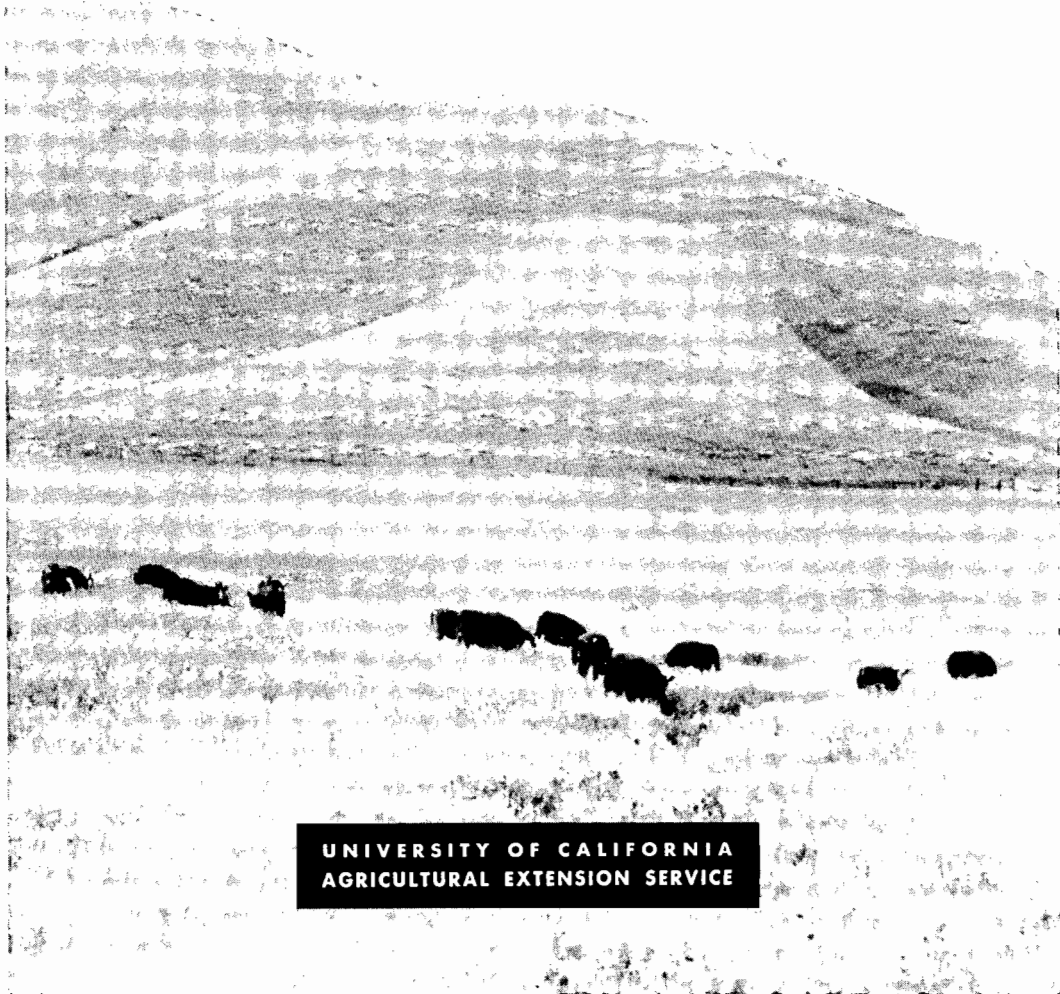


CHOOSING **PROFITABLE BEEF PRODUCTION**

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AGRICULTURAL EXTENSION SERVICE**

Beef production in California is essentially the harvesting of range, pastures, and other feeds through beef cattle. Profitable beef production is neither easy nor automatic. For maximum profit over a long span of years, the beef producer must:

1. Select a breed of cattle which brings the best income from the feed he has.
2. Have enough cattle on the land to fully utilize seasonal feed crops.
3. Manage the cattle for efficient production. Obtain high gains, calf crops, etc. for the feed used.
4. Obtain good feed yields at low cost from range, pastures and feed crops.
5. Buy and sell well.

This circular explains the first two items above – fitting the kind and number of cattle to the feed supply. It explains how to choose the best stage or type of beef production for the farm. It shows how to plan a breeding or buying-and-selling program to balance the size of the herd to the available feed.

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THREE STAGES OF BEEF PRODUCTION

When considering the best kind of beef production for your farm or ranch, think of the three stages which produce a choice slaughter steer.

- In the first stage, the animal is a weaner calf in a breeding herd, usually on a range cattle ranch.

- In the second stage, the calf is raised to the yearling-feeder stage. This may be done on the same ranch or elsewhere, perhaps on irrigated pasture.

- In the third stage, the feeder is finished to a grade of good or choice for slaughter.

COMPARE ALTERNATIVES

Compare alternative plans under expected price and cost conditions to determine quickly and surely the most profitable way to use feed in beef production. Trial and error is slow and hazardous. Even if you develop a profitable production program, you must anticipate the need to change with changes in price differentials or feed supply. A yearly trial budget improves your chances for a good profit.

Make two or more plans for using your pasturage and feeds for the coming year, or for the general future. Figure probable income and expenses to arrive at the probable net income, or profit, from each plan. The plan which is most profitable on paper usually turns out to be most profitable in practice if you have been careful in estimating production prices and costs, and in making the budget for each plan.

Price differentials seldom change enough in a year or two to reverse the relative profit of different plans.

Making plans and budgets in advance requires experience and judgment. Assume certain feed production, then estimate the kind and number of animals you will need to use this feed. Next, estimate calf crops, weaning weights, selling weights, and death losses. Figure income and costs by estimating cost items and probable selling prices. These estimates should be based on observation and experience, with attention to current and near future price trends.

BEEF PRODUCTION IN CALIFORNIA

Consider the beef business in California, how it competes with other areas, its advantages and disadvantages. California is a deficit area, producing half, or less, of the total beef consumed by its large and growing population. This gives local beef producers a slight price advantage which represents the transportation cost when the other western states ship beef animals to California.

In 1954, over 1,800,000 cattle and calves were shipped into California. About a million of these were stockers and feeders, and the other 800,000 went directly to slaughter. Three million cattle were slaughtered in California in 1954, more than in any other state. These included beef and dairy cattle raised here, those fed here for a while after coming in, and those shipped in for direct slaughter.

Some shipped-in stockers and feeders go on range for a grass season. Then they are put into a feed lot, for an average of three or four months, for the final fattening period.

The feeding period in California is usually shorter than in the corn belt area of the central states. California has a highly developed and specialized commercial agriculture with keen competition for land and water. Land values, taxes, irrigation, labor and feed costs are higher here than in most of the rest of the country. The California producer competes with animals produced in states with lower produc-

tion costs. To make a profit the Californian must be highly efficient and attain low production costs through full use of low-cost forage nutrients.

California beef production is basically the harvesting and marketing of range, pasture, and other feeds through beef cattle. The stockman is first a producer of grass and other feeds. As a crop producer he must see the importance of high, economical yields of grass, hay, and other feed crops.

Consider all feeds as hay for a moment. As a grower of hay you would plant the best varieties and keep out weeds and brush. You would fertilize to increase yields when profitable. Of most importance, you would use the proper number and kind of forage harvesters at the right time.

As a beef producer, you use cattle as forage harvesters. An 800-pound steer results from harvesting and converting feed equivalent to that found in ten tons of hay. Cattle are self-fueled, self-propelled, and fully automatic forage harvesters. But they must be managed to have the correct number on hand at the right time. Sometimes they have to be held on more expensive feeds to make them available when the range or pasture is ready. This can reduce the overall profit. Therefore, it is important to make the livestock plan to fit the feed supply.

START WITH THE FEED SUPPLY

The livestock business is based largely on the harvesting and conversion of forage and other feed crops into high value animal products.

Fitting the livestock to kind and quantity of feed produced on the farm is one of the most important profit factors in livestock production.

A "good fit" avoids unnecessary purchase of additional feeds or forced sale of livestock under any but the worst feed shortages. It enables the orderly marketing, through livestock, of the pasturage and other feeds produced.

Feed prices are largely determined by supply and demand. Profit opportunities in the use of feeds for livestock production help determine feed prices.

With competent management you can make more profit in the long run by using your feed crops than by selling or renting your feed to others.

The first step in making a livestock plan is to list the feeds you expect to have next year, or in some future year for which you are planning. Use the Livestock Feed Plan (Figure 1), which is available free from your farm advisor at the local office of the Agricultural Extension Service of the University of California. This is one of several work sheets available to help you analyze your situation and work toward more profitable farming.

To list available feed, estimate the probable production of each pasture and each feed crop or crop residue on your farm. Consider the different feeds, their cost or value, and how to figure quantities.

LIVESTOCK FEEDS IN CALIFORNIA

RANGE: California's main livestock feed is the natural seasonal growth of grasses, clovers, and other plants on about 35 million acres of grazing land or range not used for crop or timber production. Production per acre varies widely with the quality of land and climate. The value or cost of range feed also varies widely according to location and season of use.

LIVESTOCK FEED PLAN FOR THE YEAR 1956

Name Hidollar Ranch Address _____ Date 3/31/55
 Location Central Coast Counties Type of farm Range Cattle and grain

If you have a certain number of livestock to feed, start by figuring your feed needed in the first section below. Or, if you have certain feed and pasture production planned, start by listing it first in the second section and then make a livestock plan to fit the feed. It would help you to make one of these sheets for last year first so you can see actual quantities and then adjust these in your plan for next year. You may obtain other sheets. You may also obtain other planning sheets-the "Farm Plan and Budget Work Sheet" and the "Monthly Pasture Plan Work Sheet."

LIVESTOCK PLAN AND FEED NEEDED FOR THE YEAR 1956

Kind of Livestock	No. head	An. U per head	Pasture An. unit months	Hay tons	Silage, greens, tons	Pounds	
						Grain	Other concen.
<u>Breeding herd, selling yearling feeders</u>	<u>100 cows</u>	<u>1.74</u>	<u>1871</u>	<u>50</u>			<u>25 T</u>
Total feeds needed							

FEED AND PASTURE PRODUCTION PLAN FOR THE YEAR 1956

Field no.	Crop or Land Use	Acres	Yield per acre		Pasture total, A.U.mo.	Hay total, tons	Silage, greens, tons	Grain pounds
			Crop	Pasture A.U.mo.				
	<u>Range</u>	<u>2868</u>	<u>—</u>	<u>0.6</u>	<u>1721</u>			
	<u>Oat and Vetch Hay</u>	<u>25</u>	<u>2 T</u>	<u>1.0</u>	<u>25</u>	<u>50</u>		
	<u>Barley</u>	<u>125</u>	<u>1500*</u>	<u>1.0</u>	<u>125</u>			<u>187500</u>
	<u>Summer Fallow</u>	<u>150</u>	<u>—</u>	<u>—</u>				
Total production					<u>1871</u>	<u>50</u>		<u>187500</u>
Plus carryover from last year								
Total supply								
Less needed carryover, share rent, etc.								
Available to feed								
Needed, totals from above livestock plan					<u>1871</u>	<u>50</u>		<u>(25 T mix)</u>
Difference, surplus or shortage (-)								

FIGURE 1
UC Cooperative Extension

Carrying capacity is usually expressed in number of animals that can be carried for a certain period. (For example, 100 animal units for 9 months on 500 acres.) Range is rated according to the number of acres required to feed an animal unit for a year. The state average is about 23 acres. County averages vary from ten acres to 150.

ANIMAL UNIT MONTH: For determining how many livestock can use range or pasture, we need a quantitative measure of pasturage.

The most convenient and widely used is the animal unit month (AUM). This is the amount of feed needed by one animal unit for good growth and production during one month.

It furnishes about 400 pounds of total digestible nutrients (TDN) and is equivalent in food value to about 800 pounds of hay.

An animal unit is a mature head of cattle two years old or older or its equivalent in feed requirement. All ages and kinds of grazing livestock may be converted to animal

units. A beef cow is considered an animal unit, including the calf by her side. For precise balancing of feed we sometimes make an extra allowance for the calf, starting at .2 of an animal unit at four months of age, and gradually increasing the allowance to .5 at weaning time. For young growing beef animals we use a little over 0.1 of an animal unit for each 100 pounds of weight. For example, a yearling steer of 650 pounds is figured as 0.7 of an animal unit. Table 1 shows the animal units per head for some of the stock that may be using pasturage.

Production of all kinds of range, pasture, or stubble and other crop residues can be figured in animal unit months per acre. When experience shows that six acres will carry an animal unit a year (as in our best grass lands in the central coast counties), divide the twelve animal unit months for the year by six acres to obtain a yield per acre of two animal unit months.

If 40 animal units have done well on 40

TABLE 1: LIVESTOCK FEED REQUIREMENTS AND ANIMAL UNITS PER HEAD

	Age in years	Average weight pounds	Pounds TDN per day*	Animal units per head
BEEF CATTLE				
Cows - nursing part of year	Over 2	1000	13.2	1.00
Bulls	Over 2	1200	13.2	1.00
Steers	Over 2	930	13.2	1.00
Yearling steers, bulls, heifers, average	1 to 2	627	9.9	.75
Calves, average for period	4 mo. to 1 yr.	354	6.6	.50
Feeder cattle per 100 pounds of weight	1 to 2	100	1.3	.11
DAIRY CATTLE				
Cows - dry or up to 200 pounds BF per year	Over 2	1000	13.2	1.00
Cows giving 350 pounds BF per year	Over 2	1100	16.5	1.25
SHEEP				
Ewes with lambs	Mature	120	2.6	.20
Lambs after weaning	4-12 mos.	70	2.0	.15
HORSES				
Light weight at light work	Mature	1250	13.2	1.00
Colts	1-2	750	11.2	.85

*From Morrison Feeding Standards - mid-point of suggested usage for ordinary maintenance and growth. More feed would be used for fattening and less for maintenance only.

TABLE 2: COSTS OF TOTAL DIGESTIBLE NUTRIENTS IN DIFFERENT FEEDS

	Unit of quantity	Pounds TDN per unit	Units equivalent to one AUM	Price or cost per unit	Cost 100 pounds TDN
Range or Natural Pasture					
Grazing district, public land (Lassen County)	Animal unit			.15	.04
National Forest Permit	month			.46	.12
Private range, Modoc, Lassen	month	400	1.00	1.60	.40
Coast range and Sierra foothills	or			2.00	.50
Best natural range	AUM			3.00	.75
Irrigated pasture					
Low cost areas	AUM	400	1.00	4.00	1.00
Central valley, irrigated farms				6.00	1.50
Hay about 50% TDN					
Low cost or price areas	Ton	1000	.40	15.00	1.50
Usual producing areas				20.00	2.00
Deficit areas				25.00	2.50
Silage about 15% TDN					
	Ton	300	1.33	6.60	2.20
Green chopped alfalfa, 76% moisture					
	Ton	267	1.50	6.00	2.24
Concentrates, grains, meal, etc.					
Usual mixtures, 75% TDN	Ton	1500	.27	60.00	4.00
Ground barley	Ton	1560	.26	55.00	3.52
Molasses (Tank truck lots)	Ton	1080		23.00	2.12

acres of good barley stubble for one month, we say the barley stubble yielded one animal unit month of feed per acre. If we have an 80-acre range, estimated to yield one animal unit month per acre, we count on 80 AUM of pasturage. However, we would not expect to obtain this in a single month. We would probably spread its use over a five-month period, perhaps from February through June, and would graze sixteen animal units for that period.

TOTAL DIGESTIBLE NUTRIENTS (TDN): The nutrient content of livestock feeds is that portion which is digested and used by the animal for maintenance, growth and production. Some feeds are more concentrated than others and furnish more nutrients per pound. We use this measure to estimate equivalent quantities and compare costs of the nutrients in different kinds of feed.

Total digestible nutrients (TDN) are the digestible proteins, carbohydrates and fats in a feed.

Table 2 shows approximate average TDN contents of different feed types. These are accurate enough for figuring the quantity of one feed that can be substituted for another, and for comparing the cost of nutrients in different feed types.

Table 2 also shows sample prices and the resulting cost of nutrients. Notice the wide range, from a low of \$.04 per 100 pounds of TDN in a grazing district, up to \$4.00 in a concentrate mix costing \$60 a ton. This explains why each type of beef production requires different proportions of feed types to be profitable. A breeding herd must be run largely on low cost range and irrigated pasture. Harvested forage and concentrates can be used to finish for market.

IRRIGATED PASTURE is perhaps next to range in importance as a feed for beef production in California. Irrigated pasture, usually on higher value crop lands, or sprinkler-irrigated, rolling, tillable land has somewhat higher costs than range, and yields per acre in animal unit months are much higher.

Irrigated pasture yields in California vary from six to 30, AUM per acre per year. On good soil and with good cultural care and grazing management, a yearly yield of twelve animal unit months per acre should be obtainable in most of our irrigated valleys. Such a pasture will carry about 1½ animal unit months per acre from about March through September, less during the fall and early spring, and little or none in winter.

Another Agricultural Extension Service circular, "Beef Cattle on Irrigated Pasture," treats this subject more fully. It shows several alternative plans and budgets for using 100 acres of irrigated pasture with a very wide range of profit opportunities. It is obtainable from your local farm advisor.

CROP RESIDUES, such as grain stubble and sugar beet tops, are another important feed for beef cattle. These are usually lower in nutrient cost than irrigated pasture or hay and are available in late summer and fall, when the natural range is of limited use. Planning to use them to fill gaps in natural feed makes for better use of all feeds. Stockmen frequently rent such crop residues on nearby farms on an acre or head per month basis. Table 7 illustrates how the diversified farmer with livestock can make good use of such feeds.

HAY AND SILAGE: Hay and other harvested forage are important feeds in beef production mainly because they can be stored and transported for use when grazing is not available. In the mountain areas a ton or more of hay is needed to carry an animal unit through the winter.

Since this class of feed is harvested by manual labor and machinery instead of live-

stock, it is usually more expensive than range or irrigated pasture. Therefore, it is used mainly as a supplement to range, as pasture to fill gaps in natural feed, or to make up for a shortage of natural feed due to unusual weather. It is a suitable feed for use with concentrates in finishing animals in the feed lot.

Hays vary in quality and in ease and economy of storing and feeding in the loose, baled and chopped form. However, for making a livestock plan, the approximate feed value and costs in Table 2 are sufficiently accurate to use where more exact information is not available.

Silage is green forage which has been harvested and preserved. This process makes it possible to save more of the vitamins and nutrients in fresh green forage than if cut and dried for hay. With recent developments in forage harvesting equipment and in ensiling, we expect this method to increase in economy and use. But even so, the nutrient cost will almost always be higher than where animals do their own harvesting in pastures and on the range.

Where green chopped forage is harvested at the correct stage in regular daily quantity, its succulence, palatability, and higher protein and vitamin content than hay, make it an excellent feed. The nutrient cost is about the same, or a little higher, than hay or silage.

Under good management the yield of alfalfa can be enough higher per acre to offset the harvesting cost, and results in a nutrient cost no higher than in a grass clover pasture harvested less perfectly by livestock on the same land. But this requires a large operation to justify the mechanical equipment and also skillful management to synchronize the harvesting with irrigation and growth. Because of its high cost it is suited more to the feed-lot finishing of cattle than to growing young animals to a feeder stage. It is too expensive a feed for use by a cow herd.

CONCENTRATES: This wide class of feed includes grains, oil meals, and other

products which have a higher nutrient content and less bulk than the forage crops. Concentrates are used in small amounts to supplement inadequate or poor quality forage. Where animals remain on the range through summer and fall with little feed but the dry grass, a high protein feed supplement of about two or three pounds a day makes up the nutritional deficiency economically.

Concentrates are also used as a major part of the daily feed in fattening cattle for market in the feed lot, and to add finish during a short period before marketing, while animals are still on a good natural or irrigated pasture.

VITAMINS: Vitamin A is the only vitamin in which cattle may become seriously deficient. Cattle pastured on dry range and grain stubble for several months are likely to develop evidence of Vitamin A deficiency. This is particularly important with growing cattle and pregnant cows. Four to five pounds of good quality alfalfa hay per day provide the necessary Vitamin A. There are also stabilized Vitamin A supplements available which may be included in a supplemental range-feed mixture. A short pasture period on a green feed crop, such as dry-land sudan, will often carry cattle through a dry feed season by restoring Vitamin A reserves.

Natural ranges, irrigated pastures, and crop residues are seasonal and do not provide feed in equal amounts throughout the year. There are many different climatic conditions in California. These include mountain summer ranges, early spring ranges in the coast range and foothills, and ranges near the coast that can be used almost throughout the entire year but are at their best in spring and early summer. Yet livestock have to eat the year around, and growing animals need more feed as they get larger.

Fitting a livestock plan to an animal feed supply includes the timing and number of animals as well as the selection of the most profitable stage of beef production. Recognize

the nutrient costs in different feed groups and the stages of beef production to which they are best adapted. Then approach the selection of a beef enterprise in more detail.

ESTIMATING BEEF PRICES

A plan is a schedule of number of head of various kinds, with estimated weights and times of buying and selling.

To compare the probable profit of alternative plans, or to see if there is a potential profit in a single plan, it is necessary to estimate the prices these cattle will bring and figure the income. To do this, consider the class and grade of each animal, the time of year it will be sold, and the location and selling cost.

Table 3 shows some recent prices at the stockyards in Stockton. Net prices at the ranch for these same animals would be decreased by transportation costs and commission for selling. Or, if buying feeders, the cost might have been a little more delivered to the ranch.

In the last column of the table the prices used in some of the sample budgets in this circular are shown. These are not price predictions, but at the time these illustrations were prepared they were likely to prevail for the next year or two. You will have to decide on prices to use in your own calculations.

In comparing alternative plans use the same prices for the same kind of cattle, and the prices for other classes and grades that are in line with those prices. To show likely differences in profit, price estimates need not turn out to be correct later, but relative prices of different classes and grades should be approximately correct.

Yearling feeders are the kind of stock sold from most California range cattle ranches without facilities for finishing to a slaughter

grade. Table 3 shows them to bring about 2¢ a pound less than good slaughter steers which in turn, are 2¢ less than choice steers in the spring, and about 3¢ in the fall.

A rule of thumb on margins for finishing in the feed lot under current price conditions allows about 1¢ per pound under the slaughter grade for each month of feeding required to make that grade.

For example, when buying feeders to carry to the grade of choice, requiring five months of feeding to make choice, the price of the feeders should be 5¢ a pound below their probable selling price as choice slaughter cattle five months hence.

The time of year you buy and sell may make a difference in price for certain grades and classes. Choice slaughter steers are about the same throughout the year. But

TABLE 3: SOME RECENT BEEF CATTLE PRICES AT STOCKTON

From Federal State Market News Service

	1950	1951	1952	1953	1954	Our budgets
Choice slaughter steers						
Spring: February – April (inclusive)	25	34	35	25	24	23
Fall: September – November	29	35	31	23	24	23
Good slaughter steers						
Spring: February – April	24	33	33	22	21	21
Fall: September – November	28	33	28	20	21	20
Good slaughter heifers						
Spring: February – April	22	32	32	21	20	19
Fall: September – November	27	32	27	19	19	18
Veal calves, commercial to choice						
Spring: February – April	28	38	35	26	23	22
Fall: September – November	33	36	28	18	19	21
Cows, utility						
Spring: February – April	19	26	23	15	13	13
Fall: September – November	22	25	16	11	11	12
Choice and good feeder steers						
Spring: February – April	25	34	34	21	21	19
Summer: May – August	27	33	29	19	20	18
Fall: September – November	28	34	25	17	19	18
Choice and good stocker calves						
Spring: February – April	26	39	37	23	21	20
Summer: May – August	28	36	33	19	20	19
Fall: September – November	32	38	26	17	19	19

* In cents per pound.

Notice the differences in price by class of cattle such as steers, heifers, cows and calves. There are also price differentials between the several grades within each class such as choice, good, commercial and utility. Lower grades and feeder cattle also tend to be lower in price in the fall than in the spring.

good and lower grades, and feeder animals, are more plentiful and usually lower in price in the fall than in the spring. Fall is a good time to buy feeder cattle, and not a bad time to sell finished cattle.

With cattle to buy or sell, you should watch California cattle markets, and study the beef situation and outlook continuously. Several Federal State Market News reports are issued regularly and may be obtained free of charge on request. Several periodicals also carry market reports and comments. "The Livestock and Meat Situation" is issued monthly by the United States Department of Agriculture, Washington 25, D.C. Local farm advisors may also have helpful price as well as planning information. But future prices can never be predicted with certainty. The responsibility of making decisions and estimating prices is yours. That's what management is — making decisions and taking the consequences.

some of the information needed. Your farm advisor may have some general cost information based on other ranches or areas.

In the following sample budgets quantities are based on actual supervised studies and trials, and are figured at the assumed prices shown.

Use these in estimating costs, item by item, for your ranch. Since some ranchers rent or buy some of their feed we have shown the quantity and value of all feeds, whether produced on the farm, or bought. If you have financial records for your place, or income tax farm schedules, cost items may be adjusted to a particular plan. Complete cost schedules are not always necessary. Differences in probable earnings can be estimated by considering only those items which differ. We will now make our first plan in detail to illustrate all the steps in a logical order.

BEEF IN THE CENTRAL COAST

The Hidollar Ranch has about 3200 acres, contains some grain land, and is typical of ranches in the central coast counties and the lower portion of the foothills east of the interior valley. It has a reputed capacity of about 100 breeding cows. What is the most profitable plan for operating this ranch?

We start with plans for the year 1956, when half of the 300 acres of grain land is in summer fallow, 125 acres in barley, and 25 acres in oat and vetch hay. We begin our written plans with the "Livestock Feed Plan for 1956." (Figure 1). Acreage and production are filled in first on the lower part of the page. It is assumed that the 2868 acres of range have a total normal carrying capacity of 1721 animal unit months for the year. It has been rated as requiring 20 acres to carry an animal unit a year, which is $.6$ of an animal unit month per acre ($12 \text{ AUM} \div 20 = 0.6$). This 0.6 times 2868 acres gives us the 1721 total AUM of range which was placed in the

ESTIMATING NET INCOME

After you have your plan showing the number of cattle you expect to have for sale, and have estimated the average price, multiply the number of head by the average weight to get total pounds. Then multiply the total pounds by the expected price. Do this for each class and grade of cattle. Add the total pounds sold to obtain production and add the income for total income.

If income for a plan fails to come up to expectations, or is inadequate, abandon it and try another. Sometimes it is enough to compare the income of alternative plans without estimating expenses, if they are about the same for each plan. To compare profit, the expenses must be estimated on a comparable basis for each plan, changing only items which differ.

Estimating costs may be difficult if actual records of previous costs are not available. A previous owner will sometimes give you

WORK SHEET FOR ESTIMATING CATTLE PRODUCTION AND COSTS

Name Hidollar Ranch

Address _____
Date 3/31/55 By _____

Kind of Enterprise Beef breeding herd
selling yearling feeders.

Fill in estimated number of head of each age and sex group on the 1st of each month on the table to the right. List calves first when about 4 months old and figure at .2 of an animal unit per head increasing as they get older. Convert all stock to animal units and insert total animal units in last column.

Stock Count by Months

	Bulls	Cows	Calves	Yrlg. Steer	Yrlg. Heifer	2-yr. Heifer	Total Animal Units
A.U.	1.0	1.0	.2-.5	.6-.8	.6-.8	.9-1.0	Units
Jan.	5	99	count	42	41	20	170
Feb.	5	98	at 4 mos.	41	41	20	170
Mar.	5	98	40	41	40	20	185
Apr.	5	98	85	41	40	20	198
May	5	96	83	41	40	20	205
June	4	85	83	41	40	20	199
July	4	80	83	sold	21	20	151
Aug.	5	100	83		21	10	157
Sept.	5	100	83		21	cows	162
Oct.	5	100	83		21		163
Nov.	5	100	83		21		163
Dec.	5	99	83		21		165
Total	58	1159					2088

Av. Animal Units for year 174

Estimated Inputs, Costs, Production, Sales and Net Income

	Total AUM feed	Total Pounds TON	Quantity		Price	Total dollars	Per AU	
			Total	Per AU.				
Range ^{Taxes etc.} _{Int. on invest.}	1721		28684	16.5	1.35	3877	3.38	
Stubble & misc.	150		1504	1.7	2.00	300	1.72	
Irrigated pasture								
Hay	125		507	.29	20.00	1000	5.75	
Silage, Green chop								
Concentrates, Mix	92		257	.14	60.00	1500	8.62	
Salt & minerals						36	.27	
Total feed	2088	835200 1.29 per lb. beef		4800 TON	.77	6421	36.90	
Hired labor			200 hr.	7.5	1.00	200	1.15	
Operators & family labor			1100			1100	6.32	
Horse & automobile expense 2 hd. \$100 & 4000 mi \$400						500	2.87	
Taxes, Ins. Repairs, & Misc. Exp.						500	2.88	
Depreciation on cattle buildings & equipment						300	1.73	
Interest on investment cattle enterprise 26000 @ 5%						1300	7.47	
Total production costs. A						10321	59.32	
Stock sales, purchases and net income								
		No. head	Av. Wt.	Weight		Price	Total dollars	Per
Sales				Total	Per			
2-yr. steers		41	800	32800	44.	18.5	6068	38.38
Yearling steers								
Yearling heifers		19	700	13300		16.5	2194	12.61
Weaner calves								
Veal calves		2	250	500		21.0	105	.60
Cows		18	1000	18000		12.0	2160	12.41
Bulls		0.5	1400	700		15.0	105	.60
Total sales		80.5		65300		16.3	10632	61.10
Less: Replacement bulls		1.0	700	700			300	1.72
Feeder & other stock								
Net stock prod. & income B		79.5		64600	371		10332	59.38
Management income B minus A				-1100			11	.06
Net farm income, Mgt. inc. plus oper. labor & int. on invest.						{ 3011 1300	5422	31.16
Net cash income, Figure as applicable in this case.								

16.04 per lb.

column, "Pasture Total A.U.Mo."

The oat and vetch hay is entered—25 acres with a yield of two tons per acre, so 50 tons of hay is entered in the hay column. About an animal unit month of feed per acre is expected from the mixed hay, stubble, etc., after the hay is made, so 25 AUM is entered in the pasture column. Barley is estimated to have the yield of 1500 pounds of grain per acre and an animal unit month of stubble pasture after harvesting and up to the time it is tilled for the following year. That gives 125 more animal unit months of pasturage, and 187,500 pounds of grain. There will be no feed on the summer fallow other than that covered by the grain and hay stubble. This is our feed supply. It adds to a total of 1871 AUM of pasturage, 50 tons of hay, and plenty of barley which will probably be sold as grain.

Now, with the feed supply written down, we start on our first livestock plan. A breeding herd and the selling of yearling feeders each year in June at the end of our good spring grass season will be our first plan. We use the "Work Sheet for Estimating Cattle Production and Costs." (Figure 2)

We try 100 cows (80 older cows and 20 three-year-old heifer replacements raised on the ranch). To get the most out of the grass, cows are bred for calving in October and November. We start with 100 in the cow column under "Stock Count by Months," for August, September, October, and November. To allow for a 2-percent death loss the number of cows is dropped to 99 for December, and 98 for February, March, and April. Sales of cull cows reduce the number to 96 for May, 85 for June, and 80 in July. This completes our cow count for each month in the year. (Figure 2)

Twenty springing heifers are needed each year to bring the cows back to 100, so

we enter 20 for July in the "2-Yr. Heifer" column, and run that number back to January. Allowing a death loss, we follow back with 21 yearling heifers from December to July.

Bulls are figured next, with five, or one bull per twenty cows. A new young bull is purchased annually to replace one sold or dead, so we fill in our "Bulls" column with five each month, except June and July when we allow four for the period between the time we sell and buy.

Calves are figured next. We should be able to raise 85 calves per 100 cows. They start coming in October, but are not considered in figuring animal units until they are four months old. We enter 40 for March and the full 85 for April. To allow for a possible need to remove two as veal calves the number is dropped to 83 in May, and continued through December.

These calves would be weaned in July, but are left in the "Calves" column and shifted to yearlings in January. We assumed 42 yearling steers and 41 yearling heifers for January. To allow for one-head death loss steers are dropped to 41 for February through June. They are sold in June. The 41 heifers drop to 40 in March through June and drop to 21 saved for replacements in July.

The next step is to list the sales and figure the probable income on the bottom portion of the work sheet. The stock account shows the sale of 41 yearling steers at the end of June, so these are entered in the head column for yearling steers. The estimated weight considering the way they are fed, is 800 pounds. We multiply 41 by 800 and get 32,800 total pounds. After looking at Table 6, we decided to figure the steers at 18.5¢ a pound at the ranch and, multiplying this, we get \$6,068, which was placed in the "Total Dollars" column.

The same procedure was followed for the

other stock with the results shown—19 yearling heifers, 2 veal calves, and 18 cows. To allow for the loss of a bull occasionally we figured on selling one every other year, averaging half a bull per year and buying one as shown in the budget.

We used 2¢ less a pound for the heifers than for the steers, and figured 21¢ for the veal calves and 12¢ a pound for the cows, which are expected to be in good condition and sell at the utility grade. At each of these steps or calculations, weights, conditions, and probable prices have been considered and adopted.

In planning, make these decisions for yourself. Then they will represent your best judgment and you will have confidence in them.

We can now add the pounds sold and income from sales. The bull bought is subtracted to get the net stock production of 64,600 pounds or 646 pounds per cow which is not bad. Net stock income is \$10,332—a bit disappointing—but that should be known in advance.

We must now go back and figure the animal unit months of stock in our plan to see how it fits our feed supply. Table 1 shows the animal units per head. To be precise, we use an increasing figure for our young stock each month. We figure our bulls, cows, and two-year heifers at one animal unit per head each month. Calves are first listed at .2 of an animal unit at four months, which figure is increased to .5 in August when they are weaned. Thereafter, we used about .1 of an animal unit for each 100 pounds of estimated weight the rest of the year for calves, and all through the year for yearlings. The yearling steers, before selling in June, were figured at .8, and the heifers at .7. This job has to be done for each month to be sure to get alternative plans comparable and equal in feed requirement. Here is how the animal units were figured for June:

	Total
4 bulls at 1.....	4 A.U.
85 cows at 1.....	85
83 calves at .35.....	29
41 yearling steers at .8.....	33
40 yearling heifers at .7.....	28
20 2-year-old heifers at 1.....	20
Total AUM for June.....	
	199

Animal units are figured as above for each month of the year and entered in the last column in the stock count. This adds up to 2,088 animal unit months for the year, the total feed requirement for the year. How does this fit our feed supply? We have a feed supply of 1,871 AUM of pasture and 50 tons of hay, which converts to 125 AUM for a total of forage available of 1,966. Cows and calves would not do well on the dry feed in late summer and fall so plan to supplement this dry feed with a high protein feed concentrate. If we add 25 tons of this at 3.75 AUM per ton, that is 92 more AUM for a total of 2,088 in all feeds—an exact balance. This 100-cow breeding herd, with the sale of yearlings, would fit this ranch.

Notice in the plan in Figure 2 that for each cow there is a considerable amount of other stock to be fed besides the cow herself—the calf, until sold as a yearling, a portion of a one- to three-year-old replacement heifer, and the cow's share of a bull. In all, there were 2,088 AUM of stock for a year. Divide this by 12, and you get 174 animal unit years of stock or 1.74 per cow.

In general with this type of herd where replacement heifers are raised to about 20 percent of the number of cows, with bulls at 5 percent, and a calf crop of 85 percent raised to yearlings, 1.7 to 1.8 animal unit years of feed are required per breeding cow. This has been shown by many records in beef management studies conducted by the Agricultural Extension Service over the last twenty years. If you do not want to work out your own livestock plan you may use this rule.

maintain the desirable nutritional level. Surplus feed in irrigated pastures can be made into hay, and surplus growth in any month can be grazed over the next month or two. This process is illustrated in Table 9. Here a feed pattern assumed for a Lake County ranch is revised for two beef production plans, with a good fit obtained in both cases to minimize the hay and supplemental feeds required.

The operator of the Springview Ranch in Lake County, primarily a fruit grower, has some extra land in irrigated pasture and alfalfa, and some nearby range land. He has been building up a breeding herd to utilize this grazing and hay, but has been losing money on his beef operations when the feed is charged to his herd at prices for which he could sell or rent it. What should he do? Here are two alternative plans and budgets to meet this problem:

First, his grazing is listed by quantity in Animal Unit Months, and distributed over the year according to the way which his experience has shown to be feasible. This gives the feed in the sample pasture plan at the top of Table 9. Note the wide variation from 172 AUM in May to 20 in December. The entire irrigated pasture is cut for hay in May and June, getting a yield of 1-1/4 tons of hay per acre, or 50 tons from the 40 acres. This is equivalent to 125 AUM of pasturage, which is subtracted from pasturage listed for those months when this hay would be growing. There is still a spring surplus on the range, which is deferred for use as dry grass with supplements the following fall and winter. These adjustments are shown in Table 9 in reaching the adjusted total for Plan A.

Plan A is for a breeding herd with a higher efficiency assumed than in the present plan. Yearlings will be carried to slaughter grade of good on the irrigated pasture by feeding some hay and considerable grain. A 90 percent calf crop is assumed, with half of the replacement heifers calving as two-year-olds, and half as three's. With good feeding assumed, he can expect to sell good yearling steers at 950 pounds

at the end of November, and the surplus heifers at 850 pounds a month earlier. A summary of probable income and costs appears as Plan A in Table 10. The estimated management income is only \$41, which is better than previous losses. The operator also gets the prices shown for the feed used, which include some return for his labor and investment. This is probably the best that can be done at these prices and feed costs with a commercial breeding herd.

A feeder enterprise from calf to yearling stages offers a potentially greater profit, since it takes less feed per pound of beef produced, and can stand the more expensive feeds of this region. Plan B is tried. Weaner calves are purchased about the first of November, carried about eleven months, and sold finished to slaughter grade of good the following September. There would be no cattle in October, which provides a welcome vacation and a chance to reserve pasturage available for use in November by the following year's batch of feeders. Table 9 shows the adjusted pasture Plan B, and the feed required by 120 head. For maximum gains, supplemental concentrates and hay are provided, as shown from November through February, and hay and grain for finishing in July through September.

The trial budget for Plan B, shown in summary form in Table 10, is based on the purchase of 120 calves averaging 420 pounds, for 19¢ a pound in November. By the following September it is assumed that 117 would be sold at an average weight of 900 pounds at a price of 20¢ at the ranch—a gain of 480 pounds per head. Management income is estimated at \$4127. It is true that this plan involves some risk from market decline, and would not appear so profitable with a higher paying price for the stock bought. The profit potential, however, is so much greater than from the breeding herd that it may add up to a greater total profit over the years, despite an unprofitable year occasionally.

The Springview Ranch example illustrates the great opportunity to improve profits from

**TABLE 9: MONTHLY PASTURE AND FEED PLAN IN AUM FOR A BEEF ENTERPRISE
FOR A NORTH COAST RANGE RANCH WITH IRRIGATED PASTURE, RANGE AND OTHER FEED**

	Acres	AUM per A.	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	TOTAL
Range	1200	0.33	20	30	40	60	100	80	20	10	10	10	10	10	400
Irrigated pasture	40	11.8		12	32	40	72	72	64	60	56	40	24		472
Alfalfa	20	1.5		15									15		30
Orchard cover crop	30	2.0	20	20	10									10	60
Total unadjusted	1290	-	40	77	82	100	172	152	84	70	66	50	49	20	962
Possible adjustments															
Hay from irrigated pasture 50 T					-5	-25	-72	-23							-125
Shift by deferred grazing to use dry			+10				-20	-50				10	10	10	-30
Adjusted total for plan A			50	77	77	75	80	79	84	70	66	60	59	30	807
Plan A, 40-cow breeding herd needs			64	65	66	74	76	78	80	82	77	63	64	65	854
Difference			-14	12	11	1	4	1	4	-8	-11	-3	-5	-35	-47
Other feeds															
Supplemental concentrates furnished, in AUM			3	2							1	3	3	3	15
Hay in AUM (24 tons)			10							5	5		5	35	60
Grain to fatten steers in AUM									4	6	8				18
Adjusted pasture use for plan B			55	70	74	80	85	90	95	60	56	-	64	60	789
Plan B - 120 feeder calves need			65	68	71	77	83	89	94	99	105	0	60	62	873
Difference			-10	2	3	3	2	1	1	-39	-49	-	4	-2	-84
Supplemental feeds															
Supplemental concentrates (12 tons)			15										15	15	45
Hay in AUM (24 tons)			10	10						10	10		10	10	60
Grain to fatten in feed lot (29 tons)			10	10					20	40	50				110

Above is the total pasturage available as it would occur by months, from a low of 20 AUM in December to a high of 172 in May. The spring peak can be removed by making hay in the irrigated pasture, and by deferring some grazing for use in the winter with supplement. A feasible adjusted total for Plan A is a fairly good fit for the 40-cow breeding herd. Quantity of supplemental feeds in concentrates, hay and grain for fattening are shown converted to animal unit months so it can be seen that feed is adequate each month. Plan B covers the purchase of 120 stocker calves in November and their sale from irrigated pasture after grain feeding to grade of good the following September. A revised pasture use plan is made for this enterprise by deferring some pasturage from October to November and December. By a little supplemental feeding we obtain an excellent fit until August when we wish to begin feeding hay and grain to fatten the animals for market.

**TABLE 10: A COMPARISON OF TWO BEEF ENTERPRISES TO FIT
A FEED SUPPLY OF RANGE AND IRRIGATED PASTURE**

	A – Cow Herd		B – Feeders	
	Total	Per animal unit	Total	Per animal unit
Number of cows or feeders bought	40 cows		120 calves	
Total animal unit years of stock	71		73	
Pounds of live beef produced	29550	422	54900	752
Total AUM of feed available or charged	911	12.8	1032	14.1
Pounds of TDN per pound produced	12.3		7.5	
Average selling price per pound all stock	17.7¢		20.0¢	
Income from stock sales	5298		21060	
Less cost of stock bought	150		9576	
NET STOCK INCOME	5148	72.51	11484	157.31
Charge for range at \$1.50 per AUM	600	8.45	600	8.22
Miscellaneous crop pasture at \$2.00 per AUM	180	2.54	180	2.47
Irrigated pasture at \$4.00 per AUM	1312	18.48	1312	17.97
Hay at \$20 a ton	480	6.74	480	6.58
Oil meal and salt mix at \$60 a ton	240	3.38	720	9.86
Grain for fattening at \$55 a ton	275	3.87	1595	21.85
Salt and minerals	20	.28	20	.27
TOTAL FEED COST	3107	43.76	4907	67.22
Labor at \$1 per hour	800	11.27	900	12.33
Miscellaneous, horse, auto, taxes, veterinarian, etc.	500	7.04	600	8.12
Depreciation, cattle facilities	100	1.41	150	2.05
Interest on investment	600	8.45	800	10.96
TOTAL ALL COSTS OF PRODUCTION	5107	71.93	7357	100.78
Management income	41	.58	4127	56.53

Plan A is for a breeding herd managed for maximum production and efficiency. Still, it takes a lot of feed to run a breeding herd through the year, and total production was only 54% of Plan B – Feeders. Notice that in the “breeding herd” it took 12.8 pounds of TDN to produce a pound of live animal, while with “calf to yearling feeders,” it takes only 7.5. With so much high-priced feed, such as irrigated pasture, the breeding herd plan A was barely profitable with a management income of \$41, about \$1.00 per cow, or 58¢ per animal unit year.

Plan B is the purchase of stocker steer calves, weighing 420 pounds, for 19¢ per pound about the first of November, and selling them as slaughter steers, grade of “good,” the following September at 900 pounds, and for 20¢. Enough grain is fed on irrigated pasture to make this grade and price. These young feeder animals put most of what they eat into growth or gain in weight, so make more efficient use of feeds, and hence offer higher profit potential. A surplus of feed is allowed for this plan to achieve maximum gains.

beef production by fitting the most profitable stage or stages of beef production to the feed supply. This ranch shows large losses under the present program of about 50 breeding cows and the sale of weaner calves. Shifting to Plan A (with sale of fed yearlings) will wipe out the loss and give a small profit. Shifting to Plan B (all feeders) offers a material increase in profit.

WORKING TOWARD A BETTER PLAN

So far nothing has been said about the transition from a current plan to a better one. Sometimes it will be necessary to make the shift in two or three years, with intermediate plans working toward the one most profitable. This will be the case, particularly if much additional capital is needed or current gross income must be maintained.

In the above case, the first step from the plan of selling weaner calves is to sell enough cows to make room to keep the calves over for sale as yearlings. This results in a reduction in gross income this first year. The rest of the cows could be liquidated during the second year, or spread into a third, and extra feeders to fit the feed supply would be purchased. Intermediate plans for each year help make this change profitable. When the final plan is in use planning a year ahead will still be required, with changes to fit feed supply and cattle prices.

SUMMARY

California producers must sell their beef in competition with beef produced at lower cost all over the west. They must produce efficiently the kind of beef best suited to convert and market their feeds.

There are three main stages in beef production:

1. getting the weaner calf
2. growing the calf to a yearling feeder
3. finishing the feeder for market

Running a breeding herd to get weaner calves takes a lot of feed, so the feed must low in cost to allow a profit.

The second stage—growing the calf to a mature feeder—takes less feed per pound produced. It is usually a profitable stage and can stand the higher feed costs of our better grass ranges and irrigated pastures.

The third stage—finishing for market—usually requires a period in the feed lot, largely on concentrate feeds, but can be partially done on irrigated pasture with grain.. It is profitable in California under good management, where the correct feeds are available and an adequate price margin prevails.

For each farm or ranch suited to beef production, there is one, or a combination of the above three stages, which offers the greatest profit opportunity under an assumed future situation as to cattle and feed prices.

The further an animal is carried with farm-grown feeds toward a popular slaughter grade, such as good or choice, the greater the profit potential.

Feeder enterprises, under current price margins, offer better profit potentials than breeding herds under most California conditions, where higher cost range, irrigated pastures, crop residues, hay, grains, and other relatively high cost nutrients make up most of the feed supply.

The finishing of feeders in farm feed lots to grades of good and choice with farm-grown and some purchased feeds usually pays. A margin of about 1¢ a pound between buying and selling price is required for each month of feeding required to make that grade.

The addition of irrigated pasture at a reasonable cost to other cattle feeds available on the farm or ranch will usually pay, if used to improve the weight, grade, and price of the cattle sold.

The profit on a cattle ranch can generally be increased by:

- Increasing quantity of feed available through range improvement
 - Changing the kind of beef produced, such as from calves to yearlings, or breeding herd to a small breeding herd and feeders, or to feeders only
 - Adding a feed lot to finish cattle before selling
 - Adding irrigated pasture
 - Improving production efficiency through better breeding and feeding—getting higher calf crops and selling weights.

Pre-test every step toward improving profit by making a plan and budget with and without the change. Estimate changes in costs and production, and income and potential profit under these assumed price and other conditions. Relative profit differences estimated in advance will be in the right direction, even though actual prices and ultimate profit cannot be forecast exactly.

To improve profits in beef production, take these steps:

1. List feeds produced, and estimate the

quantity of each.

2. Look carefully to feed production to see if yields or grazing can be increased.
3. List grazing available by months, and study its distribution to see how it may be improved or shifted.
4. Select a kind of beef production and number of animals to try in a plan to fit the feed supply.
5. Work out your first plan, adjusting and changing it until it is a good compromise between what is feasible and a perfect fit.
6. Complete a budget of expenses, income, and profit.
7. Make several different plans to fit the same conditions and feed supply.
8. Make and test the final plan with a budget.
9. Work gradually toward your final plan.
10. Revise plans annually to fit changing price and feed conditions.
11. Keep full production and financial records so that planning ahead will be easy and accurate.

12/55---4000

10/57---1500

11/59--1000