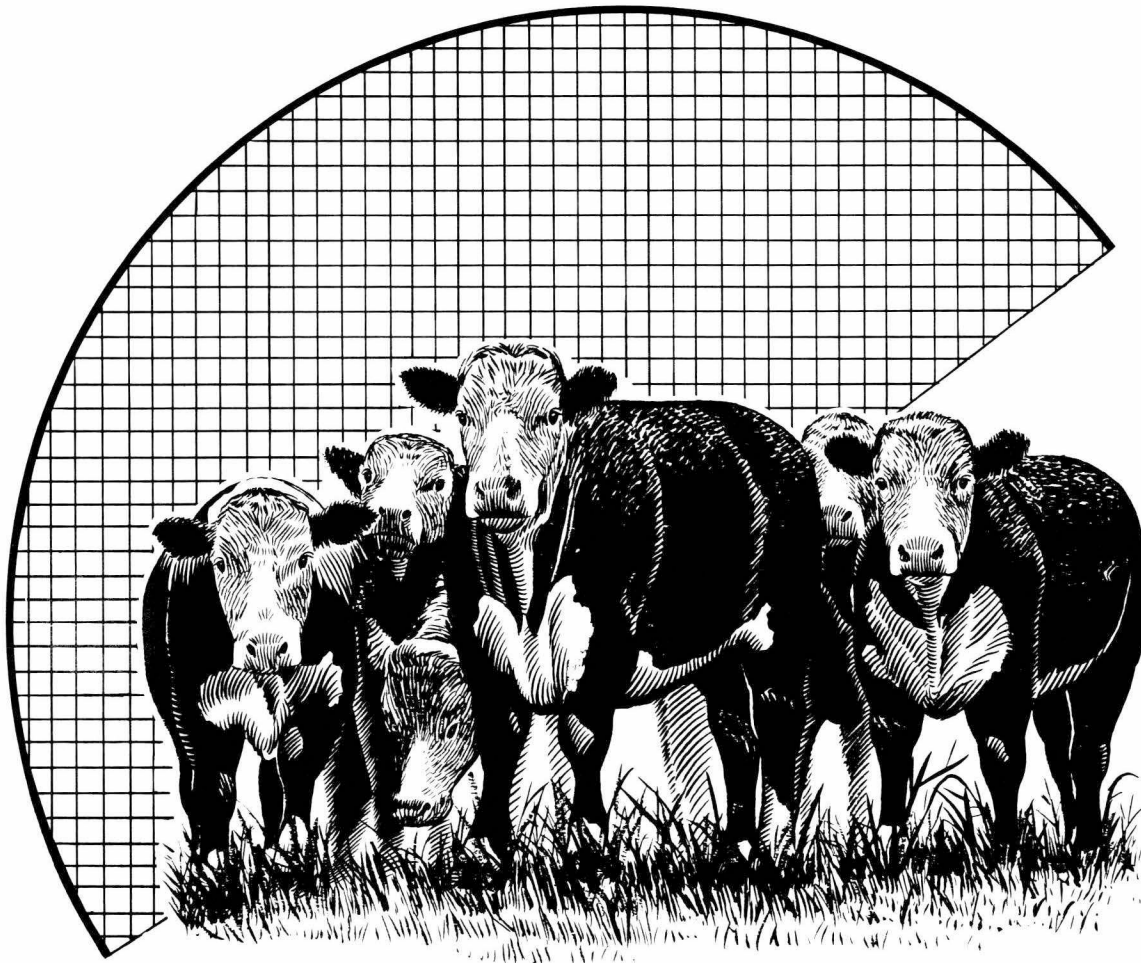


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THE HAWAII BEEF INDUSTRY: SITUATION AND OUTLOOK

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SUMMARY

During the 1980s, several events, both nationally and in Hawaii, have had and will continue to have a profound effect on Hawaii's beef industry. Events in Hawaii include:

- * The closing of Miko Meat's slaughtering facilities on the island of Hawaii.
- * The continued export of feeders (8,000 head in 1986).
- * The eradication of cattle on Molokai.
- * The opening of feedlot, slaughtering, and processing facilities (Big Island Meat) in Hamakua.
- * The development of a market for feeders in Hawaii.
- * The increased use of intensive grazing management techniques and improved pastures.
- * A dramatic decline in cattle numbers.
- * A decline in the number of ranchers.
- * Further erosion of the market share of Hawaii produced beef.

And on the national level:

- * The passage of Chapter 12 of the farm bankruptcy code.
- * A general tightening of credit to agriculture.
- * A decline in the national inventory of beef cattle.
- * Increasing supplies of competing meats (e.g., poultry and pork).

A major effect of all these events and trends is that there will be a real shortage of cattle in Hawaii, both on the ranches and in the marketing system (Figure 1). There also will be more excess capacity in the feedlots, slaughterhouses, and packing facilities than ever before. One way to increase cattle numbers is to withhold more heifers as replacements. However, this will initially reduce ranch revenues and the number of cattle moving through the marketing system. Given the current credit situation and past cash flow problems in the beef industry, this may not be a feasible alternative for most ranches. An alternative would be to import stockers. However, this will also put a heavy demand on the ranches' cash flow.

Because of the shortage of cattle, and particularly the shortage of feeders relative to the capacity of the system, a higher proportion of calves will be fed for the rest of the decade. The capacity of the feedlots would be better utilized if the time on feed remained at current levels: however, the shift in market demand toward no-roll beef will tend to shorten the time on feed. The

underlying economics (essentially the cost of feed and the price difference between Choice and no-roll beef) indicate that Hawaii should be trying to shorten the time on feed for all feeders except those that have a high probability of grading Choice or better. The tendency for the feedlots to take ownership of the feeders should continue, and the amount of beef fed on consignment should continue to decline.

Another major effect will be a significant decline in the market share of Hawaii-produced beef. Until 1986, Hawaii's share of the beef market had been slightly less than 30 percent (Figure 2). It is expected to fall below 25 percent this year, however, and if existing trends continue, to decline for the rest of the decade. This results from both the decline in the beef cattle inventory and from the increasing population of the state. The Hawaii market will become even more dependent on imports. Existing firms in the meat processing, packing, and distribution business will have to import more beef, both to their facilities efficiently and to meet market demands.

INTRODUCTION

During this decade, the College of Tropical Agriculture and Human Resource's Department of Agricultural and Resource Economics, in cooperation with the Department of Animal Science and with the support of the Governor's Agriculture Coordinating Committee, has published a series of papers on Hawaii's beef industry. During the past few years, however, there have been several important changes in the structure of the industry, both locally and nationally. This report updates the previous studies, describes the current situation, and discusses the implications of current trends for the future of the beef industry in Hawaii. First some general trends in the beef industry are discussed. This is followed by a description of the current situation in Hawaii. Next, a brief analysis of some of the current problems facing Hawaii's beef industry is presented. The paper concludes with a discussion of the implications of the current situation on the future of Hawaii's beef industry.

MEAT CONSUMPTION IN THE UNITED STATES

Until 1953, pork was the most widely consumed meat in the United States, comprising 45 percent of the

Figure 1. Beef cows, calf crop, and head sold: 1976-1986, and 1987 estimate.

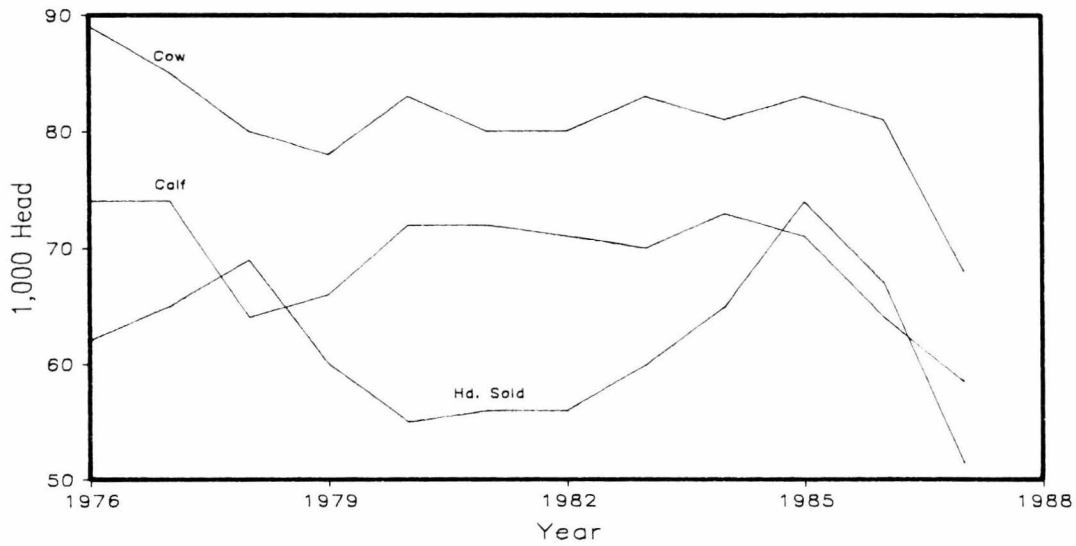


Figure 2. Estimated market shares, 1977-1987.

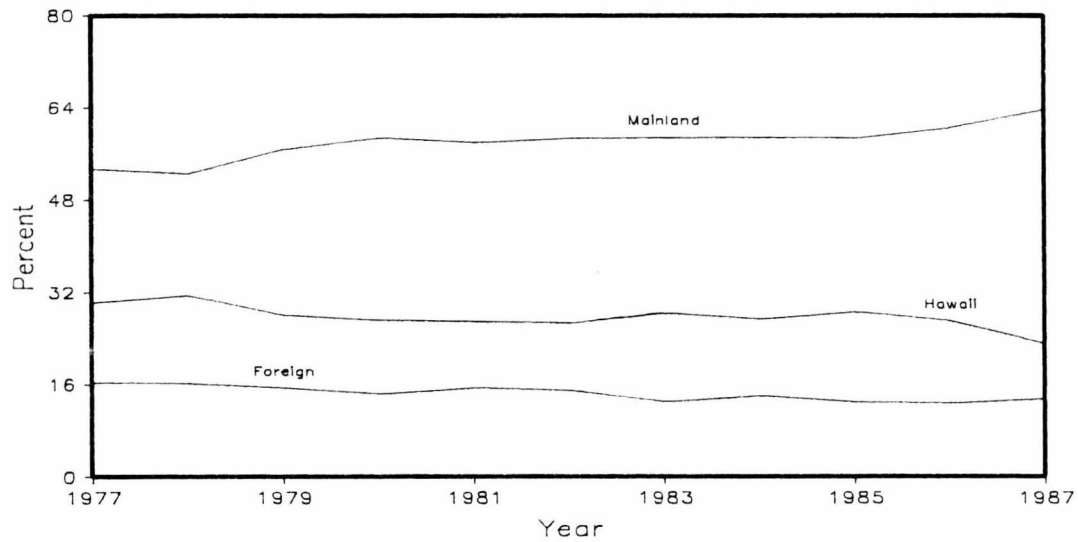


Figure 3. Per capita consumption of meats: retail weights, 1960-1986.

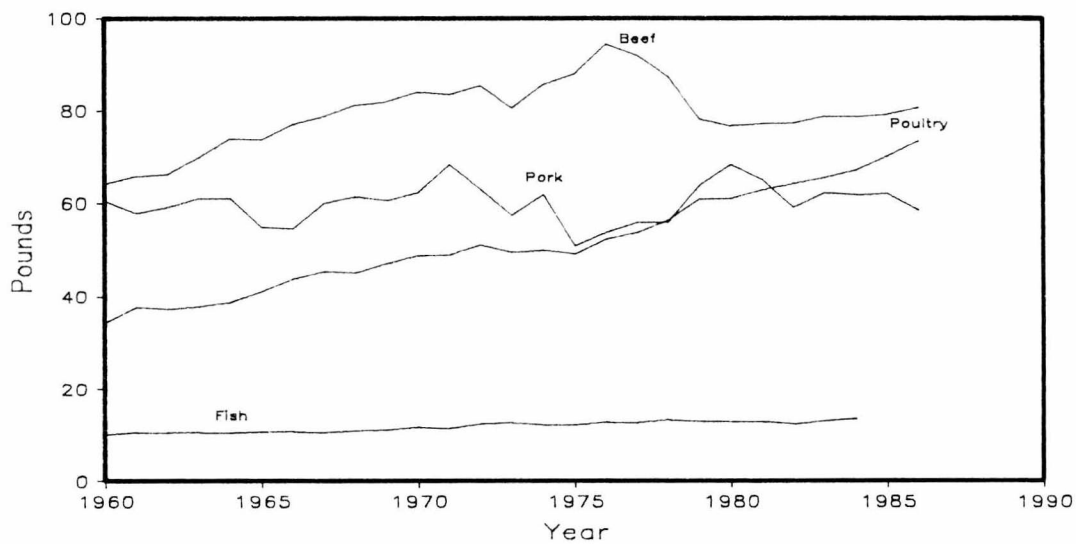


Figure 4. Meat consumption shares, 1965.
(Per capita consumption = 181 lb.)

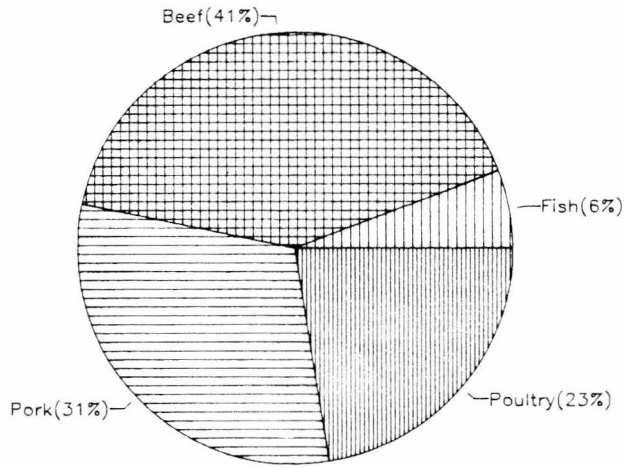


Figure 5. Meat consumption shares, 1984.
(Per capita consumption = 221 lb.)

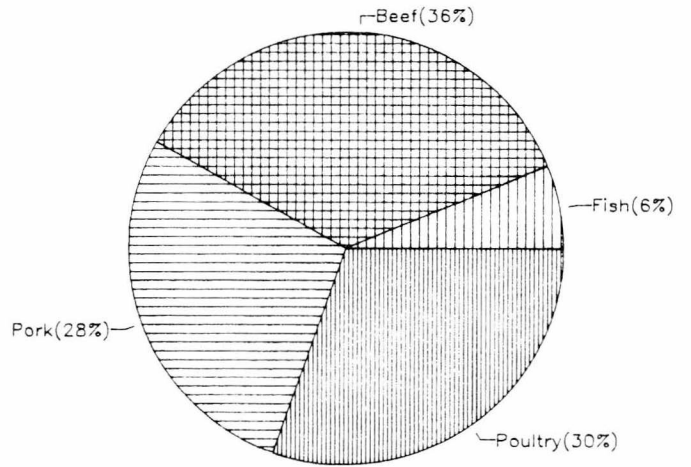


Figure 6. Meat expenditure shares, 1965.
(Real per capita expenditure = \$391.)

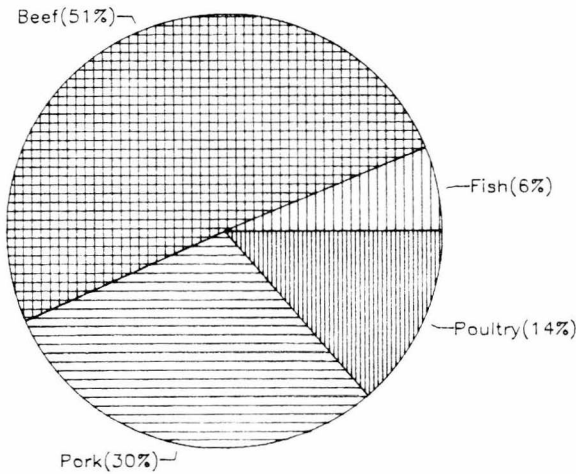
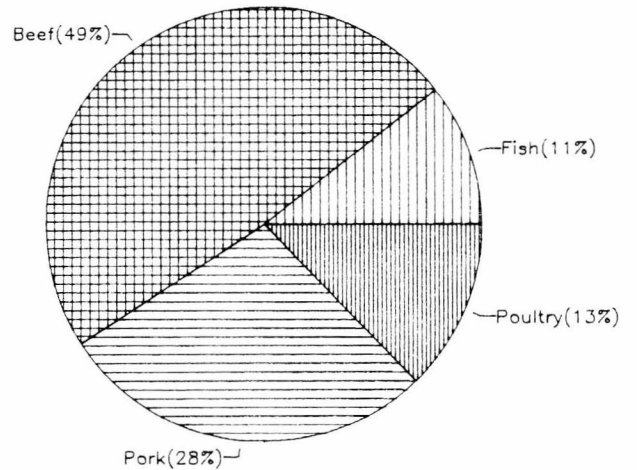


Figure 7. Meat expenditure shares, 1984.
(Real per capita expenditure = \$378.)



domestic meat market. Beef consumption gradually passed pork consumption in the late 1950s. At the same time, poultry consumption began a steady increase. In 1978, the retail weight per capita consumption of chicken and turkey surpassed that of pork. Beef's market share is now greater than that of pork, poultry or fish, but beef's top position will be challenged in the future if consumption of chicken and turkey continues to grow.

Three different but not necessarily exclusive explanations have been put forth to explain the changes in meat demand: the mature market hypothesis; relative price effects; and changing consumer taste and preferences.

Mature Market Hypothesis

From 1960 to 1971, there was a rapid annual increase in meat consumption. A gradual stabilization occurred through the late 1970s and early 1980s. The data in Figure 3 indicate that the meat industry may have matured, beginning about 1975. Little or no increase in per capita consumption can be expected in a mature meat market, because consumers have reached a desired level of consumption (Trapp). Only population growth would result in total market expansion, while increased consumption of one meat would occur at the expense of others. This hypothesis assumes that any future increases in disposable income will not increase the per capita consumption of meats.

Relative Price Effects

Relative price differences among meats and fish have been shown to be a major factor in changing market shares. From 1965 to 1984, the real price (price adjusted for inflation) of most meats declined. Beef and pork prices have fallen 25 percent, and poultry prices fell further, by 43 percent. Correspondingly, beef and pork have lost market share to poultry. The shift in market shares is more dramatic when measured in terms of pounds consumed (Figures 4 and 5) than when measured in terms of expenditures (Figures 6 and 7). Indeed, expenditure shares between red meat and poultry have not changed much.

Of all the meat prices, on fish prices have increased in real terms (a 24 percent increase net of inflation). Fish consumption shares have also increased, both on a weight basis and on an expenditure basis. Relative price effects offer a reasonable explanation for the shift from red meat to poultry but do not explain the increased share of fish in the consumer diet.

It now costs three times as much to produce a pound of beef as it does to produce a pound of chicken, and pork is about twice as expensive to produce as chicken. Changes in the relative costs of producing red

meats, poultry, and fish are primarily the result of technological changes. The biggest change has occurred in chicken production, where small-scale operations have evolved into an integrated, capital-intensive industry. Confined production is the norm in chicken production and is becoming more common in hog production. Beef production and fishing methods have changed the least. Research has shown that changes in production costs in the past have accounted for about 85 percent of the changes in market shares between beef, pork and poultry (Skaggs and Menkhaus).

Changing Tastes and Preferences

During the 1970s and early 1980s, a health and fitness trend developed, which may have been at least partly responsible for the decline in red meat consumption and increase in consumption of poultry, fish, fresh fruits, and vegetables. For example, the United States Senate in 1977 published guidelines recommending reduced red meat consumption. During this same period, consumers were also urged to eat less animal fat by the National Institute for Health.

Published research in the economics literature generally concludes that the shift in consumer preferences among beef, pork, and poultry are consistent with the changes in the relative prices of these meats (as well as changes in tastes). The increased consumption of fish, however, cannot be explained just by changes in relative prices and illustrates the importance of changing tastes and preferences on consumption levels and patterns.

What Do Beef Consumers Want?

It has become increasingly apparent during the past decade that consumers' preferences for leanness in the beef they purchase are by no means uniform. Some consumers prefer lean beef, others prefer substantial intra muscular fat (marbling), while many, and probably the majority, have no clear preference. The manner in which beef is retailed reflects this wide range of consumer preferences.

There are essentially three distinct beef marketing strategies found in food chains throughout the nation. One group of food chains markets lean beef, either on a specification or no-roll basis. This generally involves beef that would qualify as USDA Good or (low) USDA Choice. Nearly all of these stores market their beef under a house brand. The second group retails USDA Choice beef and often stresses the term "grain-fed". The third and smallest group of food chains markets two grades of beef, usually USDA Choice and a leaner, house brand beef.

The composite of strategies among retailers across the country varies depending on the region. In general,

Table 1. Cattle and calves: January 1 inventory, by island, 1975–1987.

Year	State	Hawaii	Niihau/ Kauai (1,000 Head)	Maui	Lanai/ Molokai	Oahu
1975	250	141.2	22.5	43.0	7.8	35.5
1976	245	139.6	20.2	42.7	6.1	36.4
1977	240	135.7	20.5	43.5	7.0	33.3
1978	234	128.6	21.1	41.4	7.1	35.8
1979	215	119.9	18.0	37.5	6.9	32.7
1980	213	121.0	18.1	36.0	6.5	31.4
1981	220	127.2	18.4	38.7	7.2	28.5
1982	228	132.3	17.0	39.5	6.5	32.7
1983	230	133.3	18.3	36.3	6.4	35.7
1984	226	135.8	16.0	35.0	5.9	33.3
1985	221	128.1	14.4	33.9	7.4	37.2
1986	209	123.9	15.0	31.7	5.4	33.0
1987	195	121.2	14.1	28.5	0	31.2

Source: Statistics of Hawaiian Agriculture.

Table 2. Beef cow inventory in Hawaii, January 1, by island, 1975–1987.

Year	State	Hawaii	Niihau/ Kauai (1,000 Head)	Maui	Lanai/ Molokai	Oahu
1975	93	59.1	8.6	17.6	4.1	3.3
1976	89	55.5	7.9	18.5	3.5	3.6
1977	85	52.4	7.7	18.4	3.8	2.7
1978	80	49.3	7.7	16.7	3.7	2.6
1979	78	50.6	6.1	15.6	3.9	1.8
1980	83	56.4	6.4	15.3	3.6	1.7
1981	80	52.2	7.4	15.1	3.8	1.7
1982	80	53.1	6.8	14.9	3.7	1.8
1983	83	55.7	6.5	14.6	3.7	2.4
1984	81	55.1	5.8	14.9	3.5	1.6
1985	83	57.5	5.2	14.1	3.8	2.5
1986	81	55.8	5.4	13.6	3.5	2.5
1987	68	48.3	5.2	12.2	0.0	2.6

Source: Statistics of Hawaiian Agriculture.

consumers in the West prefer leaner beef than those in the East, and therefore, more meat counters in the West carry leaner, privately labeled beef than those in the East. The situation in Hawaii mirrors what has happened in the rest of the country, especially the West.

NATIONAL TRENDS

On January 1, 1987, the beef cow inventory was up 1 percent over a year earlier. The increase in absolute cow numbers was concentrated in the 1982-84 drought-affected areas of Oklahoma, Texas, Arkansas, and Missouri. Beef herds in the North Central and Western States continued to decline or were being maintained near the reduced 1986 levels. Therefore, the beef herd expansion reflects a turnaround in the situation in the Southern and Central Plains. Considering that 1986 was the first year since 1981 that cattlemen have been able to cover cash costs, a large national expansion is not expected. The U.S. beef herd will likely stabilize near or slightly below current levels during the coming year.

The total supply of steers weighing 500 pounds or more was down 4 percent on January 1, 1987 from a year earlier, while the heifer supply, excluding replacements, was down 7 percent. During 1987, beef production is expected to drop 6 to 8 percent, and nonfed beef supplies for hamburger and processing meats will drop sharply. Even as beef supplies decline, however, large poultry and pork supplies are expected to continue. These large meat supplies, coupled with a sluggish, economy will hold down beef price gains and the price cattle feeders can pay for feeder cattle.

Prices in 1987 are likely to continue rising, with annual peaks expected in the spring. Feeder cattle prices, particularly feeder calves, will experience the sharpest increases. Retail prices are likely to rise only moderately during 1987 because of large supplies of competing meats at relatively lower prices. The farm-to-retail spread is expected to tighten, because the retail price increases typically lag fed cattle price increases.

Japan is the largest importer of U.S. beef, purchasing 60 percent of total U.S. exports in 1986. Strength in the yen relative to the dollar will make U.S. beef more attractive this year, even as prices rise modestly. Export gains are expected, but they will be restrained by the Japanese quota system.

THE CURRENT SITUATION IN HAWAII

Since 1980, the structure of the Hawaii beef subsector and the practices used within it have undergone significant changes. These changes have brought and will bring forth additional changes, and the resulting structure will have potentially large long-term

effects on the beef industry in Hawaii.

Trends in Production

At the beginning of this decade, the Hawaii beef industry was characterized as having a surplus of cattle feeding, slaughtering, and processing capacity. At that time, 80 percent of the feedlot capacity was on Oahu, 56 percent of the cattle produced in the state were slaughtered on Oahu, and three plants -- two on Oahu and one on Hawaii -- accounted for over 70 percent of the cattle killed. Since then, Miko Meat's slaughter plant on Hawaii closed, and a new feedlot, slaughtering, and packing operation opened on the Big Island. When complete, the feedlot will have a one-time capacity of 10,000 head and the slaughterhouse will have a one-shift capacity of 120 head. In a market like Hawaii's, where retail and wholesale prices are determined externally (on the Mainland), excess capacity can only lower the price ranchers receive.

The number of cattle in Hawaii has been declining significantly. Between the first of the year in 1985 and 1986, the inventory of cattle and calves declined 13,000 head (over 5 percent) and between 1986 and 1987 by 14,000 head (Table 1). The greatest decline was in the number of beef cows. On January 1, 1987, there were an estimated 68,000 beef cows in Hawaii (Table 2). This is a 13,000-head or 16 percent reduction from the previous year. As a result of declining cow numbers, the calf crop has also declined. There were 7,000 fewer calves in 1986 than in 1985 (Table 3).

Sales of pen-fed and range slaughter cattle peaked in 1985, with the number of the latter reaching an all time high (Tables 4 - 8). Sales of range slaughter cattle continued to be high in 1986.

The depopulation of Molokai (as part of a program to eradicate bovine tuberculosis) reduced the beef inventory in the state by 5,400 head (Table 1) and the number of beef cows by 3,500 (Table 2). The immediate impact on the marketing system is that about 1,000 fewer feeders will move through the feedlots and about 2,000 fewer head will move through the slaughterhouses. Also, in the near future, any attempt to restock Molokai from within state sources will put increased pressures on a limited supply of cattle.

The export of feeders is also partly responsible for the reduction in cattle numbers. It has been reported that an estimated 8,000 head were exported in 1986 and about 1,000 are expected to be exported in 1987 (Hawaii Range Newsletter). This further reduced (and will continue to reduce) the flow of beef through the Hawaii marketing system. This is one of the factors that reduced the sale of pen-fed animals in 1986 and will continue to affect sales in 1987.

Ranch numbers started to increase during the first

Table 3. Cattle and calves: inventory and disposition, 1975–1986.

Year	Beginning Inventory January 1	Calf Crop	In-shipments	Cattle & Calves Marketed	Farm Slaughter	Deaths	Ending Inventory December 31
(1,000 Head)							
1975	250	73	2	54	2	24	245
1976	245	74	1	62	2	16	240
1977	240	74	1	65	1	15	234
1978	234	64	1	69	2	13	215
1979	215	66	1	60	1	8	213
1980	213	72	*	55	1	9	220
1981	220	72	*	56	1	7	228
1982	228	71	*	56	2	11	230
1983	230	70	*	60	2	12	226
1984	226	73	*	65	1	12	221
1985	221	71	1	74	1	9	209
1986	209	64	*	67	1	10	195

*Less than 500 head.

Source: Statistics of Hawaiian Agriculture.

Table 4. Cattle and calves: number sold, weight, price, and value.

Year	Number ^a Sold (1,000 Hd)	Pounds Sold ^b (liveweight) (1,000 Lb)	Farm Price (liveweight) (\$ per Cwt)	Value ^c of Sales (\$1,000)
1975	54	50,180	34.7	17,412
1976	62	59,140	31.3	18,511
1977	65	59,310	31.7	18,837
1978	69	62,300	39.1	24,370
1979	60	55,015	51.5	28,356
1980	55	52,475	53.5	28,074
1981	56	52,215	54.4	28,405
1982	56	52,910	52.2	27,619
1983	60	59,100	49.6	29,308
1984	65	60,600	46.4	28,101
1985	74	65,160	40.9	26,632
1986	67	62,300	39.6	24,645

^aIncludes custom slaughter for home use on farms where produced and out-of-state sales of cattle and calves, but excludes interfarm sales.

^bExcludes custom slaughter for use on farms where produced.

^cPrices are equivalent to delivered slaughterhouse prices for sales on island of production and to delivered at shippers' dock prices for interisland and out-of-State sales.

Source: Statistics of Hawaiian Agriculture.

Table 5. Cattle and calves: number and pounds sold, by island, 1975–1986.

Year	Hawaii		Kauai		Maui		Molokai		Oahu	
	No.	Lb	No.	Lb	No.	Lb	No.	Lb	No.	Lb
	(1,000 head and 1,000 lb)									
1975	35.0	33,200	3.8	3329	11.1	9,972	1.3	898	2.8	2781
1976	39.9	37,792	4.4	4149	12.0	11,119	2.6	2861	3.1	3219
1977	41.5	36,989	5.4	5328	13.2	12,127	1.9	1709	3.0	3157
1978	45.9	41,035	6.1	5775	11.8	10,246	2.2	2039	3.0	3205
1979	37.0	32,971	4.8	4582	12.3	11,553	2.5	2377	3.4	3532
1980	34.5	33,153	6.0	5765	10.6	9,510	1.3	1124	2.6	2923
1981	35.5	33,113	4.6	4266	10.3	9,161	2.4	2352	3.2	3323
1982	37.7	36,211	3.9	3629	10.0	8,626	2.7	2710	1.7	1734
1983	38.0	38,188	4.5	4143	11.8	10,850	2.3	2446	3.4	3473
1984	43.0	39,802	4.3	3988	12.0	11,134	3.0	3056	2.7	2620
1985	49.5	42,567	3.8	3858	15.2	13,541	2.5	2307	3.0	2887
1986	42.1	41,244	4.1	3844	13.7	11,250	5.2	4101	1.9	1861

Source: Statistics of Hawaiian Agriculture.

Table 6. Number of pen-fed and range slaughter cattle sold, 1975–1986.

Year	Pen-fed ^a	Range and Other ^b	Total	Pen-fed as Percent of Total
	Cattle	Slaughter Cattle		
	(1,000 Head) ^c			
1975	29.2	24.8	54	54.1
1976	35.3	26.7	62	56.9
1977	36.0	29.0	65	55.4
1978	38.3	30.7	69	55.5
1979	30.3	29.7	60	50.5
1980	26.8	28.2	55	48.7
1981	29.2	26.8	56	52.1
1982	29.4	26.6	56	52.5
1983	31.9	28.1	60	53.2
1984	33.8	31.2	65	52.0
1985	36.5	37.5	74	49.3
1986	33.6	33.4	67	50.1

^aAnimals fattened on grain or other concentrates that produce a carcass expected to grade Good or better.

^bAnimals fattened primarily on grass and other roughage; may include some supplementary feeding of grain. Dairy cattle and calves included.

^cIncludes custom slaughter for home use on farms where produced but excludes interfarm sales.

Source: Statistics of Hawaiian Agriculture.

Table 7. Feedlot slaughter cattle sold, number and weight, by island, 1975–1986.^a

Year	Hawaii		Kauai		Maui		Molokai		Oahu	
	No.	Lb	No.	Lb	No.	Lb	No.	Lb	No.	Lb
	(1,000 Head and 1,000 Lb)									
1975	20.9	21,797	0.9	938	6.7	6775	0.1	80	0.6	615
1976	23.3	25,093	1.2	1521	7.7	7984	1.7	1901	1.4	1521
1977	23.1	22,873	2.1	2198	8.5	8423	1.5	1383	0.8	781
1978	26.7	27,235	2.3	2435	6.9	6911	1.6	1535	0.8	953
1979	18.8	18,651	1.6	1621	7.4	7452	1.5	1477	1.0	987
1980	17.6	18,439	2.8	2851	5.3	5149	0.4	413	0.7	740
1981	20.2	20,572	1.0	1075	5.5	5169	1.7	1790	0.8	843
1982	22.0	23,131	0.9	991	4.4	3993	1.9	2058	0.2	255
1983	22.8	25,669	0.9	992	5.8	5871	1.6	1828	0.8	1048
1984	23.3	25,381	1.0	1098	6.4	6406	2.4	2614	0.7	746
1985	25.2	26,022	1.0	1043	8.3	8114	1.1	1199	0.9	919
1986	33.6	35,463	0.8	840	6.3	6043	0.4	377	0.1	148

^aAnimals fattened on grain or other concentrates that produce a carcass expected to grade Good or better.

Source: Statistics of Hawaiian Agriculture.

Table 8. Number and liveweight of range and other slaughter cattle sold, by island, 1975–1986.^a

Year	State		Hawaii		Kauai		Maui		Molokai		Oahu	
	No.	Lb	No.	Lb	No.	Lb	No.	Lb	No.	Lb	No.	Lb
	(1,000 Head and 1,000 Lb)											
1975	24.8	19,975	14.1	11,403	2.9	2391	4.4	3197	1.2	818	2.2	2166
1976	26.7	21,120	16.6	12,699	3.2	2628	4.3	3135	0.9	960	1.7	1698
1977	29.0	23,652	18.4	14,116	3.3	3130	4.7	3704	0.4	326	2.2	2376
1978	30.7	23,331	19.2	13,800	3.8	3340	4.9	3335	0.6	504	2.2	2352
1979	29.7	24,827	18.2	14,320	3.2	2961	4.9	4101	1.0	900	2.4	2545
1980	28.2	24,883	16.9	14,714	3.2	2914	5.3	4361	0.9	711	1.9	2183
1981	26.8	22,766	15.3	12,541	3.6	3191	4.8	3992	0.7	562	2.4	2480
1982	26.6	22,482	15.7	13,080	3.0	2638	5.6	4633	0.8	652	1.5	1479
1983	28.1	23,692	15.2	12,519	3.6	3151	6.0	4979	0.7	618	2.6	2425
1984	31.2	24,355	19.7	14,421	3.3	2890	5.6	4728	0.6	442	2.0	1874
1985	37.5	27,863	24.3	16,545	2.8	2815	6.9	5427	1.4	1108	2.1	1968
1986	33.4	26,837	16.1	13,189	3.3	3004	7.4	5207	4.8	3724	1.8	1713

^aAnimals fattened primarily on grass and other roughage; may include some supplementary feeding of grain.

Source: Statistics of Hawaiian Agriculture.

part of this decade, but have been declining steadily since 1982 (Table 9). Twenty-five percent of the ranches in existence in 1982 were no longer in business by the end of 1986. Most of the ranches that failed were small operations with fewer than 20 head. The number of ranches with more than 20 head has also been declining, however, down over 70 ranches from 1982, a decrease of over 15 percent.

During this decade, several ranches have embarked on programs of range and pasture improvement. Results have been quite favorable, with ranchers achieving increased rates of gain and being able to send younger animals to market. More ranches can be expected to adopt intensive grazing management (IGM) techniques in the future.

One very positive side effect of the establishment of the new facilities on the Big Island was development of a market for feeders in Hawaii. There was always a small trade in feeders, but before Big Island Meats opened, the only really viable option available to ranchers who thought their calves would return more if sold as feeders than if they were held and marketed as fat animals was to ship feeders to the Mainland. The establishment of a market for feeders now gives cattlemen a choice. This in turn allows ranchers to make better decisions and gives them more flexibility in resolving short-term cash flow problems.

Feeder prices in Hawaii can be expected to track mainland prices, but not nearly as closely as beef prices. The price of feeders in Hawaii will be roughly the higher of (1) the price of beef in Hawaii less the costs of feeding, slaughtering, processing, and marketing beef in Hawaii; or (2) the price of feeders on the Mainland less the cost of transporting them from Hawaii to the Mainland.

Feed Costs

The prices of feed grains have apparently reached a plateau after their rapid rise during the late 70s and early 80s (Table 10). Feed grain prices are projected to remain at about their current level through 1987. Feed prices past 1987 will depend on U.S. price supports, set aside programs, and foreign trade policy as well as economic conditions in the U.S. livestock and feed grain industries.

The trend toward selling no-roll beef has the potential of shortening the time on feed. In Hawaii, an estimated 80 percent of the beef sold in retail outlets is now sold under a no-roll program. It takes approximately 90 to 110 days on feed to produce beef that can meet the specifications set by most retail no-roll programs. Currently, most fed beef in Hawaii is in the feedlot for 140-160 days.

Transportation

Transportation costs have not changed substantially during the past five years. With the construction of a new feedlot, slaughtering, and processing facility on the Big Island, however, flows of cattle have changed. Table 11 gives the estimated costs of shipping live mature animals, feeders, carcasses, and boxed beef by barge on a per head basis. The costs include all direct shipping costs, plus taxes and wharfage fees, and exclude any land cartage costs. In computing the estimates, it was assumed that a standard livestock trailer held either 45 mature animals or 65 feeders and that all processed beef moved in reefers. It was also assumed that the capacity of a reefer was eight tons of carcass or boxed beef. In addition to the direct costs, the costs for shipping live animals includes an ownership charge for the trailers of \$200 per shipment. This is to cover the capital cost of the trailer as well as repair and maintenance.

The lowest cost route is always to or from Honolulu. Shipments between Neighbor Island ports involve transshipment via Honolulu and are always more expensive, with the exception of shipments between Kaunakakai, Molokai, and Kahului, Maui. As long as the barge going to or coming from Kahului stops at Molokai, the freight will move at the Honolulu-Kaunakakai rate.

On a cost-per-head basis, shipping feeder animals is the cheapest (with the exception of shipments from Molokai), followed very closely by shipping of boxed beef. Shipping of mature live animals is the most expensive. These costs are just for ocean transport costs. Excluded costs will change the rankings. For example, the time and feed used while live animals recover from shipping stress increases the cost of shipping feeders, and the weight lost increases the cost of shipping all live animals. If the slaughter of animals on the Neighbor Islands necessitates the intrastate shipment of hides, offal, or other by-products, this also would increase the actual costs of shipping processed beef. Land cartage costs typically run between 15 and 20 percent of total transport costs, and as both the cost per unit and the distance shipped will differ for different forms of beef, the inclusion of these costs could also change the rankings.

The magnitude of these estimates of transport costs depends heavily on the assumed rate of usage of the shipping container. The estimates for shipping live animals assume that the shipping containers are fully loaded. If less-than-container loads are shipped, costs increase significantly. For example, if only 60 feeders rather than 65 feeders per trailer were shipped, boxed beef would be the cheapest form.

The cost estimates for boxed beef, on the other hand, are based on using only 67 percent of the reefer's capacity. Shipping more than this apparently results in

Table 9. Number of beef cattle farms, total and with greater than 20 head, 1975–1986.

Year	State		Hawaii		Kauai		Maui		Molokai		Oahu	
	Total	>20	Total	>20	Total	>20	Total	>20	Total	>20	Total	>20
1975	930	450	385	205	155	75	235	105	20	10	135	55
1976	900	440	380	200	150	70	230	120	20	10	120	60
1977	900	440	385	205	150	70	235	100	20	10	110	55
1978	800	410	355	195	155	70	190	80	15	10	85	55
1979	800	400	355	190	155	70	190	80	15	10	85	50
1980	800	440	360	210	150	80	190	90	20	10	80	50
1981	900	440	425	220	175	80	195	80	25	10	80	50
1982	1000	460	490	230	190	85	200	85	30	10	90	50
1983	950	430	450	215	180	75	205	80	30	10	85	50
1984	850	410	395	205	165	70	190	80	25	10	75	45
1985	850	390	400	180	165	75	170	75	35	15	80	45
1986	750	a										

^aThe remaining data for 1986 are not yet available.

Source: Statistics of Hawaiian Agriculture.

Table 10. Average annual price paid by Hawaii farmers for selected feeds, 1976–1985.^a

Year	Rolled ^b	Rolled ^b	Alfalfa ^{b,c}	Cottonseed Meal ^d	Beef Cattle Feed ^d
	Barley	Corn	Pellets	41% Protein	10--20% Protein
1976	160.8	162.8	134.0	12.6	9.0
1977	156.4	147.3	138.8	13.3	8.7
1978	151.5	148.5	125.1	12.3	8.9
1979	157.5	166.0	143.3	14.8	9.4
1980	196.0	193.2	190.8	14.7	10.9
1981	210.6	210.6	182.8	16.3	12.2
1982	193.8	195.1	181.3	16.2	13.3
1983	195.7	217.3	189.7	17.6	14.5
1984	201.7	219.9	186.9	17.5	15.5
1985	174.8	196.1	183.5	16.5	14.0

^aNew series beginning August 1976.

^bDollars per ton.

^cData before 1981 are for alfalfa cubes.

^dDollars per 100 pounds.

Source: Statistics of Hawaiian Agriculture.

the boxes at the bottom of the stack being crushed. If more of the capacity of the reefer could be used, boxed beef would become the lowest-cost form for transporting beef.

On a per pound basis, shipping boxed beef between the Big Island and Honolulu costs slightly less than 3 cents. This is less than a third of the 9.5 to 10 cents per pound it costs to ship boxed beef from the West Coast to Honolulu.

Imports of Foreign Beef to Hawaii

A significant portion of the Hawaii beef market continues to be occupied by foreign imports. Based on data for the three-year period 1984 -- 86, Hawaii imported from 11.4 million to 12.2 million pounds of foreign beef with an export value (the value at port of origin) of \$11.4 million to \$13.7 million. Beef imports during this period were almost entirely chilled or frozen boneless beef, shipped by boat from Australia and New Zealand.

New Zealand is the largest source, with 72.5 percent of import volume in 1986, followed by Australia, with 26.1 percent (Table 12). Canada and Brazil are the only other countries with recorded volumes. New Zealand steadily increased its market share during the three-year period. Only negligible quantities of beef were reported as being shipped by air, nearly all originating in Canada.

The export value of imported beef averaged \$1.08/lb in 1984, \$0.96/lb in 1985, and \$1.14/lb in 1986. In comparing market shares measured by export value, New Zealand seems to have shipped a higher-valued product in 1986 relative to Australia and the earlier years (Table 13). Practically all of the import volume (98--99 percent) and value (97--98 percent) was either fresh chilled or frozen beef, with almost all being boneless. The only other product of note was corned beef in cans.

Land

In 1985, SS171-17 of the Hawaii Revised Statutes was amended so that when State land leases are now renegotiated, the new rent is set at current market value. Before 1985, the renegotiated rent was set at the highest of either current market value or the actual bid rent. For leases renegotiated in 1986, the rent was set at \$27.18 per Animal Unit Year. This change should remove some uncertainty from the bidding process. Under the current law, if the winning bid turns out to have been too high, it will be adjusted downward to the market value of the lease during the renegotiation period.

Trends in Ranch Management

The same factors that historically influenced ranch management in Hawaii continue to be important. Particularly significant are:

- * Limited alternative uses for the land resource. Ranching is the best, if not only, alternative to land being idle.
- * Limited market access and market power. Feeder and slaughter animals are generally sent to a few large operations.
- * Limited market information and, subsequently, high degree of price uncertainty.
- * Risks associated with weather and a long production cycle. Long-term survival dictates the preservation of a viable breeding herd as well as maintaining a positive cash flow.
- * Prices of beef as well as prices of most inputs are determined by supply and demand conditions on the Mainland, not in Hawaii.
- * Absentee ownership of some ranches can limit the ability of the managers to react quickly to market conditions.

More recently, unfavorable economic conditions in the beef industry have spurred and necessitated movement into non ranching or non traditional activities. The trend is to move away from harvesting grass as the only activity, toward treating the ranch as a broader entity. Typically, the activities make better use of under used or unused resources, usually land. Examples of these non traditional activities include:

- * Land divestment, typically for resorts, subdivisions, or to speculators.
- * Tourism-oriented activities such as resort development, horseback riding, hunting, and other outdoor activities.
- * Other livestock related activities, including sheep, goats, dairy, and others.
- * Other agricultural activities, including vineyards, floriculture, vegetables, and orchard crops.
- * Forestry.
- * Energy and mining, including windfarms, blue rock (gravel), and cinders.

In some cases, such activities were needed for short-run financial survival. In the long run, it appears that operations based on ranching alone may not be viable. Non-ranching or non traditional activities are targeted at diversification: the goal is to stabilize the timing and flow of income and reduce the risk of the overall operation.

At the ranch level, the ongoing and even increased emphasis on pasture improvements and on more intensive grazing management (IGM: Savory cell or paddock operations) continues to affect the industry. Such activities make better use of land resources and have the potential of significantly improving ranch revenues. Herd improvement in terms of different breeds and crosses continues, and the use of artificial insemination is becoming more common.

Table 11. Estimated costs of shipping different forms of beef between islands. 1986.

Transport Costs Per Head -- Range Animals^a

From/To	Kawaihae	Maui	Kauai	Molokai	Oahu	To/From
	30.84	30.84	30.84	30.84	21.50	Hilo
		30.84	30.84	30.84	21.50	Kawaihae
			30.25	20.29	20.91	Maui
				30.25	20.91	Kauai
					20.29	Molokai

Transport Costs Per Head -- Feeders^b

From/To	Kawaihae	Maui	Kauai	Molokai	Oahu	To/From
	22.38	22.38	22.38	22.38	15.02	Hilo
		22.38	22.38	22.38	15.02	Kawaihae
			21.97	14.18	14.61	Maui
				21.97	14.61	Kauai
					14.18	Molokai

Transport Costs Per Head -- Carcasses^c

From/To	Kawaihae	Maui	Kauai	Molokai	Oahu	To/From
	24.22	24.22	24.22	24.22	18.68	Hilo
		25.15	25.15	25.15	19.58	Kawaihae
			22.56	15.67	16.99	Maui
				22.56	16.99	Kauai
					15.67	Molokai

Transport Costs Per Head -- Boxed Beef^d

From/To	Kawaihae	Maui	Kauai	Molokai	Oahu	To/From
	21.62	21.62	21.62	21.62	16.85	Hilo
		22.45	22.45	22.45	17.48	Kawaihae
			20.14	13.99	15.17	Maui
				20.14	15.17	Kauai
					13.99	Molokai

^aBased on 45 head/shipment in shipper-owned trailers. Includes all direct costs (transport, wharfage, taxes, insurance, and empty return) plus \$200/shipment ownership charge.

^bBased on 65 head/shipment; otherwise the same as range animals.

^cBased on rates for carrier furnished reefer containers, carcasses weighing 631 lb, and 16,150 lb net per shipment.

^dSame as for carcasses, based on a conversion from carcass to boxed beef of 0.95, and a shipment weight of 17,200 lb.

Table 12. Annual beef imports into Hawaii by country of origin.

<u>Year</u>	<u>Canada</u>	<u>Australia</u>	<u>Brazil</u>	<u>New Zealand</u>	<u>Total</u>
(1,000 Lb)					
1984	306.8	3,711.4	0.0	8,212.1	12,230.3
1985	142.1	3,049.2	125.2	8,034.6	11,351.2
1986	108.3	3,040.0	62.5	8,455.6	11,666.4
(\$1,000)					
1984	447.9	3,923.5	0.0	8,893.0	13,264.3
1985	212.5	3,004.2	101.6	8,094.5	11,412.9
1986	150.1	2,845.4	61.3	10,668.3	13,725.2

Source: Bureau of Census, Dept. of Commerce.

Table 13. Annual beef imports by product type, quantity and value, 1984–1986.

<u>Product</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
(1,000 Lb)			
Boneless beef, chld/fzn	11, 888.5	10, 935.0	11, 410.5
Beef w/bone, chld/fzn	194.7	163.0	102.4
Veal, fresh chld/fzn	65.7	62.2	27.4
Corned beef	68.9	171.5	124.8
<u>Other, processed</u>	<u>12.6</u>	<u>19.5</u>	<u>1.3</u>
Total	12, 230.3	11, 351.2	11, 666.4
(\$1,000)			
Boneless beef, chld/fzn	12, 692.0	10, 882.2	13, 326.3
Beef w/bone, chld/fzn	271.3	224.7	116.6
Veal, fresh chld/fzn	115.0	74.7	29.9
Corned beef	160.4	202.7	242.0
<u>Other, processed</u>	<u>25.6</u>	<u>28.6</u>	<u>10.4</u>
Total	13, 264.3	11, 412.9	13, 725.2

Source: Bureau of Census, Dept. of Commerce.

ONGOING AND EMERGING PROBLEMS

A rule of thumb in the slaughtering business is that slaughter byproducts should cover all or a major part of slaughter costs. In Hawaii, however, there are no outlets for slaughter byproducts, such as pet food, as are available to most plants on the Mainland. Also, it has been reported that there is not enough demand in local markets to utilize the available supply of such items as liver or tripe. This increases slaughter costs, which in the long-run can only result in lower returns to the producers. Because of competition with imports from the Mainland and overseas, prices cannot be increased to cover the additional processing costs.

Excess capacity has been a long-term problem in Hawaii beef marketing. The advent of Big Island Beef has made the problem more severe. The limited supplies of feeders, combined with the fact that wholesale and retail prices of beef in Hawaii are determined by Mainland prices, has resulted in the margins of the major feeders and packers being squeezed. The increase in costs cannot be entirely absorbed by the packers - all or part is passed back to the producers in the form of lower prices. It is difficult to foresee how the present situation can continue indefinitely. Several possible futures can be envisioned. One is that one of the three major slaughterer-packers goes out of business. Another is that some of the existing operations combine their operations. A third method, which is already being undertaken, is to use existing facilities more efficiently. One possibility is to bring in Mainland beef, further process it, and box it for resale. Another is to use the same facility to process other meats, such as pork and lamb.

Costs of Increasing Herd Size

Both the use of IGM and the selling of feeder animals (or shipping young feeders to a feedlot) allow the ranchers to increase their herds of beef cows. The grass that was previously used to raise animals for market becomes available to cows. The size of the cow herd can be increased in essentially two ways, either by retaining heifers or by buying heifers or cows. However, even if an operation oriented toward selling feeders is more profitable than selling grassfat slaughter animals, the transition costs can be prohibitive. For example, if a ranch that exclusively sells grassfat animals were to switch to a cow-calf operation and build up the herd by retaining heifers, it would take approximately five years to complete the change, and during the first years, revenues would be reduced by 15 to 20 percent, and by about 7 to 10 percent for the remaining years until the transition was complete.

Buying replacement cows is also expensive and can cause cash flow problems. Particularly as it is unlikely

that large numbers of cows will be available in-state, except at premium prices. The import of out-of-state cattle, particularly from New Zealand, is one possibility. Under current regulations, such cattle would have to be kept in quarantine (which can be a separate enclosure on the ranch if it meets Federal specifications) for at least 60 days.

Credit

Changes taking place in the U.S. banking industry are expected to make it increasingly difficult for ranchers to find a lender. Particularly, the financial and organizational problems of the Farm Credit System, the rapid growth of bank holding companies, and the addition of Chapter 12 to the U.S. Bankruptcy Code are making it harder for ranchers to borrow money. Historically, private lenders have been unwilling to provide full-service agricultural financing.

Changes in U.S. banking laws permit financial institutions to buy banks in other states. Currently, large holding companies are taking over small banks that have traditionally served agriculture. To date, these larger banks can operate in states adjoining their home base, but many observers expect this trend to extend to all states. Some agricultural economists anticipate that as management decisions are made farther away from the farm and ranch there will be a lessening of willingness to finance agriculture.

Changes in Farm Credit System lending practices observed on the Mainland are not as apparent in the Hawaii Production Credit Association and Federal Land Bank at this time. The uncertain future of the Farm Credit System and its Production Credit Association (PCA) and Federal Land Bank (FLB) branch offices tends to cloud the situation. Nationally, the Land Banks have established a five-tier individual pricing system with interest rates determined by the borrower's financial condition. The PCA has also started using differential interest rates based on the quality and purpose of the loan. It appears that before making loans both the FLB and PCAs are giving close attention to the ranch borrower's future ability to service debt.

The effect of Chapter 12 on the credit available to ranchers is not yet clear. It will depend in part on how bankruptcy judges will rule on cases involving Chapter 12. To file under Chapter 12, at least 80 percent of the total debts and 50 percent of the gross income have to be farm related, total debt must be less than \$1.5 million, and a reorganization plan must be filed within 90 days after filing for Chapter 12. The principal difference between Chapter 11 and Chapter 12 bankruptcy filing is that Chapter 12 rules favor the debtor while Chapter 11 rules favor the creditor. All lenders to agricultural operations, e.g., feed, seed, chemical, fuel, and livestock

suppliers, as well as financial institutions, are vulnerable under Chapter 12.

Market Share

In 1983, it was estimated that the Hawaii beef industry supplied 28 percent of the market in the state. Since then, imports from the Mainland have increased, probably by more than 10 million pounds, and it is expected that Hawaii's share of the beef market will fall at least to 23 percent in 1987. If current trends continue, Hawaii's share is likely to fall to 20 percent or less by the end of the decade (Figure 1).

FUTURE TRENDS FOR MEAT DEMAND

A glance at the demographics of the U.S. population provides some insight into future meat consumption. The projected population growth is estimated to be less than 1 percent per year for the next hundred years and is expected to approach zero after 2010. The meat industry can no longer expect much expansion from population growth.

The median age of the population is rising. The percentage of the population over 65 will continue to grow, while that under 35 will decline. Older consumers typically eat less food and, in particular, less beef. They also may experience a decline in their sense of taste, making flavor enhancement appropriate. The average size of households is getting smaller, and the percentage of the population living alone has increased. Smaller and older households may both be concerned with portion size and convenience.

Consumers' taste preferences vary depending on their geographic location and ethnic background. The population is now centered west of the Mississippi, with the Western United States having the highest growth rate, followed by the South. This is due to higher birth and migration rates in those areas. Most of the new immigrants are from Latin America and Asia, and may prefer different cuts of meat and flavoring than those traditionally supplied in retail markets.

Red meats must continue to dispel the image of being unhealthy. This issue is being addressed very successfully, and the situation has eased in the past few years. Various consumer education programs have been positively received by consumers, health professionals and retailers.

A second issue is the relative cost disadvantage of beef. The existing production and management systems do not lend themselves easily to vertical integration, geographic concentration, or immediate improvement. Production costs of beef will probably not decline in the near future. If the industry wishes to maintain its market share, however, it is essential that it stay price-

competitive, and continuing efforts in this area are imperative.

A third issue, where chicken has excelled beyond the other types of meat, involves segmenting the market to provide the various groups of consumers with a product that better fits their preferences. This means becoming more consumer-oriented and selling more branded products rather than just selling commodities. For example, organically produced beef, economical no-roll beef, closely trimmed cuts, family packs, precooked and vacuum-packed, individual portions, and semiprocessed products may all contribute to greater overall demand for beef. The various products must be targeted to the consumers willing to pay for the characteristics they desire. Tailoring production to what consumers desire should be more profitable than persuading them, via advertising, to buy whatever is produced.

Beef Quality and Consumer Preferences

An in-store experiment of steak purchase decisions designed to analyze the effect of three variables (price, grade and labeling) on shoppers' purchase decisions in two supermarkets on Oahu was conducted during October and November of 1985. Shoppers were divided into three groups, according to their stated preference for marbling. Seventeen percent of the shoppers cited less marbling as a reason for selection; 22 percent cited more marbling, and 61 percent did not cite marbling as a selection criterion.

Consumers' decisions to purchase a Choice or a Good steak were found to be independent of the existence of a label. That is, whether the steak was labeled Choice, had a store label, or was unlabeled apparently made no difference to the shoppers. Increasing the price of the Choice steaks relative to the Good steaks had the expected impact for the more-marbling and no-marbling preference groups; the higher the relative price, the less likely they were to buy the steak. For the less-marbling group, however, an increase in price increased the likelihood of purchase. Apparently, at least some of the buyers who preferred less marbling were using price as a measure of quality. That is, they were assuming that a higher price implied a better product. Overall, data from the experiment indicated that a 20-cent increase in price per pound caused one-third of these shoppers to switch from a choice steak to a house brand steak. The shopper's preference for Choice or Good steaks was found to be unrelated to socio-economic variables such as the shopper's annual income, ethnic background or education.

Consumers were also surveyed as to their preferences and actual market behavior with regard to

Good and Choice beef in early 1986 through a phone survey. The results indicated that consumers either did not consider Good and Choice beef to be significantly different products, or were unable to distinguish between them. That is, consumers who said they preferred Choice beef were as likely to buy less-than-Choice as Choice, and the same was true for consumers who stated a preference for Good beef.

Implications for Marketing Beef

Consumers are not homogeneous. The majority of the beef consumers in Hawaii appear to be price shoppers and apparently are not affected by the label on the package or whether or not the beef is Choice. Some consumers, however, have specific preferences (either for well-marbled or for lean beef) and apparently are willing to pay for beef that has the level of marbling they prefer. Targeting the different preferences of these two groups should be a profitable marketing strategy, given the large number of consumers involved.

The remaining 61 percent of the market (shoppers in the no-marbling preference group), appear to choose between the two types of steaks based on price, not on grade. The profitability of meeting this market demand hinges on maintaining competitive prices.

CONCLUSION

The most striking and obvious conclusion is that from the point of view of maintaining an efficient marketing industry for local beef in Hawaii, there is a shortage of local beef, and this shortage will become even more serious over the remainder of the decade, if current trends continue. The shortage results from the decline in numbers of beef cows combined with increases in capacity in the beef marketing system in Hawaii. The industry is in a state of flux. Cattle on Molokai have been eradicated, and there is a major new actor in the beef feeding-slaughtering-packing-marketing sector. It is not possible to state how the industry will progress, but some indications can be given:

- * There will be a continued demand by the feedlots for feeder animals. This will result in the continuation of the trend of feedlots to purchase feeders and fewer, if any, feeders being shipped out-of-State.
- * Production patterns are likely to change as feed lots will want to purchase young, light cattle to keep costs down.
- * Economies of scale and economies of scope will create incentives for some consolidation to take place in the beef market sector. Most of these incentives have existed throughout the 80s, however, so it is quite possible that nothing will happen.
- * Market shares will continue to decline. The

wholesale and retail sectors will become even more dependent on imports from the Mainland and from foreign sources to meet their demands for beef.

- * To use existing facilities efficiently and meet the demands of their current clientele, existing meat processors will import and process increasing amounts of beef.
- * Packers will move towards new packaging for consumers -- particularly vacuum packed uniform cuts.
- * The beef herd in Hawaii will not increase and may decrease even further, if current trends continue.
- * The number of ranches will continue to decline.

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