

CALIFORNIA BEEF-PRODUCTION DATA

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Beef Production and Feed Requirements

Estimates of livestock production and feed utilization in 1942 were recently summarized.⁴ Table 1 gives the same data for beef cattle in more detailed form. The inventory number of beef cattle and calves on farms in the state was 1,526,000 on January 1, 1942, and 1,545,000 on January 1, 1943. These numbers represent all cattle and calves other than milk cows and dairy heifers one to two years old.

The estimated number of beef cattle and calves from California range and feed lots slaughtered in 1942 was 779,000 head, about 40,000 head of which were calves. The average live weight used for cattle slaughtered was 930 pounds; for calves 275. From the total poundage thus obtained was deducted the estimated arrival weight of the 367,000 head in-shipment of stockers and feeders, to find the net production for California feeds.

Feed-lot production was based on an estimated

TABLE 1.--California Beef Production and Feed Requirements, 1942

Type of production	Production of live weight		Feed requirements				Pasture and range	
	Amount	per cent of total	Barley or equivalent	Protein concentrate	Legume hay	Nonlegume hay	Irri-gated	Nonirri-gated
	<u>million pounds</u>	<u>per cent</u>	<u>thousand tons</u>	<u>thousand tons</u>	<u>thousand tons</u>	<u>thousand tons</u>	<u>thousand acres</u>	<u>thousand acres</u>
Range and field cleanup	342	72	8	30	111	258	...	40,000
Irrigated pastures	60	13	...	...	...	...	150	.....
Feed lots	73	15	168	15	57	133	...	.....
Total	475	100	176	45	168	391	150	40,000

The total pounds produced include live weight of beef cattle and calves slaughtered plus the gain in inventory numbers at 325 pounds per head.

290,000 head fed, as compared with 260,000, the more conservative estimate of Swedlund and Scott.⁵ The average gain was estimated at 250 pounds;



Fig. 1.--Beef cattle utilize about 40 million acres of range and field cleanup in California, and about 72 per cent of California-produced beef tonnage comes from these feed resources.

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poultry production. 4 p. California Agricultural Experiment Station. July, 1943. (Litho.)

⁵Swedlund, H. A., and G. A. Scott. California livestock and poultry. A statistical summary, 1867-1942. California Crop and Livestock Reporting Service, U.S. Bureau of Agricultural Economics, and California Department of Agriculture, Bureau of Agricultural Statistics. Special Publication 192:1-137. 1943.

this figure may be somewhat high, but should compensate in feed-requirement estimates for cattle full-fed on range that were not included. Feed requirements were based on a total of 1,050 pounds of feed for each 100 pounds' gain, consisting of 50 per cent each of roughage and concentrates.

Based on the feeds and by-products utilized, the average or composite feed-lot ration was approximately as follows:

Feed	Per cent of ration	Pounds for 100 pounds' grain
Nonlegume hay	35	367
Legume hay	15	158
Grains	26	273
Beet pulp	15	158
Molasses	5	52
Protein concentrate	4	42
Total	100	1,050

Enterprise-efficiency studies show a consumption of 1,800 pounds of hay per animal unit in northeast counties and about 400 pounds per animal unit in south-coast and valley counties. A weighted average of 680 pounds per animal unit was calculated on the basis that about 20 per cent of the cattle were in the high hay-requirement areas. Thus with an average of 315 pounds' gain per animal unit, the hay requirement in addition to range becomes 216 pounds per 100 pounds of beef produced. Concentrates similarly estimated amounted to 21.8 pounds per 100 pounds' gain. Hay was figured as 70 per cent nonlegume; and 80 per cent of the concentrate was considered to be protein feed. Hay consumption thus estimated is probably low because of the recent tendency to feed more hay to cows and young animals in winter. Some operators are figuring on the

animals make up much of the utilization, the gains consist more of growth and less of fat than with feed-lot animals and thus are not comparable from the standpoint of computing relative efficiency of production.

Labor and Land Requirements

Table 2 estimates the man-hours, production per acre, and land required for 1942 beef production, while table 3 shows the yield of products from 100 pounds of live weight.

The estimated average labor requirement is 3.3 man-hours for each 100 pounds of live weight produced; hence about 3.16 pounds of protein and 22,400 calories are produced per man-hour. The total labor requirement was estimated as equivalent to 5,570 men working 54 hours weekly for a year.

Beef cattle utilize about 40 million acres, or 65 per cent of the 60 million acres of range land in the state. Much of this land, which includes brush, forest, and desert areas, has a low carrying capacity, hence low yield per acre, and therefore cannot be utilized for food production except by cattle and sheep. The average yield of protein per acre as calculated was 1.22 pounds; calories, 8,700. The competition for primary products of croplands for beef production is relatively low: 72 per cent of the total production came from range (fig. 1), field cleanup, and the hay production that is a part of this type of production; 13 per cent was from irrigated pasture (fig. 2), a part of which land might be used for primary crops if needed and if labor were available; and 15 per cent of the total production came from feed lots (fig. 3), in which only 26 per cent of the total feed required was grain, the remainder being hay, other roughage, and by-product feeds. The cropland exclusive of irrigated pasture uti-

TABLE 2.--Labor and Land Requirements Exclusive of Production of By-Product Feeds

Type of production	Requirements for 100 pounds live weight produced						Total labor requirement	Total acreage
	Operating labor	Feed-production labor	Total labor	Range or pasture	Crop-land	Total		
	man-hours	man-hours	man-hours	acres	acres	acres	thousand man-hours	thousand acres
Range and field cleanup	2.10	0.78	2.88	11.70	0.06	11.76	9,771	40,219
Irrigated pasture	0.25	3.75	4.00	0.25	....	0.25	2,400	150
Feed lots	1.73	3.04	4.77	.....	0.36	0.36	3,482	269
Total	.....	....	....	.....	....	.....	15,653	40,638
Weighted average	....	....	3.30	.....	....	8.54	.....	.....

basis of 1½ to 2 tons of hay per animal unit in the colder sections, instead of the 1 ton or less formerly considered sufficient.

In recent years many irrigated pastures have been developed. The 150,000 irrigated acres estimated to be utilized by beef cattle includes Ladino clover and pasture-grass mixtures, alfalfa, Sudan grass, and other improved crops and meadows. Records indicate an average production of about 400 pounds of beef per acre. Since young growing

lized by beef cattle, was a little over 5 per cent of the 9-million-acre total. Grain utilization was equivalent to about 11 per cent of the barley acreage.

Utilization of By-Products Other than Protein Feeds

The total cattle given wet beet pulp at or near sugar factories in 1942 was estimated at 80,000 head, or about 28 per cent of the total

TABLE 3

Beef Cattle: Yield of Products from
100 Pounds Live Weight

Product	Weight pounds
Carcass beef, 54 pounds	
Lean	35.4
Fat	10.0
Bone	8.6
Edible offal meats	3.5
Oleo fat	3.5
Blood	5.7
Hide	6.5
Other inedible by-products, valueless material, and shrinkage	26.8
Total	100.0
Total protein for food	10.4
Total fat for food	13.5
Total calories for food	74,000

Sources of data:

Chatfields, C. Proximate composition of beef.
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389:1-18. 1926.

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book of the industry. p.1-64. American Meat In-
stitute, 59 East Van Buren Street, Chicago, Ill.
1941.

Aldrich, P. I. The packers encyclopedia.
p.1-529. National Provisioner, Chicago, Ill. 1922.

cattle fed. The total of this pulp, plus an es-
timated 10 per cent of the dried pulp produced,
accounted for 30 per cent of the concentrate, or
15 per cent of the total ration for all cattle
fed in the feed lots. In addition, beef cattle
consume large quantities of molasses, brewery
and distillery by-products, cull fruits, vege-
tables, and vegetable wastes.

Utilization and Need for Protein Feeds

In past years, when cottonseed cake and meal
were relatively cheap, quantities in excess of
protein requirements were used in feed-lot rations
and in supplementing range for fattening. Re-
cently, cost and supply considerations have tended
to bring about better adjustments, though the
quantity used might sometimes be further reduced.
Prices of protein feeds under ceilings, and the un-
controlled advances in grain prices, have lately
encouraged the excessive use of proteins--a situ-
ation perhaps partly responsible for the recent
order which canceled contracts and raised the
price on protein feeds.


The total protein-concentrate utilization in
1942 was based on feed-lot requirements and on
data from enterprise-efficiency studies showing
an average of 68 pounds of concentrates used per
animal unit in range production, 80 per cent of
which was estimated to be protein-rich feed. The
estimated total of 45 thousand tons of 40 per
cent protein-equivalent feed was about 35 per



Fig. 2.--Use of irrigated pastures by beef cattle has in-
creased rapidly in recent years. This economical and labor-
saving type of production was responsible for about 13 per
cent of California-raised beef in 1942.



Fig. 3.--Feed-lot finishing accounted for about 15 per cent
of the total California beef produced in 1942.



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cent of the total cottonseed and linseed meal or cake processed in California.

The use of protein and other concentrated feeds by range producers cooperating in the enterprise-efficiency studies may be somewhat higher than the average. Since much of the range forage is markedly deficient in protein 4 to 6 months of the year, and since large quantities of non-legume hay are fed, at least 60,000 tons, or twice the amount indicated for 1942, would apparently be required for efficient utilization of range resources.

Production of linseed has increased and that of cottonseed meal has decreased till the relative tonnage expected in 1943 is the reverse of that of 1942. Cattle must therefore rely more on linseed and soybean meals and pellets and less on cottonseed.

Soybean meal and pellets will replace 43 per cent protein cottonseed cake, pound for pound. Linseed meal contains about 28 to 30 per cent protein, and about 1½ pounds is required to replace 1 pound of 43-per-cent-protein cottonseed meal or cake.

Suggested Priority Ratings for Concentrate Feeds for Different Types of Beef Production

First consideration should be given to supplying concentrates, particularly protein, for supplemental feeding in range production. As already mentioned, protein deficiency is acute 4 to 6 months of the year. This vast feed resource has sufficient energy value to support some gain that can be realized only when minimum protein requirements are met. Otherwise, no gain may result, and weight losses of 50 to 200 pounds per animal are commonplace. After autumn rains have brought on new forage, grains and other carbohydrate feed can supply the additional energy while the forage is scant and excessively low in dry matter.

As records have shown, 100 to 300 pounds of supplementary feeds per animal, used with range or in addition to nonlegume hay for promoting continuous gains in calves and yearlings, will commonly produce about 100 pounds' increased gain and replace 1,000 to 1,500 pounds of feed that would otherwise be required in the final finishing process.

Similar supplemental feeding on the San Joaquin Experimental Range has resulted in over 100 pounds more, per breeding cow, of calf weight at weaning time through increased calf crops and greater weight per calf.

Since few if any other uses can result in this increased production from so little additional feed, this use should have high priority rating.

Concentrate feeding is practiced only to a limited extent, in connection with irrigated pastures, but may become increasingly important in finishing the cattle that must be slaughtered directly after pasturing. Since labor and transportation in irrigated-pasture operations are much less than in hay production and subsequent feeding from the same land, and since pasture feeding is usually more economical than dry lot, this type

of production should have a high rating for the concentrate supplies needed, which will be largely carbohydrate feeds.

In general, feed-lot operations should come third in priority rating, as far as different types of beef production are concerned. If, however, present standards of quality and finish are to be maintained, feed-lot finishing is essential to capitalize on the gains secured from other types of beef production. It not only adds the fat covering essential for merchandizing and storage, but also increases the yield of the carcass in relation to live weight.

The whole beef-production program would be disrupted by any serious curtailment of feeding resulting from high-priced feeds in relation to the margin between feeder-cattle cost and slaughter-cattle value or feed allocation. If feeding were reduced, standards for finish or fatness would have to be lowered; marketing would be delayed; and cattle would be further backed up on farms and ranges.

In considering priorities, discrimination should be made within the industry. A high preference rating should be given to the farmer feeders who may require small quantities of supplementary feeds if they are to utilize efficiently home or locally grown feeds. Next consideration should be for feeding plants that are largely utilizing by-products. Last consideration should be for feeding plants which are not located in centers of feed and livestock production and which require transportation of feeds to the cattle.

Recommendations to Producers

1. Adjust cattle numbers to assured feed supply. Inventory numbers are high. Range and other feed production have been above average for several years. A poor year could bring about disastrous results.

More beef can be produced from a few cattle adequately fed than from larger numbers poorly fed. The object should be to produce 85 per cent calf crops, with 450-to-500-pound weaner calves, and to promote continuous growth of calves and yearlings during the dry season and the winter season. Feeding calves and yearlings for a daily gain of 1 to 1.5 pounds at these times requires only small amounts of concentrate supplement and will result in a high percentage of satisfactory slaughter cattle off grass, or shorter periods in feed lots the following year, with consequent enormous saving of total concentrates required. Such a program not only is best for the economic stability of the individual, but would render the greatest service to the country.

Local areas or individual ranches having short feed supply should sell down to the numbers that can be safely carried. The selling of the poorer type of breeding cows and heifers should receive first consideration, in addition to the marketing of normal surpluses. For proper adjustment

it may also be necessary to sell surplus stock at younger ages, including calves. Holding back normal sales for speculative consideration is to be avoided.

In general, experienced and established operators have already culled herds or are planning to make these adjustments at their next normal selling time. Because of marketing and slaughter restrictions, however, supplies are backing up in the country and continue to consume feed. A stock pile of beef cannot be maintained "on the hoof." Part of the backing up represents cattle sold from established outfits that have passed into new and often inexperienced hands. Many farms and ranches have lately established small herds. In some instances there has also been a shift from sheep and dairy cattle to beef. A greater outlet in slaughter channels is necessary if efficient production is to be sustained and the market preserved from demoralization.

2. Increase quality and protein values of hays by greater use of legumes. The rapid increase in the use of vetch with oats is an example that can be greatly extended.

3. Develop and utilize improved and irrigated pastures. Coordinate their use with native range to utilize each when it has the greatest production value and can provide for continuous gains of cattle throughout the year. To conserve labor, substitute pasturing for harvesting of crops whenever it can be done efficiently.

4. Use protein feeds carefully: 2½ pounds daily per animal should be the extreme limit under any conditions during the present emergency; and for most purposes the limit should be 2 pounds daily.

For bred cows on dry pasture or other low-grade roughage, feed 1 to 1½ pounds daily of 40 per cent cottonseed cake or equivalent, and increase to 2 pounds 30 to 60 days before calving when on dry feed. Reduce to 1 pound daily when green feed first becomes available, and gradually replace with carbohydrate feeds when new feed is scant and watery. For calves and yearlings on dry grass, feed 1 to 2 pounds daily; supply grain as needed; and substitute grain for protein feed on young green grass. From ¾ to 1 pound daily for calves and 1 to 1½ pounds daily for yearlings should be adequate for supplementing nonlegume hay. For fattening cattle, 2 to 2½ pounds of protein feed for each 1,000 pounds live weight is sufficient with nonlegume hay; one half this amount suffices with half-and-half legume and nonlegume roughage. None should be fed with legume roughage or green pasture.

Other Means of Increasing or Utilizing Feed Resources

1. The enormous possibilities of increased production from beet tops have recently been summarized.⁶ Even with 50 per cent reduction of

⁶ Guilbert, H. R., W. M. Regan, and R. F. Miller. Utilization of sugar-beet tops. 4 p. California Agricultural Experiment Station. March, 1943. (Litho.)

beets in 1943, apparently four to five times as much beef could be produced from tops as last year if all tops could be harvested, stacked green for silage, and fed with other feeds. Only about 40 per cent of the tops were utilized in 1942. Experience shows that tops will produce two to three times more gain when made into silage than when pastured in the field. The 1943 crop has potential replacement value of about 100,000 tons of alfalfa hay. Colorado and other states are progressing rapidly toward 100 per cent utilization of this resource, which produces at least one and a half to two times the amount of digestible nutrients as the beet pulp from the same beets. Machinery development in these areas is probably no greater than here, nor is the labor shortage much less acute.

2. There should be organized and directed killing of surplus deer and antelope, not only for the meat supply but also to prevent excessive deer mortality from starvation and to preserve range and hay resources for livestock.

3. Controlled brush burning will increase feed production and areas that can be grazed.

Sources of Additional Information

More detailed information than is given in this report can be obtained from the publications listed below; also from the Agricultural Extension Service in the counties or at Berkeley; or from the Agricultural Experiment Station.

Guilbert, H. R., and L. H. Rochford. Beef production in California. California Agricultural Extension Service Circular 115:1-125. 1940.

Hutchison, C. B., and E. I. Kotok. The San Joaquin Experimental Range. California Agricultural Experiment Station Bulletin 663:1-145. 1942.

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