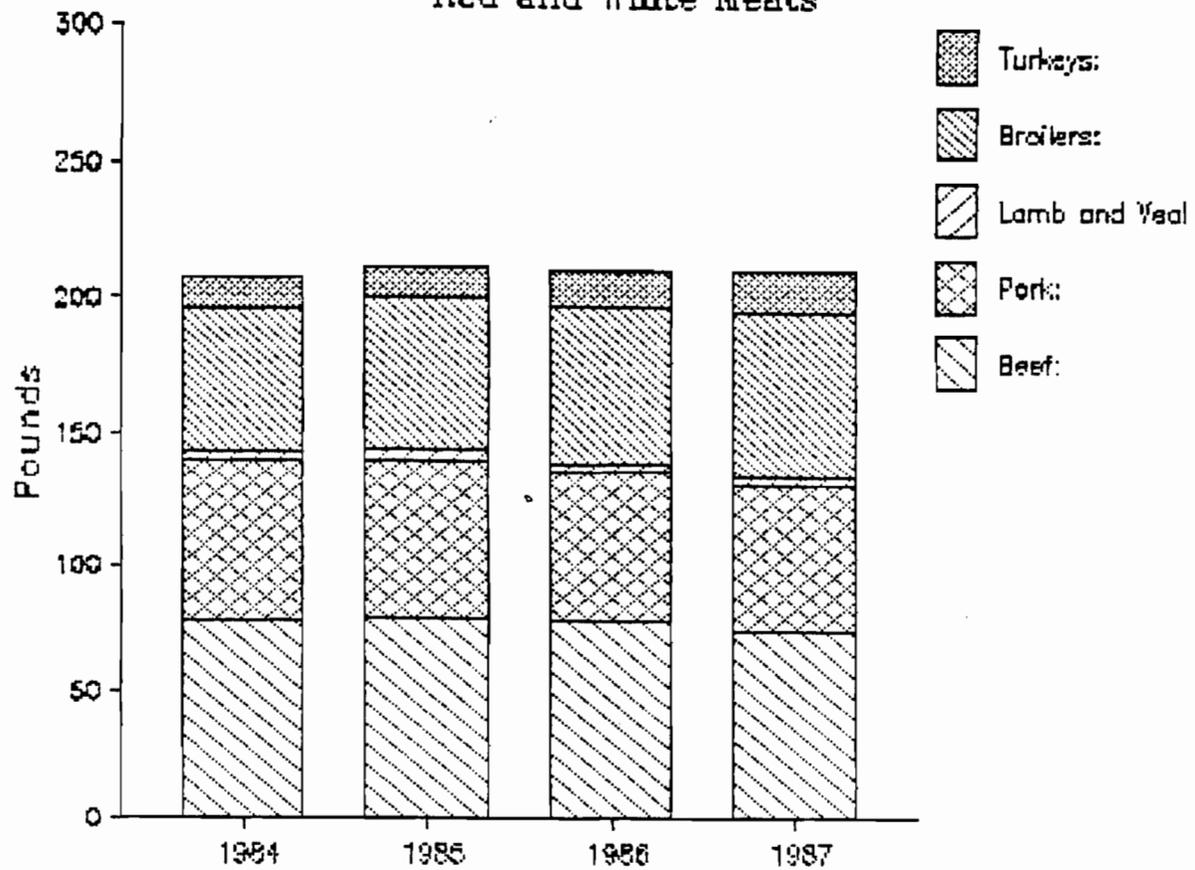


Red and White Meat Production: 1985-87

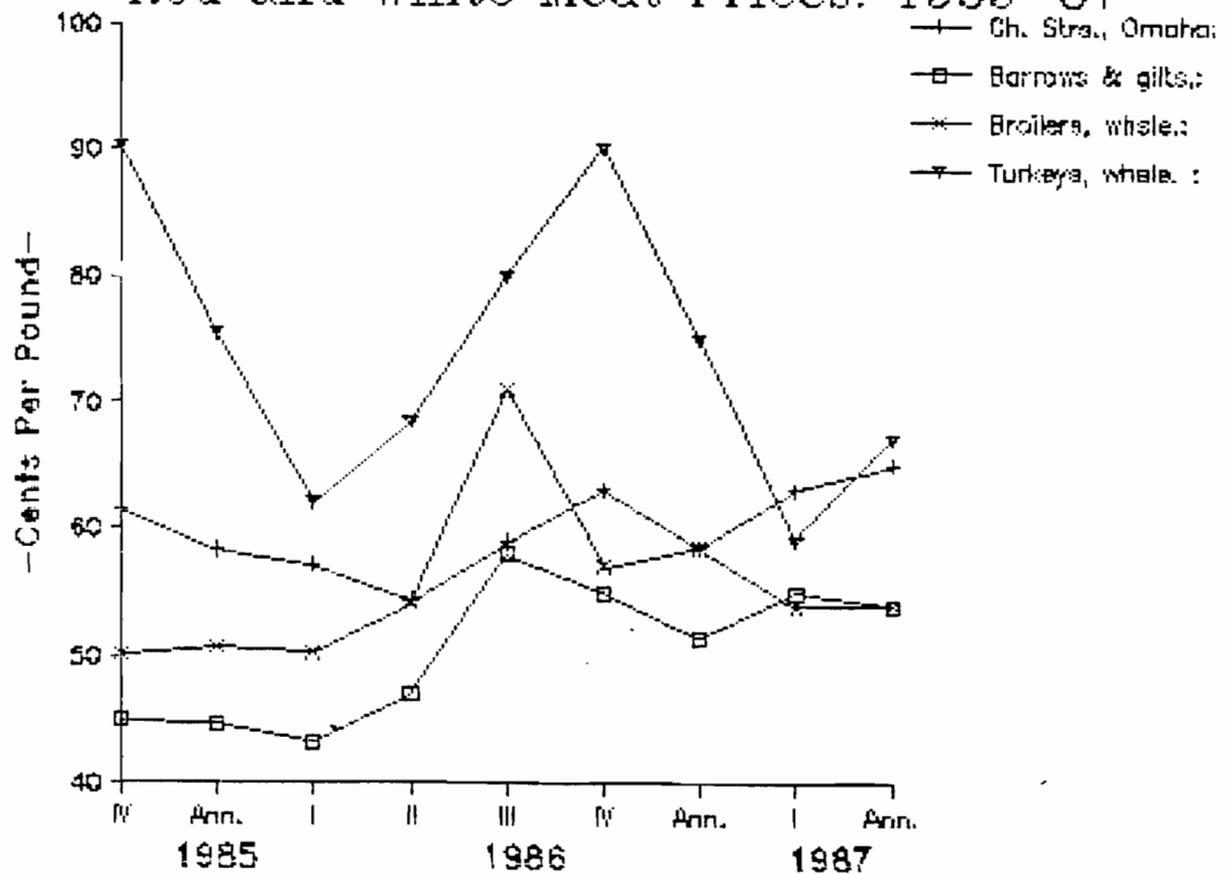


Per Capita Consumption: 1985-87

Red and White Meats



Red and White Meat Prices: 1985-87



The Battle for the Consumer Meat Dollar:

Can we improve the beef carcass to increase beef demand?

Meat consumption trends and consumers' expenditure for meat.

Per capita food consumption rose to a record high in 1984. Crop products consumption has risen 10.6%, whereas animal products rose 4% since 1967 (Fig. 1). Among the animal products (Fig. 2), poultry consumption has risen 49% since 1967, the fastest of all animal products. Per capita poultry consumption was 45 pounds in 1967 and it peaked at 70 pounds in 1985 (Fig. 3). Thus, poultry consumption may continue to increase in the future. Red meat consumption increased to a peak of 155 pounds (retail weight) in 1976, then it declined sharply for 3-4 years and it has levelled off in recent years. Among red meat, per capita beef consumption increased to a peak of 95.7 pounds in 1976, then declined sharply until 1979, and since then it has remained constant at about 78 pounds. Per capita pork consumption has remained the most constant during the last 30 years or so at 60 pounds. It reached a high of 70 pounds (retail weight) in 1980 and a low of 50 pounds in 1975.

As shown in table 1, per capita expenditure in total dollars for beef increased by 7 dollars during the last 7 years. Expenditures for pork increased from \$92 in 1979 to \$100 in 1985. For poultry meat, the increase was \$13 from \$41 to \$54 dollars, which is approximately 32% increase compared to 4% and 9% increase for beef and pork, respectively. Per capita expenditures for all meat are dropping down sharply from 4.23% of disposable income to 2.77% in the first quarter of 1986. The decrease was the most for beef (from 2.41% to 1.50%), followed by pork (from 1.26% to 0.84%) and poultry (from 0.56% to 0.43%).

Figure 1

Per Capita Consumption of Food

% of 1967

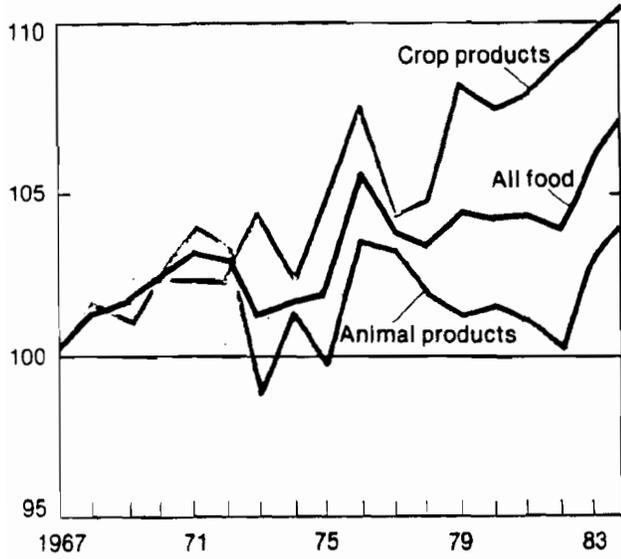


Figure 2

Per Capita Consumption of Selected Animal Products

% of 1967

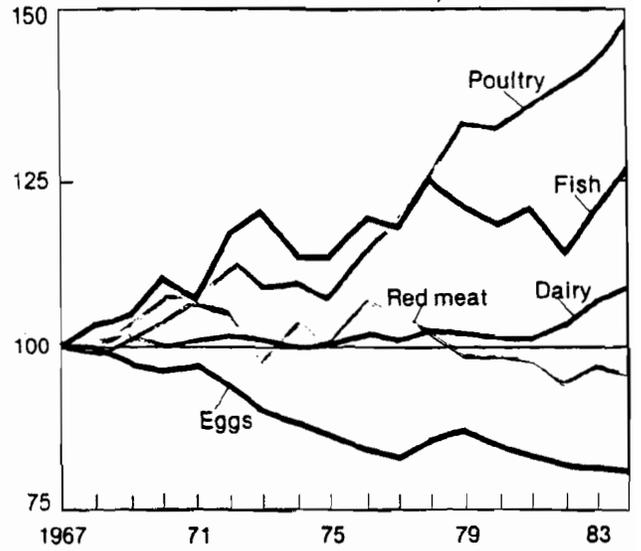


Figure 3

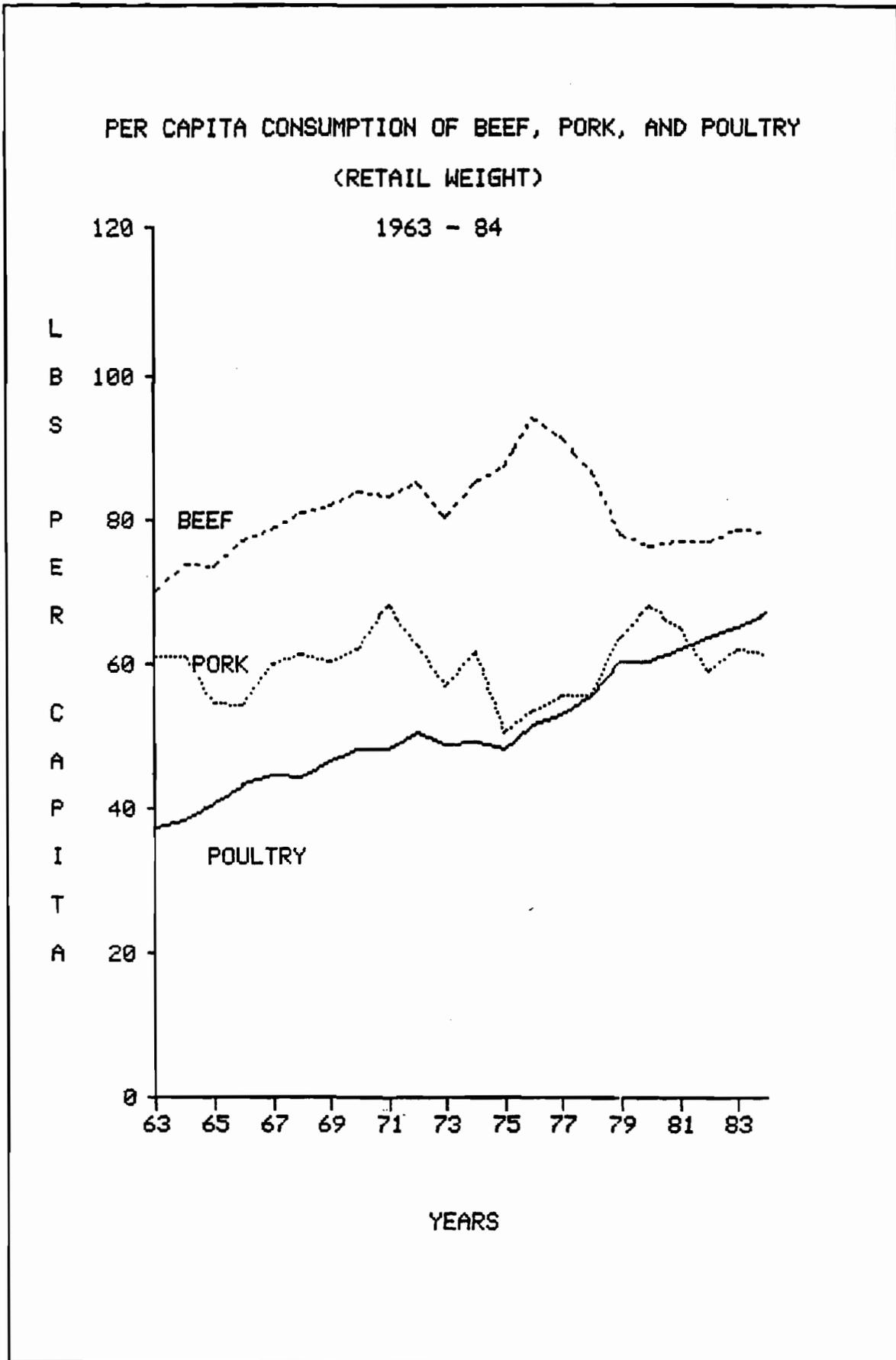


Figure 4 shows how market shares have changed over the past 30 years. Beef's market share of total meat consumption remained fairly stable at about 48 percent from the mid-1950's to the early-1970's. It peaked in 1976 at 52.5 percent. By 1985, beef's market share had slipped to 42.9%, the lowest since 1959.

Pork's market share was above beef and poultry in the early 1950's, peaking at 44.6% in 1951. It dropped below beef in 1954 and dropped below

Table 1. Expenditures per person for red meat and poultry

Yr.	Beef		Pork		Red Meat		Poultry		Total	
	\$	% of income	\$	% of income	\$	% of income	\$	% of income	\$	% of income
1979	176	2.41	92	1.26	268	3.66	41	0.56	309	4.23
1980	181	2.26	95	1.18	276	3.45	45	0.56	322	4.01
1981	184	2.07	99	1.11	283	3.18	45	0.50	328	3.69
1982	187	2.00	103	1.11	291	3.10	44	0.47	335	3.57
1983	187	1.88	105	1.06	293	2.94	47	0.47	340	3.41
1984	188	1.73	100	0.92	288	2.65	54	0.50	342	3.15
1985	183	1.57	100	0.86	284	2.43	54	0.46	338	2.89
1986 I	44	1.50	25	0.84	70	2.34	13	0.43	82	2.77
% change		-38%		-33%		-36%		-23%		-34%

poultry in 1983. Pork's market share in 1985 was 26.6%. Over the past 30 years, poultry meat has gained market share. It increased from 16.9% in 1950 to 30.5 in 1985. From the 1950's through the 1970's, poultry's market share increased at the expense of pork. However, poultry has gained market share at the expense of both pork and beef since the mid-1970's.

All these data clearly demonstrate that total meat consumption has levelled off in recent years after having peaked in the mid-1970's and, among

meat products, poultry gained market share and per capita consumption at the expense of pork and beef. We can think of several factors which may have affected consumption changes. Some of the important factors would be retail price (table 2), quality of products, consumer preference changes due to diet-health concerns and availability of product variety. Today my remarks will focus on "what is an ideal beef carcass" and "how to utilize beef carcass" to increase beef demand and to capture more meat dollars.

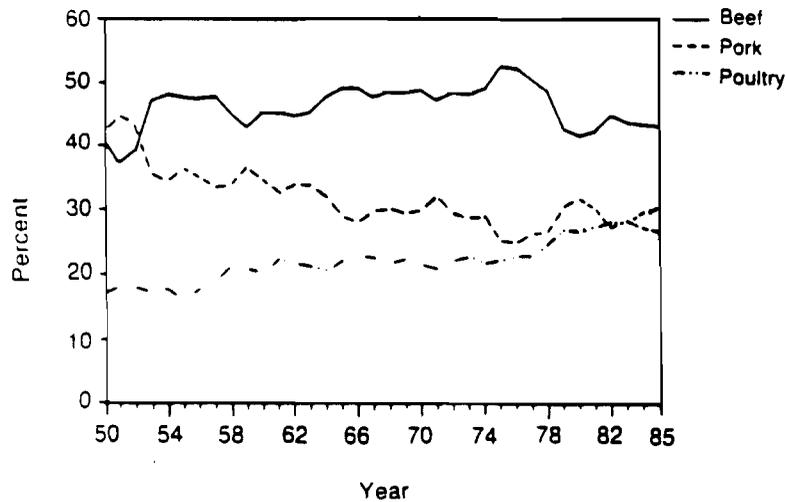


Figure 4 Market Shares: Beef, Pork, and Poultry

Table 2. Consumer Changes in Meat Purchasing

Buying less expensive meat	47.5%
Buying less meat	41.5%
Buying no meat	0.5%
No difference in purchasing	26.0%

"Ideal beef carcass"

Today's consumers' priorities in purchasing beef are good taste (high quality), high lean to fat ratio and reasonably low price. Based on this, an ideal beef carcass can be defined as follows.

1) The carcass should be from fast growing animals with excellent feed efficiency and of less than 2 years old.

2) The carcass should have the following traits:

Carcass weight: 700-750 lbs

Backfat thickness: 0.25-0.3 inch

Marbling: small to modest

Texture: fine-medium

Loin eye area: minimum 13 inch²

Total carcass fat: 20%

Total carcass muscle: 65%

Today we do not see many of these ideal beef cattle and we may never attain the goal that all cattle we feed have the above-mentioned characteristics unless we insert all the desirable and identical genes into the genomes of all beef cattle. However, beef industry must strive hard to produce ideal market beef cattle through aggressive application of rapidly developing technologies. Meantime, there is and will be in the future a proliferation of consumer desires and diversified market, that is, market segmentation. I can think of three major markets for beef: 1) HRI trade that want well-marbled cuts of meat from generally fat cattle, 2) supermarkets and retail stores that want leaner, yield grade 2 carcasses with acceptable quality, and 3) hamburger and processed meat trade that want lean carcass with 15% of carcass fat.

Beef industry will maintain enough diversity to supply three segmented markets as well as countless others who want something special. But the bulk of our demand will be for leaner, yield grade 2 carcass with some marbling (slight + or higher) and good texture to insure adequate quality. Reflecting the positive market demand of quarter-inch trim on beef, there are strong signs that YG 2s are taking center stage. In 1980 the amount of graded steers and heifers that were YG 3s was 58.3 percent. That figure has dropped lower each year since until it reached 49.3 percent in late 1985. At the same time there was an increase in the percentage of YG 2s, to 40.5 percent by late 1985. Most people feel that if quarter-inch or half-inch trim programs are going to work at either the plant or retail level, they are going to work with YG 2 cattle.

A recent study (tables 3 and 4) on carcass traits and palatability of California beef shows that average backfat is about 0.43 inch, rib eye area 12 inch², USDA yield grade low 3, quality grade high Good, and overall palatability score 5 (slightly tender and satisfactory). It is particularly bothersome to see a rib eye area of less than 11 inch² in many carcasses. The carcass data clearly point out that the industry should try harder to further reduce subcutaneous fat and to improve muscling without compromising meat quality.

Another problem we are experiencing in a cooler of meat packers is a tremendous variation in many carcass traits (carcass weight, backfat, rib eye area). In other words, uniformity and consistency in meat yield and quality that the poultry industry enjoys are lacking in beef carcasses. Because of the introduction of more so-called exotic breeds, we may see more diversity of carcass traits. The recent emphasis of leaner beef has certainly accelerated the cross-breeding between the traditional British breeds and exotic breeds or

TABLE 3. CARCASS TRAITS^a

	Holstein	Brahman crosses	Brahman	British crosses, Choice	British crosses, Good ⁺	IBP boxed meat, Choice
No. of carcasses	18	18	20	16	19	15
Hot carcass wt., lbs.	807±16 ^c	708±13 ^d	752±14 ^e	741±14 ^e	749±12 ^e	N/A
Maturity	A-A ⁺	A ⁺	B-C	A	A	N/A
USDA quality grade	Good ⁺	Good ⁰	Commercial ⁺	Choice ⁻	Good ⁺	Choice
Backfat, in	0.26±0.01 ^c	0.42±0.03 ^d	0.50±0.04 ^d	0.41±0.03 ^d	0.46±0.03 ^d	N/A
Rib eye area, in ²	11.5 ±0.3 ^c	11.7 ±0.3 ^{cd}	11.1±0.2 ^c	12.2±0.3 ^d	12.5±0.3 ^d	N/A
% KPH fat	2.3 ±0.1 ^c	2.5 ±0.1 ^{cd}	2.9±0.1 ^d	3.0±0.1 ^d	2.9±0.1 ^d	N/A
USDA yield grade	3.0±0.1 ^c	3.0±0.1 ^c	3.7±0.1 ^d	3.1±0.4 ^c	3.1±0.4 ^c	N/A
Short loin wt., lbs	45.1±0.8 ^c	43.0±0.8 ^c	45.2±0.9 ^c	44.1±0.8 ^c	45.4±0.6 ^c	50.3±0.9 ^d
% Short loin ^b	5.6±0.1 ^c	6.1±0.1 ^d	6.0±0.1 ^d	6.0±0.1 ^d	6.0±0.1 ^d	N/A

^a Means ± S.E.

^b % short loin = $\frac{\text{short loin wt}}{\text{carcass wt}} \times 100$

^{c,d,e} Means with different superscripts in the same row differ significantly, P<0.05.

TABLE 4. PALATABILITY TRAITS^a

	Holstein	Brahman crosses	Brahman	British crosses, Choice	British crosses, Good ⁺	IBP boxed meat, Choice
No. of short loins	18	18	20	16	19	15
Shear press test						
W-R ^b	6.4 ± 0.2 ^e	6.9 ± 0.2 ^{fg}	7.1 ± 0.2 ^g	6.6 ± 0.2 ^{ef}	6.8 ± .02 ^f	6.7 ± 0.2 ^{ef}
L-K ^c	87 ± 3 ^e	106 ± 4 ^f	107 ± 3 ^f	99 ± 5 ^g	104 ± 8 ^{fg}	96 ± 5 ^g
Trained panel test ^d						
Tenderness	5.7 ± 0.2 ^e	5.2 ± 0.2 ^f	4.6 ± 0.2 ^g	5.6 ± 0.2 ^{ef}	5.4 ± 0.2 ^{ef}	5.5 ± 0.3 ^{ef}
Connective tissue	5.6 ± 0.1 ^e	5.3 ± 0.2 ^e	4.8 ± 0.2 ^f	5.6 ± 0.1 ^e	5.3 ± 0.1 ^e	5.5 ± 0.2 ^e
Juiciness	5.3 ± 0.1 ^{ef}	5.1 ± 0.2 ^e	5.1 ± 0.1 ^e	5.5 ± 0.1 ^f	5.3 ± 0.1 ^{ef}	5.4 ± 0.1 ^{ef}
Flavor	5.0 ± 0.1 ^e	5.1 ± 0.1 ^e	5.0 ± 0.1 ^e	5.4 ± 0.1 ^f	5.1 ± 0.1 ^e	5.3 ± 0.1 ^{ef}
Overall palatability	5.5 ± 0.2 ^e	4.9 ± 0.2 ^f	4.2 ± 0.2 ^g	5.5 ± 0.2 ^e	5.1 ± 0.2 ^{ef}	5.4 ± 0.2 ^e
% carcasses rated less than score 5	15	33	60	19	26	25

^a Means ± S.E.

^b Kg/core sample.

^c Kg/20 g meat sample.

^d Tenderness: 1 - extremely tough, 2 - very tough, 3 - moderately tough, 4 - slightly tough, 5 - slightly tough, 6 - moderately tender, 7 - very tender, 8 - extremely tender.

Connective tissue: 1 - abundant, 2 - moderately abundant, 3 - slightly abundant, 4 - moderate, 5 - slight, 6 - traces, 7 - practically none, 8 - none.

Juiciness: 1 - extremely dry, 2 - very dry, 3 - moderately dry, 4 - slightly dry, 5 - slightly juicy, 6 - moderately juicy, 7 - very juicy, 8 - extremely juicy.

Flavor: 1 - extremely bland, 2 - very bland, 3 - moderately bland, 4 - slightly bland, 5 - slightly intense, 6 - moderately intense, 7 - very intense, 8 - extremely intense

Overall palatability: 1 - not acceptable, 3 - slightly acceptable, 5 - moderately acceptable, 7 - highly acceptable, 8 - extremely acceptable.

^{efg} Means with different superscripts in the same row differ significantly, p<0.05.

even between exotic breeds. We should be very careful not to move too far in this direction because our limited research data tell us that meat quality can be adversely affected. American consumers still want acceptable quality. Except for the market segmentation that I mentioned, we probably should try to throttle this proliferation of breeds and start settling down to those which provide what we need. Fat deposition, marbling and lean to fat ratio are highly heritable traits. For example, heritability estimates for carcass grade, tenderness, fat thickness and rib eye area are 48, 61, 38 and 70, respectively. So within and between breeds we can make great strides by selection and by cross-breeding. The modern technologies of embryo transplants and gene transfer undoubtedly will have a future role to play in beef industry once the industry decide on the products they need to produce. Growth promotants, particularly growth hormone and β -agonists, increase the accretion of muscle and decrease the deposition of fat. Again, meat quality should be carefully checked because our limited study indicates that some growth promotants can adversely affect tenderness and meat quality.

Summing up "ideal beef carcass," except for segmented market, beef cattle industry must make every effort to produce leaner, yield grade 2 carcasses with acceptable quality. Today's carcasses are still too fat and poorly muscled. Meat quality should be maintained at current level for California beef but can be lowered slightly nationwide.

Utilization of Beef Carcass

In summarizing her remarks, Mary E. Powers (1984) of the Good Housekeeping Institute in New York, said, "If the meat takes advantage of the trends in home entertaining, convenience foods, and ethnic foods, and concurrently

informs the consumer of the nutrient richness and leanness of the meats of today, this decline will be reversed and meat will continue to be an important part of the American diet."

I think we need revolutionary thinking in fabricating beef carcass into various cuts and in food preparation. Today more than half of the women in the nation work outside the home, and of these women, 14% have preschool children. More than three-quarters of consumers are concerned about the preparation time of food. These phenomena have helped create a demand for more convenient food products and more convenient methods of food preparation. In addition, consumers are more than willing to purchase and prepare ethnic and regional foods. The trend in ethnic food preparation is to reinterpret foreign dishes according to American tastes, that is, Americans are adapting foreign foods to American ingredients and American equipment and are adapting foreign cooking techniques to American recipes. This interest in ethnic and also American regional foods offers many opportunities for the beef industry.

New products designed for ready-to-cook in the microwave oven, and recipes of quick, nutritional, one-dish meals or ethnic foods that use beef as their main ingredient will certainly expand the market for beef.

To capture more meat dollar created by this new trend, the fabrication of beef carcass and the preparation of meat cuts in the retail stores should be somewhat modified. High quality cuts will continue to be fabricated into steaks, but the intermediate or low quality cuts can be cut or prepared differently for quick preparation or ethnic foods. For example, some intermediate or low value cuts, instead of being presented as steaks or roasts with bones and lots of seam fat, can be chipped or sliced into thin meat slices.

tracking studies conducted for the BIC and the CBC indicate that consumers, especially Californians, are coming back to beef.

The first of these studies (Walker Research, 1986) was designed to determine consumer awareness of Beef Industry Council advertising and to track consumer attitudes toward beef. Consumers were asked to indicate their level of agreement with a series of statements or perceptions about beef. The results of this study indicate that consumers' attitudes toward beef appear to have stabilized. Virtually all perceptions about beef showed at least some improvement in 1986, ending the downward slide of recent years, with significant improvements occurring in perceptions that beef is good tasting, a good value for the money, and leaner than it used to be.

The improvement in attitudes about beef has cut across all beef usage groups, but lighter eaters continue to have lesser attitudes than either moderate or heavy eaters. Similarly, California consumers tend to have somewhat lower perceptions about beef when compared to the U.S. as a whole, re-emphasizing the relatively more difficult problems facing the industry in California.

Perhaps the most positive finding of the study showed that consumers aware of BIC advertising, generally have better attitudes about beef than those who are not aware of the advertising. Furthermore, these consumers are significantly more likely to view beef as contemporary, good for you, appropriate for active lifestyles, leaner than it used to be, and low in fat and cholesterol. The study shows that the current advertising delivers its intended message and influences consumer attitudes about beef.

Improved attitudes, however, must be translated into increased demand if the beef industry is to be profitable. The second tracking study, which monitors in-home eating of beef, indicates some positive news on this front also; beef is being eaten more frequently in more California and U.S. homes.

The National Eating Trends study (NPD Group, 1986) tracks both the number of households serving beef in an average two week period (household penetration) and the average number of times beef is served during the same period (serving frequency). This study indicates that in 1985, beef was served in 87 percent of California's homes, up from 83 percent in 1984 and 79 percent in 1983. At the same time, the frequency with which beef was served in California homes rose from 4.2 times in an average two-week period in 1984 to 4.6 times in 1985. This increase in beef eating also occurred in the U.S. as a whole, but to a lesser extent. Between 1984 and 1985, beef's household penetration in the U.S. increased from 88 to 90 percent while serving frequency increased from 4.8 to 4.9 times.

These studies provide evidence that BIC and CBC marketing programs are working, but this success has not come easily. As with a delicious meal, the new successful marketing program has depended on the careful selection, testing, and use, of quality ingredients. These ingredients include research, education, public relations, and promotion activities, which each have made an important and unique contribution. Some highlights of the 4 year marketing effort follow:

Research

Research is both the beginning and the end of a marketing program. At the beginning, research is used to learn what consumers want and need. How they feel about beef, use beef and competing products, and how beef products should be positioned to increase consumer demand can also be defined. At the end, research is used to evaluate the effectiveness of programs and determine ways to make programs more effective.

- . Information provided by the Consumer Climate for Red Meats studies (Yankelovich, Skelly and White, 1981, 1983 and 1985) has dispelled once and for all the notion that there is one consumer market by identifying

five consumer market segments, two of which, active lifestyles and health oriented, have become the primary target of the industry's marketing effort. Each year the segments change as our marketplace is dynamic. The constantly changing marketplace makes this target an elusive one, so a continual monitoring of our consumers is necessary.

- The National Consumer Retail Beef Study (Yankelovich, Skelly and White, 1986) showed that when consumers think quality in beef, they think lean and when they say lean, they mean no excess fat trim. In short, the fat has to go! Many retailers have reacted quickly. Safeway and Kroger, the two largest chains, are now offering and advertising 1/4-inch trim programs; Safeway alone is spending \$22 million to advertise this value-added image for beef rather than relying solely on price specializing to move product.

Many packers are exploring the feasibility of providing better trimmed cuts to the retailer. Excel Corporation's current test of 1/4-inch trimmed, vacuum-packaged, case-ready, retail beef cuts uses research results from prior tests on consumer attitudes, new packaging and brand labeling.

- New beef nutrient composition data developed in the late 1970's and published this summer show that beef is, in fact, leaner than it used to be and leaner than many consumers believe. Based on this data, the beef industry developed its Nutri-Facts in-store nutrition information program. Now in 12,000 retail stores, the information program has been adopted by virtually every major supermarket chain in the U.S. Nutri-Facts is the second recipient of the American Dietetics Association's President's Circle Award which is given to honor excellence in providing scientifically sound nutrition education to the American public.
- Information provided by foodservice operator research indicated that beef

was not considered fashionable, was hard to buy and prepare profitably, and did not fit the growing demand for "lighter fare." Foodservice cards were developed to position beef as an "under 400 calorie" menu item. Menu ideas and subprimal cooking suggestions were included. Beef is now returning to the menu, not only in low calorie meals, but also in a resurgence of old-fashioned beef items (e.g., meat loaf and roast beef with gravy), but even here times are changing. The new old fashioned foods are served in a more fashionable way, with smaller portions and accompanied by a wide variety of fresh vegetables.

- . New data on actual beef consumption (Breidenstein, 1984) shows that on a per capita basis, actual beef consumption is substantially lower than typically believed. This data, in conjunction with the new nutrient composition data on beef, have provided credibility for the beef industry's message and have enabled the industry to establish a dialogue about beef facts, not myths, with such organizations as the American Heart Association, American Cancer Society, and National Institutes of health. As a result, the American Heart Association now recognizes lean beef's role in a balanced, healthful diet. The same data have been used in advertisements to physicians and nutritionists in their professional journals.

Education

Education has three thrusts. To teach present and future consumers the proper use and care of beef as a food product. To demonstrate the value of beef's nutritional contribution to the diet. To explain the important role the industry plays in today's world.

- . The credibility provided by the nutrient composition and actual beef consumption data has been especially important to the industry's educational efforts. The new data is the focus of a series of "round

table discussions" with dietitians throughout the U.S. These dietitians influence the diets of many consumers and so the "round tables" are key steps toward re-establishing the important role beef plays in a well balanced diet.

- . Education programs are also aimed directly at consumers through teachers. For curriculums other than home economics, the beef industry has developed materials that utilize beef and the beef industry to teach students about nutrition, history, and economics. Health and Nutrition: A Matter of Facts has been distributed to high schools nationwide to assist health teachers who do not feel adequately prepared to respond to their students' nutrition questions and to address students' misconceptions about nutrition.

History Matters: A Story of Change is a movie on cattle ranching. Available free of charge to social studies teachers, it teaches students about investments, risks, and the need for industries to produce products which respond to changing consumer needs and wants.

- . Educational materials are changing to keep pace with new audiences and the new techniques and equipment of today's world. Microwave ovens have risen in popularity in our fast-paced, convenience oriented society. Oven ownership is now 44% nationwide and 60% in 2 income households. The need has arisen to teach consumers how to use these ovens effectively and enjoy their versatility as a cooking appliance. CBC's Microwave Cooking with Beef discussion guide covers these needs and shows consumers that, contrary to popular opinion, microwave cooking techniques can be applied to the preparation of good tasting, eye-appealing beef dishes.
- . High tech's newest best seller, the personal computer, can now be used in the kitchen. CBC's **California Beef** is a recipe file for personal computers that contains 165 beef recipes classified by cut, type of meal,

and ethnicity. California Beef is ideal for all cooks, whether a kitchen cook, chef, or caterer. One touch of a key and a recipe can be called up on a screen and adjusted to feed one person or a crowd.

Public Information

Positioning beef as part of today's fitness-oriented lifestyle, and earning public understanding and acceptance of beef and the beef industry, is the function of the industry's public information programs.

- . Concerns about health and fitness are very important to many of today's consumers. Efforts to show these consumers that beef does "fit" with their lifestyle and concerns have included such activities as print ads in sports/fitness oriented magazines, exhibits at aerobics expositions, placements of articles about today's leaner beef in magazines like Redbook, Cosmopolitan, and American Health.
- . The national and state beef cookoff contests provide creative cooks with a place to test their cooking know-how. At the same time, the beef industry has new opportunities to show the versatility of beef and get a \$40 return for each dollar invested in publicity placements on radio and TV and in magazines and newspapers.
- . While much of the public information effort is targeted at lighter eaters of beef, an important group of beef lovers has not been ignored. Public service announcements, brochures, and radio advertising that includes recipes and contests, have been developed in Spanish to thank the Hispanic population in California for its support of, and confidence in, the beef industry and its "carne de res."

Promotion

Promotion programs are the coordinated efforts of the beef industry to reach consumers at home, in the car, in the grocery store, or at restaurants.

- . With each advertising flight, point-of-purchase materials are installed in 23,000 supermarkets, nationwide. Through the use of bright, attractive photography, a variety of displays, recipes, and Nutri-Facts profiles, these materials reinforce the industry's advertising message and stimulate in-store decisions to purchase beef.
- . Meat Features is the newest in-store video information program. Retailers can use 40 sixty-second beef and veal video tapes to provide customers with cut-specific recipes, creative serving suggestions, and healthful nutrition and calorie information. The field test showed how effectively Meat Features can improve sales without price specials. Heavy moving ground beef sales increased 18 percent, moderate moving top sirloin sales increased 25 percent and sales of specialty cut stir fry increased 330 percent.
- . Advertising has been targeted at the foodservice industry with the campaign Beef: It Serves You Light. Taking advantage of this success of the versatility of beef, the campaign theme is now extended to Beef: It Serves You Light; Morning, Noon and Night, so that beef menu items are extended for use as beef appetizers and breakfast items.

With all the above ingredients, plus many more, the beef industry has provided a satisfying first course for the consumer marketplace. However, appetizer is seldom expected to be an entire meal as it "wets the palate" in anticipation of the main dish.

The "Real" Recipe

The beef industry can now provide a main dish that will live up to those expectations because of the new national check-off program. Made possible by the Beef Promotion and Research Act of the 1985 Farm Bill, this program will raise \$60 million in 1987 and increase the beef industry's opportunities to spread its messages. The industry will continue to follow its recipe for

success by using techniques that have served it so well the last few years. Building upon the programs of research, promotion, education, and public information that have had a positive impact, the main dish of expanded generic, beef marketing is about to come out of the oven!

New, expanded activities that lie ahead include: more in-depth research on consumer attitudes, wants, needs, and reactions to materials; free distribution of educational materials to classroom teachers throughout the U.S.; increased efforts to provide healthcare professionals with nutritional information about beef; an expanded sales promotion program that includes newspaper inserts, retail trade advertising, cooperative tie-ins with brand name products and consumer action devices; implementation of a toll-free hot line consumers can use to obtain information about beef. Perhaps the most visible and exciting change will be the dramatic expansion in the industry's generic advertising campaign. Funding increases from \$5 million in 1986 to \$30 million in 1987. How much of a change in programs can be expected from this 500 percent jump in dollars spent? A great deal.

In 1986, the Beef: Good News for People Who Eat campaign message has been that beef is highly nutritious, tasty, convenient, and versatile food and is consistent with today's lifestyles and health and nutrition concerns. Directed primarily at females aged 25-54 who are lighter eaters of beef, concerned about the nutrition content and healthfulness of the foods they eat, and lead active lives, the media campaign includes 12 weeks of fringe, prime-time television advertising in 10 metropolitan markets and 25 print ad inserts. In the ten markets only, 84 percent of the target audience saw the advertising an average of 4.3 times in a four-week period.

In 1987, the advertising program will be greatly expanded to reach 97 percent of the target audience, four times in a four-week period. More importantly, the target audience will also be expanded to include all adults

aged 25-54. They will be reached through more media with 28 weeks of network prime-time, late night, and weekend sports television advertising, 27 weeks of network and radio advertising and 75 print ad inserts.

The advertising theme will be changed as well in 1987. The Beef: Real Food for Real People message will build on the strengths of the current advertising and be more appealing to the broader target audience. At the same time, it will take advantage of beef's lead role in the resurgence of "back to basics" foods. The message will be delivered by real people, celebrities and personalities, who let consumers know that people who eat are real people and enjoy beef because it is real food.

So what's cooking in beef marketing? Plenty!

The beef industry is beginning to expand its menu to meet the needs of the consumer marketplace. Existing programs fuel the momentum toward a brighter future for the industry, but the challenge to the industry is to continue building. The national checkoff funds have fired this challenge and the opportunity is now here to further spread the good news about beef, increase consumer demand for the beef industry's products and so to keep beef marketing cooking!

BREED UTILIZATION TO INCREASE EFFICIENCY OF PRODUCTION

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Summary

Production efficiency is a measure of the effectiveness of management decision regarding the conversion of raw products to a marketable product. For beef cattle production, this requires exploitation of both within and between breed variation to enhance the formation of output. Information is presented documenting variation among a number of breed crosses for economically important production characteristics for life cycle production. These data were collected to evaluate growth components and maternal performance of the contributing breeds. A discussion of use of crossbreeding systems provides information describing the expected benefits for a cow/calf operation. Emphasis is placed upon a structured cross breeding program with breeds selected for use based on expected performance levels.

Introduction

Efficiency of production (ratio of output to input) may be reported in either biological or economic terms. This terminology has become increasingly publicized over the recent decade for investors involved in the conversion of raw materials such as forage products to a marketable product, e.g., meat animal protein. For beef cattle production efficiency to improve, the producer must consider all production options available and develop marketing strategies for the product. The producer has the responsibility to be an effective manager if the production enterprise is to remain viable. This responsibility includes identification of the commodity (seed stock, weaning calf, feeder, etc.) and resource availability (biological and financial). The decision concerning what commodity to be produced is not

independent of resources. Biological resources may be supported by financial resources to provide an environment suitable for a defined production enterprise. However, if the costs of environmental alteration are excessive relative to returns, management strategies have to be revised. Conversely, the production environment may be challenged by germ plasm whose potential exceeds the environmental production capacity, resulting in restricted production levels. This requires management to introduce germ plasm resources more adapted to the environment, to increase expenditures of financial resources to modify the environment, or redefine the commodity. Life cycle efficient production of beef cattle requires the synchronization of the production environment and germ plasm resources with respect to the identified commodity.

Moav (1966) suggested that for domestic species, the gross profitability of an enterprise maybe divided into two components: reproduction and production. The reproductivity component is a characteristic of the dam and productivity represents characteristics of the progeny. Both components may be enhanced within defined production environments by exploitation of genetic diversity that exists within and among the cattle breed populations available to today's producers. Gregory and Cundiff (1980) indicated that commodity production can be increased through mating systems that effectively exploits this genetic diversity. For effective exploitation, accurate information characterizing genetic potential for both the reproductivity and productivity components are required. At the Roman L. Hruska U.S. Meat Animal Research Center, a comprehensive evaluation of production traits identified as having economic importance was initiated to allow comparison of a broad range of cattle breeds. These breeds differ widely in economically important traits such as growth rate, mature size, milk production, carcass merit and energy

requirements.

This report provides information from the Germ Plasm Evaluation characterizing production characteristics of breeds through the third cycle of the Germ Plasm Evaluation. Mating systems to exploit the variation among breeds will be discussed.

Materials and Methods

Approximately 16-20 sires were sampled for each of the breeds identified in table 1. These sire breeds were mated to Angus or Hereford cows by artificial insemination. The Germ Plasm Evaluation program (GPE) was designed to provide characterization of economically important traits during life cycle production. Semen from the same Angus and Hereford sires were used each of the cycles to provide Angus-Hereford-X animals as a control. The straightbred Hereford or Angus cows used to produce the F_1 's in each cycle were the same cows or descendants of these cows. Fifteen of the breeds that have been evaluated have been assigned to a biological type classification based upon these four production criteria (table 2). The number of X's for a trait indicate the relative increasing difference between breeds increase for that trait.

Production characteristics of growth, size and carcass merit of F_1 's.

Table 3 provides characterization information for calving and weaning traits for progeny of the sire breeds. Sire breeds described as having greater potential for mature and growth rate (table 2) generally produced calves with heavier birth weights. A positive relationship between heavier birth weights and calving difficulty was observed with breeds such as the Charolais, Simmental, Brahman, South Devon and Chianina experiencing greater calving difficulty than breeds siring lighter calves. However, calving difficulty may be associated with more than heavier birth weights. This is

suggested by differences in calving difficulty experienced with breeds of similar mature size. Calving difficulty for the South Devon, Chianina and Brahman breeds was lower than the calving difficulty of the Maine Anjou and Charolais. Calves produced by breeds with greater potential for mature size generally exhibiting heavier weaning weights per cow calving.

During the postweaning period, steers from larger mature size groups gained faster (table 4) and exhibited a better feed conversion ratio on a time constant basis. The yield of retail product was also generally greater for these steers. However, variation in yield of retail product was observed among breeds with similar mature weights. For the larger breeds, Brahman, Simmental, Maine Anjou, Charolais and Chianina, the range in percentage retail product was from 70 to 73%. Steers from the Limousin sires (lighter mature weight) had a yield of 72% retail product. Higher marbling scores were observed from steers produced by sire breeds with more moderate mature size and growth rate potential when slaughtered at similar ages.

Breed group means for weights and heights of the F_1 cows at 6 years of age or older are reported in table 5. Heaviest mature weights were observed for cows produced from Charolais, Maine Anjou and Chianina breeds of sires. Mature weights of Jersey, Red Poll and Sahiwal sired cows tended to be the lightest.

Reproduction and maternal performance of F_1 females.

The reproduction performance of the F_1 cow from the first three cycles of GPE are reported in table 6. These data are pooled over the three cycles to allow comparison with the Hereford-Angus-X controls. Some differences were observed in percentage calf crop born with the Sahiwal, Brahman, Maine Anjou and Chianina breed crosses having a higher percentage. South Devon, Simmental, Limousin and Charolais breed crosses calving percentages were

and for nongestating-nonlactating cows for the Angus-Hereford-X, Jersey, Simmental and Charolais breed crosses (Ferrell and Jenkins, 1982). Energy requirements (ME, Mcal) for these three physiological states were estimated and summed to provide energy requirements for a production year. Estimated efficiency ratios (weaning weight, lb/ME, Mcal) ranged from 6.54 for the Hereford-Angus-X to 5.56 for the Simmental breed cross. The Jersey and Charolais breed crosses were similar. Relative to the average of the four breed crosses, the breed cross with genetic potential for moderate size and moderate level of milk production was seven percentage units more efficient. The breed cross with high genetic potential for mature size and milk production level was nine percentage units lower than average.

Biological efficiencies were estimated for Angus, Hereford, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou and Chianina for a 140-d period during lactation. Cattle were fed to maintain body mass during the study. Output was considered to be the weight gain of the calf during the time period. Input was the sum of feed consumed by the cow and calf during the period. Maine Anjou, Red Poll and Hereford-Angus-X breed crosses were significantly more efficient than the Chianina breed cross. The remaining breed crosses were intermediate. These results from the two evaluations suggest that breed crosses with greater potential for size or milk production may have their advantage for output reduced or totally offset by higher energy requirements for production.

These results suggest that it is important not only to quantify potential for output but also a need exists to quantify the variation in energy inputs required to sustain production. Gregory (1972) suggested that over 60 percent of the feed consumed by the cow herd is expended to maintain the cow herd. A series of studies has been initiated at the U.S. Meat Animal

emphasized only size components. Management must utilize breeding programs designed to exploit the variation among breeds, thus synchronizing germ plasm resources to the feed and management resources available to the production enterprise. Gregory and Cundiff (1980) identified alternative crossbreeding systems that provide for this type of exploitation. Key to the success of use of cross breeding systems is the implementation of definite mating systems and the commitment by management to allocate the resources necessary to support the mating systems.

Cundiff et al. (1986) reviewed the benefits that may be realized from use of designed mating systems. Included among the benefits are: heterosis, optimization of the contributed additive genetic component and complementarity. The approach of planned crossbreeding programs thus allows the producer the opportunity to identify those germ plasm resources having production characteristics for both output and input traits that coincide with available production resources. Management decisions regarding the desirability of a particular system should be made with management factors such as size of cow herd, labor resources, breeding pasture availability and insemination programs (artificial or natural). These factors must be considered because to derive the benefits, adherence to a particular strategy is critical.

Crossbreeding systems that could be considered include the rotational, static terminal, rotational terminal sire, composite and the composite terminal. Each of these systems exploit heterosis, additive breed effects and complementarity to various degrees for both output and input characters. For weaning weight per cow exposed, the relative benefit from heterosis would be greater for the rotational and rotational terminal sire breeding systems. The expected benefit from optimizing the additive genetic effects would be

livestock enterprise is to be operated. Assuming a constant land base with known energy production and a constant herd size, greater genetic production potential may be utilized if the nutrient environment is unrestricted or energy supplementation is economically feasible. If the producing females are subjected to extensive energy restriction, the reproduction rate of higher producing type may be severely limited. Management then must consider the cost of energy supplementation relative to the expected returns per unit output.

A more typical production environment is one where nutrient (energy) resources fluctuate within and over years. Research results suggests that animals with more moderate production potential are more capable of reducing energy requirements for maintenance than those with greater potential for output production. Management's identification and use of germ plasm with optimum level of genetic potential for production in a defined production environment would insure reasonable reproduction rates without being dependent upon exogenous energy supplementation use of defined crossbreeding systems, sire breeds could be used to enhance the expected performance of the offspring.

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TABLE 1. SIRE BREEDS USED DURING GERM PLASM EVALUATIONS^a

Years F ₁ produced			
1970-72	1973-74	1975-76	1986-1990
Hereford ^b	Hereford ^b	Hereford ^b	Hereford ^{b,c}
Angus ^b	Angus ^b	Angus ^b	Angus ^{b,c}
Jersey	Red Poll	Brahman	Longhorn
South Devon	Brown Swiss	Sahiwal	Salers
Limousin	Gelbvieh	Pinzgauer	Galloway
Charolais	Maine Anjou	Tarentaise	Nellore
	Chianina		Shorthorn
			Piedmontese
			Charolais
			Gelbvieh
			Pinzgauer

^aF₁'s were produced from Angus or Hereford cows.

^bHereford and Angus sires originally sampled in 1969, 70 and 71 were used for each production cycle.

^cHereford and Angus sires produced post 1982 were sampled.

TABLE 2. BREED CROSSES GROUPED IN BIOLOGICAL TYPE ON BASIS OF FOUR MAJOR CRITERIA^a

Breed group	Growth rate & mature size	Lean to fat ratio	Age at puberty	Milk production
Jersey-X	X	X	X	XXXXX
Hereford-Angus-X	XX	XX	XXX	XX
Red Poll-X	XX	XX	XX	XXX
South Devon-X	XXX	XXX	XX	XXX
Tarentaise-X	XXX	XXX	XX	XXX
Pinzgauer-X	XXX	XXX	XX	XXX
Sahiwal-X	XX	XXX	XXXXX	XXX
Brahman-X	XXXX	XXX	XXXXX	XXX
Brown Swiss-X	XXXX	XXXX	XX	XXXX
Gelbvieh-X	XXXX	XXXX	XX	XXXX
Simmental-X	XXXXX	XXXX	XXX	XXXX
Maine Anjou-X	XXXXX	XXXX	XXX	XXX
Limousin-X	XXX	XXXXX	XXXX	X
Charolais-X	XXXXX	XXXXX	XXXX	X
Chianina-X	XXXXX	XXXXX	XXXX	X

^aThe number of "X's" indicates increasing relative differences among breed groups for (1) growth rates and mature size, (2) lean to fat ratio, (3) age at puberty and (4) milk production found in the Germ Plasm Evaluation Program at the Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, Nebraska.

TABLE 3. BREED GROUP MEANS FOR BIRTH AND WEANING TRAITS OF F₁ PROGENY PRODUCED IN THE GERM PLASM EVALUATION

	Calving difficulty (%) ^{a,b}	Calves weaned (%) ^a	Birth weight (lb) ^a	Prewaning ADG (lb/d)	Weight weaned at 200 day ^c	
					Cow calving (lb)	Ratio (%)
Hereford-Angus-X	2.9	97.3	78.7	1.76	418	100
Jersey-X	2.9	92.3	68.6	1.70	375	90
Limousin-X	9.4	91.7	85.8	1.76	401	96
South Devon-X	11.9	92.9	83.1	1.74	399	95
Simmental-X	14.9	89.1	88.9	1.83	403	96
Charolais-X	18.4	86.5	90.6	1.85	397	95
Red Poll-X	3.7	97.8	78.7	1.74	417	100
Brown Swiss-X	8.4	97.2	85.6	1.83	439	105
Gelbvieh-X	8.0	91.5	86.0	1.87	422	101
Maine Anjou-X	20.4	90.8	90.6	1.81	412	98
Chianina-X	11.8	91.1	89.3	1.83	415	99
Pinzgauer-X	6.3	95.2	86.4	1.76	418	100

CONTINUED

TABLE 4. BREED GROUP MEANS FOR POSTWEANING GROWTH AND CARCASS CHARACTERISTICS OF F₁ PROGENY PRODUCED IN THE GERM PLASM EVALUATION

	Postweaning ADG (lb/d)	Slaughter weight (lb) ^a	Feed efficiency (Mcal ME/lb gain) ^b	Retail product (%) ^a	Marbling score ^c	Yield grade
Hereford-Angus-X	2.40	1008	10.5	66.3	11.3	3.6
Jersey-X	2.23	958	10.9	65.5	13.3	3.4
Limousin-X	2.32	1021	10.2	72.4	8.9	2.4
South Devon-X	2.58	1031	10.4	67.7	11.3	3.1
Simmental-X	2.69	1079	10.4	71.1	9.9	2.6
Charolais-X	2.67	1093	10.0	71.8	10.3	2.5
Red Poll-X	2.20	979	11.4	66.6	11.2	3.5
Brown Swiss-X	2.47	1076	10.4	69.1	10.4	3.0
Gelbvieh-X	2.56	1090	10.1	69.8	9.7	3.0
Maine Anjou-X	2.65	1103	10.2	70.2	10.2	2.9
Chianina-X	2.49	1077	10.4	73.0	8.5	2.7
Pinzgauer-X	2.45	1017	10.4	69.4	10.8	3.2
Tarentaise-X	2.38	1010	10.8	69.8	10.1	3.3

CONTINUED

TABLE 4, cont'd.

	Postweaning ADG (lb/d)	Slaughter weight (lb) ^a	Feed efficiency (Mcal ME/lb gain) ^b	Retail product (%) ^a	Marbling score ^c	Yield grade
Brahman-X	2.40	1033	10.8	69.4	9.3	3.6
Sahiwal-X	2.20	962	11.0	69.1	9.7	3.4

^aAdjusted to 458 days of age.

^bConstant time on test.

^cMarbling scores = 7, 8, 9 slight; 10, 11, 12 modest.

Cundiff et al. (1982); Koch et al. (1982).

TABLE 5. BREED GROUP MEANS FOR WEIGHT AND HEIGHT AT HIPS OF MATURE F₁ COWS^a

Breed group ^b	Cow weight (lb)	Hip weight (in)
Cycle I		
Hereford-Angus-X	1225	48.8
Jersey-X	1069	48.3
Limousin-X	1235	50.3
South Devon-X	1266	50.6
Simmental-X	1282	51.0
Charolais-X	1357	51.1
Cycle II		
Hereford-Angus-X	1200	48.6
Red Poll-X	1115	48.5
Brown Swiss-X	1215	50.8
Gelbvieh-X	1255	50.4
Maine Anjou-X	1355	51.2
Chianina-X	1359	54.6
Cycle III		
Hereford-Angus-X	1212	48.3
Pinzgauer-X	1207	50.5
Tarentaise-X	1193	49.7
Brahman-X	1272	52.1
Sahiwal-X	1107	50.5

^aAt six years or older.

^bBreed groups identified by sire breed.

TABLE 6, cont'd.

Breed group	No. births	Calf crop		Calving difficulty (%) ^a	Birth weight (lb) ^b	200-day weight			
		Born (%)	Weaned (%)			Per calf weaned (lb) ^b	Ratio (%) ^c	Per cow exposed (lb)	Ratio (%) ^c
Limousin-X	851	89	82	12	88	484	102	397	100
Charolais-X	693	88	80	15	93	503	106	403	101
Chianina-X	475	93	86	8	95	523	110	450	113

^aIncludes calves requiring calf puller or Caesarean section.

^bAdjusted to a steer basis.

^cRatio computed relative to average for Hereford-Angus reciprocal cross dams.

Cundiff et al. (1985).

TABLE 7. ESTIMATES OF TIME OF PEAK LACTATION, YIELD AT PEAK LACTATION AND TOTAL YIELD FOR SEVERAL BREEDS AND BREED CROSSES

Breed group ^a	Time of peak lactation (wk)	Yield at peak lactation (lb)	Total milk yield (lb)
Cycle I			
Angus-Hereford-X	8.5	21	2680
Charolais-X	7.0	25	2856
Jersey-X	8.3	27	3307
Simmental-X	7.6	29	3440
Cycle II			
Angus-Hereford-X	8.8	16	2312
Red Poll-X	8.2	19	2587
Brown Swiss-X	9.4	20	2860
Gelbvieh-X	8.7	20	2791
Maine Anjou-X	8.6	19	2693
Chianina-X	8.6	15	2081
Angus	8.4	17	2310
Hereford	7.5	14	1751
Brown Swiss	9.0	23	3350

^aSire breed listed. All sire breeds mated to Angus or Hereford cows.

TABLE 9. ESTIMATES OF METABOLIZABLE ENERGY REQUIRED FOR MAINTENANCE OF VARIOUS BREEDS OR BREED CROSSES

Breed or breed cross	Physiological state	Maintenance (kcal/kg ^{0.75} /d)
Hereford	Growing-finishing, 9-15 mo	106
Simmental	Growing-finishing, 9-15 mo	126
Angus-Hereford-X ^a	Non-pregnant, non-lactating, 9-10 yr	130
Charolais-X	Non-pregnant, non-lactating, 9-10 yr	129
Jersey-X	Non-pregnant, non-lactating, 9-10 yr	145
Simmental-X	Non-pregnant, non-lactating, 9-10 yr	160
Angus	Non-pregnant, non-lactating, 5-6 yr	118
Hereford	Non-pregnant, non-lactating, 5-6 yr	120
Simmental	Non-pregnant, non-lactating, 5-6 yr	134
Angus	Non-pregnant, lactating, 5-6 yr	149
Hereford	Non-pregnant, lactating, 5-6 yr	141
Simmental	Non-pregnant, lactating, 5-6 yr	166
Charolais	Non-pregnant, lactating, 5-6 yr	165
Angus-Hereford-X ^a	Pregnant, lactating, 8-9 yr	151
Red Poll-X	Pregnant, lactating, 8-9 yr	157
Brown Swiss-X	Pregnant, lactating, 8-9 yr	156
Gelbvieh-X	Pregnant, lactating, 8-9 yr	158
Maine Anjou-X	Pregnant, lactating, 8-9 yr	146
Chianina-X	Pregnant, lactating, 8-9 yr	174

^aCrossbred cows produced by mating Angus, Hereford, Charolais, Jersey, Simmental, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou or Chianina bulls to Angus or Hereford cows.

Economics of Integrated Ranch Management

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Introduction

The Integrated Reproduction Management (IRM) project, concerned with beef cattle production in Colorado. Initiated July 1, 1983; the primary goal of the IRM project was then said to be: "to increase by 10 percent the pounds of calf produced per economic unit, in a financially beneficial way, within the next five years". Achievement of this goal involved three objectives. Each implies an increased level of management.

They were:

1. reduce the length of the breeding season;
2. reduce calf and cow losses due to dystocia; and
3. reduce neonatal calf losses due to disease, particularly diarrhea.

After initiation of the project, it became apparent that improved ranch management and cattle marketing had been overlooked as critical objectives. Thus, a fourth management objective was identified:

4. incorporate economic analysis in management decisions which affect production and marketing of beef cattle.

Each of the objectives come at some cost -- either financial or economic. Thus, the IRM project was conceived as a multidisciplinary, management oriented study of cattle production, concerned with the biological and economic efficiency of beef cattle production in Colorado.

Background

Colorado's IRM project was formulated by representatives from the Colorado Cattleman's Association, Colorado Wool Growers, Cooperative Extension Service, and the Agricultural Experiment Station in a planning meeting in December, 1982. The general goal and related objectives were based in part upon a survey of ranchers and veterinary practitioners located throughout the state.

The IRM project involves in significant ways ranchers, extension agents and the IRM investigative team. Taken together they reflect the integrated multidisciplinary nature of the project. Viewed separately they seem to represent three "levels" of activity -- the producer level, the technical advisor level and the research level. Disciplines included at the level of the IRM team include: reproductive physiology, range management, agricultural economics, animal sciences, and veterinary sciences.

The IRM project involves eight participating ranchers. The cooperators are dispersed throughout the state representing the major geographical and climatological regions [i.e., high plains (northern and southern), high mountain country and western desert]. Each of the cooperating ranchers is working closely with their local extension agent. The initial effort of the extension agent and the cooperator is a five year ranch plan, with production and performance goals for the ranch. Additionally they are to identify those

problems the cooperator perceives as most immediate. It is the cooperator's responsibility to actively participate in the program at all levels including identification of the important problems, implementation of the program, and helping to seek financial support for the program.

Decisions involving problem resolution or attainment of objectives established by each cooperating rancher will rest with him. The county extension agent and IRM team will provide direct assistance in the identification and definition of major problems, alternative solutions or procedures, and assessment of potential outcomes and results. The final decisions and consequences reside with individual cooperators.

This aspect of the IRM project is extremely important. Since the financial burden of any changes incorporated into the existing management scheme is borne by each individual cooperator, it is the responsibility of the entire IRM team to provide as much information as possible relating the potential benefits and costs of alternative actions. For example, a recommendation by a beef specialist that a cooperator ear tag his breeding herd to assess herd performance must include information about the potential benefit/cost tradeoff of the recommendation. The underlying philosophy of the IRM project involves a systematic approach to problem solving and decision making, thus the team approach.

It is also the responsibility of the county extension and the IRM personnel to disseminate the research findings, recommendations and results of the IRM project to other Colorado livestock producers. The primary means for information dissemination will be extension publications, workshops, and demonstrations held on participating ranches.

Economic Perspective

Many Colorado livestock producers are struggling to survive financially, hoping product prices will improve. Unfortunately, livestock producers have no or little control over market prices. Livestock producers do have control over their cost of production, capital usage and debt load, marketing strategies, size of operation, and other related items. Exercising control over such variables is considered a management function. Improvement of managerial abilities can potentially resolve many of the problems livestock producers are currently facing.

If the primary goal of the IRM project is to maximize profits at the firm level, improvement of management in three major areas must be addressed. The areas are production, finance, and marketing. The three management areas are highly integrated. For example, a decision to increase production has definite impacts on the financial and marketing decisions the producer must make. To accomplish this objective involves the development of a complete management and analysis system which tracks the total activity of the ranch from the earliest physical production functions through the marketing functions of the operation.

Meetings with three of the cooperators revealed that each maintained adequate detail in their production and financial records for management purposes. The problem was that they did not have sufficient time or the managerial skills to fully utilize their records and accounts. Unfortunately the periods of time within which management decisions must be made often coincide with periods when the operator has commitments to physical production activities.

TABLE 1. PER-COW RECEIPTS AND EXPENSES, DOLLARS AND PERCENT, BY COOPERATOR AND AVERAGE.

	Rancher A		Rancher B		Rancher C		Rancher D		Averages	
	\$	%	\$	%	\$	%	\$	%	\$	%
RECEIPTS										
Cull livestock	88.47	20.35%	28.15	10.26%	59.39	20.17%	82.66	24.49%	64.67	19.29%
Calves	346.32	79.65%	246.17	89.74%	235.10	79.83%	254.84	75.51%	270.61	80.71%
TOTAL RECEIPTS	434.79	100.00%	274.32	100.00%	294.49	100.00%	337.50	100.00%	335.28	100.00%
COSTS										
Feed:										
Raised	0.00	0.00%	166.25	46.38%	43.36	14.28%	140.74	31.63%	87.59	23.62%
Purchased	110.66	29.41%	55.61	15.51%	62.47	20.57%	11.59	2.60%	60.08	16.20%
Feedlot*	69.10	16.37%	0.00	0.00%	0.00	0.00%	71.64	16.10%	35.19	9.49%
Total Feed	179.76	47.78%	221.86	61.90%	105.83	34.84%	223.97	50.33%	182.86	49.31%
Interest:										
Borrowed	0.00	0.00%	22.62	6.31%	53.46	17.60%	34.04	7.65%	27.53	7.42%
Equity	14.13	3.76%	0.00	0.00%	0.00	0.00%	0.00	0.00%	3.53	0.95%
Total Interest	14.13	3.76%	22.62	6.31%	53.46	17.60%	34.04	7.65%	31.06	8.38%
Fuel	6.58	1.75%	2.10	0.59%	11.47	3.78%	14.64	3.29%	8.70	2.35%
Labor	8.50	2.26%	0.00	0.00%	0.00	0.00%	13.35	3.00%	5.46	1.47%
Other	3.16	0.84%	0.32	0.09%	5.97	1.97%	7.41	1.67%	4.22	1.14%
Rents	74.98	19.93%	26.10	7.28%	67.49	22.22%	12.86	2.89%	45.36	12.23%
Vet, supplies	9.68	2.57%	31.95	8.91%	10.96	3.61%	10.77	2.42%	15.84	4.27%
TOTAL VARIABLE	296.79	78.68%	304.95	85.08%	255.18	84.02%	317.04	71.25%	293.49	79.14%
RETURNS ABOVE VARIABLE COSTS										
	138.00		-30.63		39.31		20.46		41.79	
FIXED COSTS										
Taxes, insurance	12.30	3.27%	6.65	1.86%	9.16	3.02%	7.44	1.67%	8.89	2.40%
Overhead	13.90	3.69%	22.78	6.36%	26.61	8.76%	22.50	5.06%	21.45	5.78%
Mortgage interest	0.00	0.00%	12.58	3.51%	0.00	0.00%	60.65	18.12%	23.31	6.28%
Depreciation	53.26	14.16%	11.47	3.20%	12.78	4.21%	17.36	3.90%	23.72	6.40%
TOTAL FIXED	79.46	21.12%	53.48	14.92%	48.55	15.98%	127.95	28.75%	77.36	20.86%
TOTAL COSTS	376.25	100.00%	358.43	100.00%	303.73	100.00%	444.99	100.00%	370.85	100.00%
NET RETURNS	58.54		-84.11		-9.24		-107.49		-35.57	

*Feedlot category may also include some non-feed expenses, such as yardage and vet.

TABLE 2. AVERAGE INVESTMENT PER COW, BY COOPERATOR AND AVERAGES.

	Rancher A	Rancher B	Rancher C	Rancher D	Average
Livestock Investment	707	682	624	512	631
Land & Buildings	1,569	413	619	844	861
TOTAL	2,276	1,095	1,243	1,356	1,493

TABLE 3. CALF CROP PERCENT, WEANING WEIGHTS AND CALVING SEASON, BY COOPERATOR AND AVERAGES.

	Rancher A	Rancher B	Rancher C	Rancher D	Average
CALF CROP:					
As % of cows exposed for breeding:	88.6%	NA	71.3%	72.8%	77.6%
As % of cows in herd at start of year:	99.5%	91.3%	92.3%	83.3%	91.6%
WEANING WEIGHTS:					
Steer calves (lbs)	506	473	453	NA	477
Heifer calves (lbs)	472	439	412	NA	441
All calves (lbs)	493	457	432	460	461
Lbs of calf weaned/cow	437	NA	308	335	360
CALVING SEASON:	94	91	124	75	96

Production data is presented in Table 3. For some ranchers, this was the first year on the Beef Cattle Improvement Program and complete data was not available. The average calf crop was 77.6%, and the average weaning weight of all calves 461 lbs.

Based on the estimated costs and returns, two sets of breakeven prices were calculated and are presented in Table 4. The first breakeven price is based on the lbs of calf actually produced per cow, including any post-weaning feeding. The average breakeven price required was \$73.94. The second breakeven price was estimated for weaned calves, excluding any post-weaning feeding. The average needed in this instance was \$72.14. The average annual price for Colorado calves for 1981 through 1984 ranged from \$64.60 to \$67.90, or \$65.85 for the four-year period. Three out of the four ranchers in this

The cattle enterprise was combined with the various crop enterprises to prepare a whole farm analysis for each ranch. Table 5 presents a summary of these analyses, including farm income, balance sheet and financial ratios. Net farm income varied from \$34,419 to -\$28,074. It should be noted that net farm income includes inventories of crops and livestock on hand, as well as cash sales. A major factor contributing to the loss for Rancher D is the amount of interest paid on the land debt.

Analysis of the balance sheets for the four ranchers shows that short-term liquidity is not a problem, particularly when the intermediate ratio is used. Since many cattle operations use an intermediate asset (their cattle) to secure a current liability (their operating note), this ratio is more reflective of their liquidity position than is the current ratio. Long-term solvency is also not a problem for three out of the four ranchers, as measured by the net capital and debt to asset ratios. However, Rancher D with his large land mortgage may have problems remaining in business unless his debt is reduced or restructured, or his income situation improved.

The first three efficiency ratios measure dollars of total expense per dollar of total income. Returns per \$100 of feed fed is a measure of the efficiency of the cattle enterprise alone, based on its major input.

On the average, these four ranchers are earning \$.23 for each \$1 in total assets. They are earning a 4% return on total capital invested in the business, and 0% on their own capital investment. The rate of return on equity capital is often used as a comparison with alternative investments, such as savings or certificates of deposit. At the very least, this rate of return should keep pace with inflation. Otherwise, the value of the operator's equity or net worth is diminishing over time. Only Rancher C earned a percent return on his investment well above the inflation rate for 1984.

Summary

The basic purposes of the IRM project are development of more profitable operations and improvement of decision making capabilities of ranchers. While problems and business situations may be similar in nature, the mix of resources (capital, land, labor, management, and human) is unique for each operation. The project must be concerned with each cooperator but the extension of results, to other livestock producers must also be of concern. Each of the case studies (each cooperator) will be utilized as a vehicle to communicate results to other producers in his locale.

TABLE 4. ESTIMATED BREAKEVEN PRICES, BY COOPERATOR AND AVERAGES.

A. ESTIMATED BREAKEVEN PRICES TO COVER TOTAL ANNUAL COW COSTS

	Rancher A	Rancher B	Rancher C	Rancher D	Averages
Total Cow Costs	\$376.25	\$358.43	\$303.73	\$444.99	\$370.85
Income from Culls	88.47	28.15	59.39	82.66	64.67
Costs Calves Must Recover	\$287.78	\$330.28	\$244.34	\$362.33	\$306.18
Lbs of Calf Produced/Cow	505.68	381.51	348.47	420.78	414.11
Breakeven Price/Cwt	\$56.91	\$86.57	\$70.12	\$86.11	\$73.94

B. ESTIMATED BREAKEVEN PRICES TO COVER COSTS OF PRODUCING WEANED CALF

Total Cow Costs	\$376.25	\$358.43	\$303.73	\$444.99	\$370.85
Raised Feed	0.00	13.72	0.00	12.21	6.48
Purchased Feed	0.00	13.72	0.00	0.00	3.43
Feedlot	69.10	0.00	0.00	71.64	35.19
Other post-wean expense	0.00	0.00	0.00	5.47	1.37
Adjusted Cow Costs	307.15	330.99	303.73	355.67	324.39
Cull Income	88.47	28.15	59.39	82.66	64.67
Costs Calves Must Recover	\$218.68	\$302.84	\$244.34	\$273.01	\$259.72
Lbs of Calf Weaned/Cow	437	NA	308	335	360
Breakeven Price/Cwt for Weaned Calves	\$50.04	NA	\$79.33	\$81.50	\$72.14

The IRM project offers concentrated production and management guidance, through a case study approach, to Colorado ranchers. By identifying rancher problems, proposing alternative courses of action, and analyzing the results from which conclusions can be drawn, the IRM project offers a significant service to the agricultural community.

INTENSIVE GRAZING MANAGEMENT ON ANNUAL RANGE

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The O'Connell Ranch

The O'Connell Ranch is owned and operated by John and Virginia O'Connell. It is located 20 miles southwest of Red Bluff, California. The ranch is approximately 4,500 acres of rolling annual grassland with scattered oak trees. The ranch includes the following soil series: Newville-Dibble, Sehorn-Millsholm, Myers, and Zamora. The average annual precipitation at the nearby Paskenta Ranger Station is 24 inches, varying from 12 to 40 inches over a 20-year period.

In 1983 the O'Connell's converted 1,060 acres of conventionally grazed rangeland to a short duration grazing plan. A grazing cell (Heavy Cell) of several paddocks was created from one large field (Figure 1). Two "centers" for cattle management were built, one on either side of a north-south gravel road bisecting the original field. Single strand electric fences radiating from the centers to existing perimeter fences created 16 "pie shaped" paddocks of approximately 66 acres each.

Cattle are rotated from paddock to paddock every few days according to a predetermined grazing plan. Each paddock receives a maximum of 60-75 days rest during the winter and a minimum of 30 days rest during rapid spring growth. Movement from paddock to paddock is determined by visual appraisal of paddocks that have had adequate rest.

Vegetation in the Heavy cell is annual grassland consisting of soft chess (Bromus mollis), annual fescue (Festuca megalura), foxtail (Hordeum spp.), medusahead (Taeneatherum asperum), annual ryegrass (Lolium multiflorum), wild oats (Avena fatua), filaree (Erodium botrys), rose clover (Trifolium hirtum),

subterranean clover (T. subterraneum), vetch (Vicia spp.), lupine (Lupinus spp.) and miscellaneous other grasses and forbs. Medusahead is everywhere but is especially dense on the clay bottomland soils. Perennials include Stipa pulchra, Aristida oligantha, A. hamulosa and the seeded hardinggrass (Phalaris tuberosa).

In 1984, two additional cells were installed using existing fences and single strand electric fences. These cells are not arranged in the "wagon wheel" design of the original Heavey Cell. One of these new cells, Alfalfa Cell, was the object of our monitoring efforts in 1984-85 (Figure 2). This cell consists of 1,110 acres divided into 12 paddocks that range from 50 to 135 acres in size. Hardinggrass is seeded into some of the paddocks. Much of the flat to gently sloping land was seeded to barley, annual ryegrass, and vetch using a Duncan no-till drill. Most of the land area is occupied by annual grassland.

Monitoring Ranch Productivity

Using long-term production records, the O'Connell's are able to compare productivity after installing the cell with productivity for 12 years before implementing intensive grazing. In 1981, Dave de Vries, a range consultant, mapped and surveyed vegetation in the original cell and developed a species composition monitoring program. Each spring the O'Connell's determine species composition along permanent transects, so that they can detect changes due to intensive grazing.

Monitoring Seasonal Productivity

Seasonal productivity was monitored to determine seasonal animal productivity and the quantity of forage dry matter that is present just before and just after cattle graze a paddock. Seasonal rates of gain were determined for a representative portion of the herd during the 1984-85 and 1985-86 growing seasons.

Two paddocks in the Alfalfa Cell were monitored before and after grazing. The Underhill paddock is entirely annual grassland with rose clover and vetch throughout the paddock and subterranean clover existing in localized patches. The Washington Garden paddock includes a large barley-ryegrass-vetch seeding that was monitored for comparison with the adjacent Underhill paddock.

A double sampling technique using a rising plate meter and clipping to determine forage yield was used before and after grazing on three dates (early January, mid March, and late April) during the green season. This is similar to the techniques used by Scribner, Center and Jones (1986) at the U.C. Hopland Field Station.

Seasonal Productivity

The group of cattle monitored in 1984-85 had an average starting weight of 576 lbs. on December 20, 1984 and an ADG of .66 lbs/head/day during the period ending February 26, 1985 (Table 1). From February 26 to Apr. 11, 1985 the ADG was 2.00 lbs/head/day. From April 11 to May 11 the ADG was 3.07 lbs/head/day.

Grazing of Alfalfa Cell began with 360 steers averaging 543 lbs. on December 12, 1984. On January 10, 1985 the herd was increased with 240 additional calves. On January 27 the cell was destocked by 120 head. On May 5, 1985 four-hundred thirty four calves averaging 734 lbs. were sold from the cell.

The green season began on approximately November 1, 1984 following mid-October rains. On January 3, 1985 forage yield in the Underhill paddock was 1,093 lbs/a (Figure 3). The herd removed 247 lbs/a of forage dry matter in 7 days. Additionally, over 1,000 lbs/a of residue from the previous growing season was present. Forage yield on the barley field in the Washington Gardens paddock was 682 lbs/a on January 8 and was reduced to 507 lbs/a following 4 days of grazing. Forage productivity on both paddocks was low during the winter period that was characterized by long dry periods and cold

No-till planting of barley, ryegrass, vetch and subclovers has contributed to increased winter and spring forage.

Stocker cattle, due to their short tenure on the ranch, do not learn to move themselves. They require more labor to move from paddock to paddock than cows.

Wildlife habitat can be improved by protecting areas from grazing using electric fence. Now the rancher has an affordable tool for environmental protection.

Perennial grasses after five years have not increased under intensive grazing management and rotation. Cattle don't seem to like our native perennials such as purple needle grass (Stipa pulcra).

Plant cover has deteriorated significantly during the wet season on heavy clay soils. It's amazing how much damage 720 seven hundred pound steers can cause just by being moved. The narrow portion of the pie shaped paddocks are especially difficult due to the concentrated trampling and difficulty using seeding equipment in a tight space. We would not design a cell like this again.

The Future

More subdividing of paddocks will be used to get more control over stock density. The paddocks are still too large to insure adequate utilization. Smaller paddock size will improve dung and urine distribution and reduce trailing. It comes back to the New Zealand concept to subdivision, subdivision, subdivision.

The O'Connells have set 1.5 lbs of ADG during the winter season as an animal production target. They will attempt to reach this goal by seeding grasses, and legumes, nitrogen fertilization and strip grazing of paddocks selected for concentrated winter grazing.

As the winter season ends a daily rotation will be used to condition the unimproved paddocks for rapid growth. Once these paddocks have been uniformly

grazed they will be set stocked during the fast growth period of April and May. Excess forage will be made into baleage to insure early and late feed in the future.

Dry matter budgeting with the help of a pasture probe from New Zealand will be tested. Dry matter budgeting offers a more precise means of budgeting forage to control animal performance and pasture growth rates.

Literature Cited

Scrivner, J.H., D.M. Center, and M.B. Jones. 1986. A rising plate meter for estimating production and utilization. *J. Range Manage.* 39:475-477.

Table 1. Seasonal ADG for stocker cattle on the O'Connell Ranch grazing cells in 1984-85 and 1985-86.

DATE	WT (lbs)	ADG	ADG
1984-85			
12/20	576		
2/26	621	.66	
4/11	709	2.00	
5/11	801	3.07	1.58
1985-86			
12/19	450		
1/21	449	-.03	
3/5	485	.84	
4/1	560	2.78	
5/3	642	2.56	
6/5	687	1.36	1.41

Table 2. Beef productivity and stocking rate before and after intensive grazing management.

Year	Beef Productivity (lbs/acre)	Stocking Rate (acres/head)
1970-82	52	5
1982-83	95	2.5
1983-84	112	2.5
1984-85	76	2.5
1985-86	<u>120</u>	<u>3</u>
Average 1982-86	101	2.6

FIGURE 1. Heavy Cell fence and cell center design created in 1983.

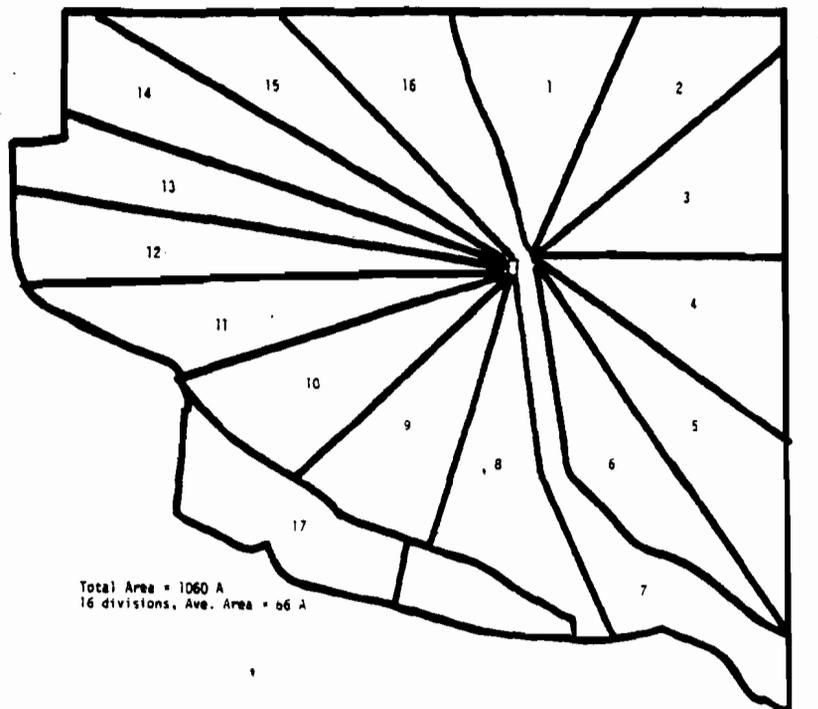


FIGURE 2. Alfalfa Cell developed using existing fence and a single strand electric fence.

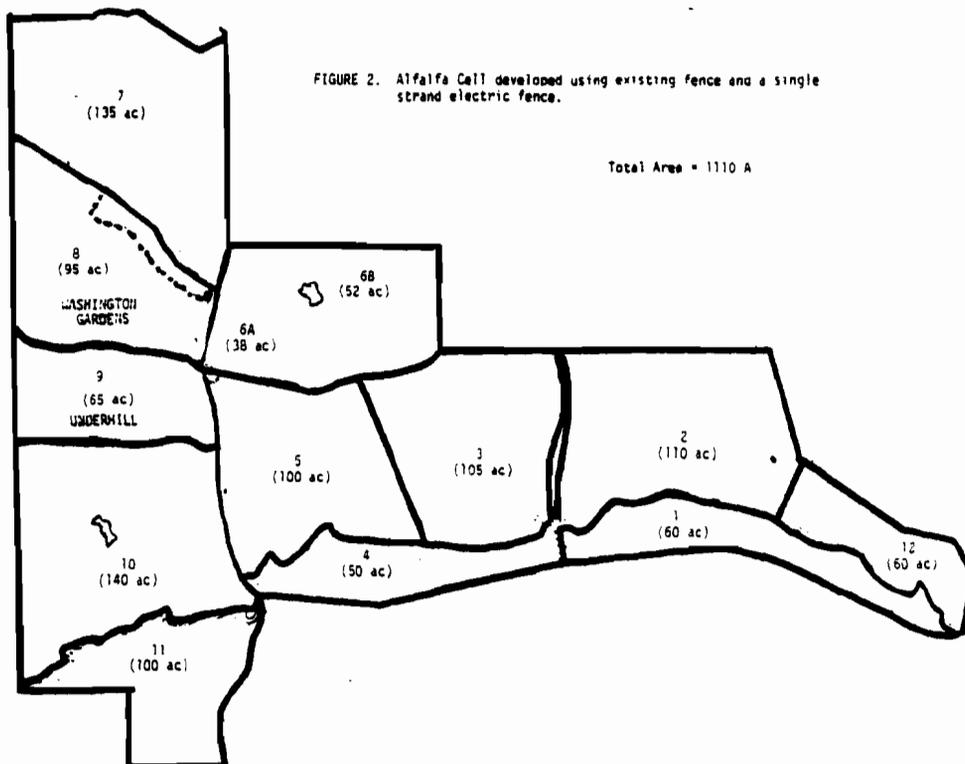


Figure 3. Seasonal forage production
(O'Connell Ranch 1984-85)

