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A Dairy Budget Guide To Determine Feasibility of Dairy Expansion

Michigan State University

Cooperative Extension Service

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Dairy and Agricultural Education Departments

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A Dairy Budget Guide

(To Determine Feasibility of Dairy Expansion)



A DAIRY BUDGET GUIDE
Feasibility of Dairy Expansion

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This guide shows how to easily determine the expected returns and debt payment capacity from an expanded dairy operation. It is assumed readers have a superior knowledge of dairying and farm management, and are in a position to advise dairy farmers on the feasibility of expansion.

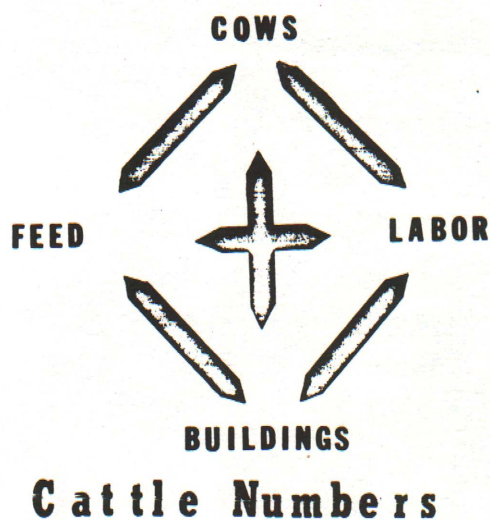
Individuals using this guide will be taken step-by-step to the income that may be expected by the dairyman considering expansion and to the amount of debt he would be able to carry. The accuracy of the answer will be greatly improved by accurate and personal information furnished by the dairyman in question. Should some information be unavailable a reasonable solution to the budget problem is still possible, as a catalog of Michigan based reference data is furnished along with the step-by-step technique to be followed. However, it is best to use the farmer's own information.

In carrying the budget to completion with a dairy farmer, you will have caused the person to consider and wrestle with many of the complexities of organization. You will have forced the manager to gain some knowledge and to make some decisions. Good! The final decision will be the sounder for having experienced the mental exercise.

Remember, this budget -- and every other budget -- has a weakness. It furnishes the expected returns at a given point in time. That point is normally calculated after equilibrium is reached. Such is the case with this budget.

The expected costs and returns determined will be those at a point approximately three years after expansion. The farm will have gone through the growth period and should be making full use of the expanded facilities.

Reaching the stage where the operation is established can be and often is a difficult experience. This budget and the accompanying cash flow analysis will be helpful in anticipating the "period of growth" income, but to accurately estimate income at year one and two, budgets will need to be made for these points. Such budgets would normally reflect the cost of making partial use of expanded facilities and equipment.



The physical organization of a dairy farm requires a balance between labor supply, number of dairy animals, available feed and facilities. It is possible to start with any of the four and arrive at the requirements in the other three. For example, if the quantity of feed is set as the limiting factor and the amount normally produced is known or can be calculated, the task then becomes one of determining the number of dairy animals that can be fed, the needed labor to produce the feed and care for the herd and finally the building and facilities required to house the animals and store the feed.

A farmer considering expansion usually knows the herd size which should be analyzed. The first task is to reconcile cow numbers to feed supply, available labor and facilities. A little later it becomes necessary to make the reconciliation of cow numbers and capital resources and desired income.

Cattle Numbers

The best first step is to establish the total number of dairy cattle at various ages and stages of lactation in order that labor and housing requirements may be determined. Replacement heifers also need to be expressed in terms of numbers that must be fed over a given period of time to determine feed requirements -- i.e. there might be eight calves receiving milk at any given moment yet over a period of 12 months 43 calves might have been fed milk.

Expected dairy cattle numbers may be arrived at by two routes -- the make-up of existing dairy herds or by calculations based upon calving interval, culling rate and calf death losses. A summary of cattle inventories of herds on Telfarm in 1973 and 1974 showed 103% as many replacements as cows. Unfortunately, the heifers were not clearly classified as to age or stage of development.

The dairy herd is a dynamic production unit. Cows are constantly in the process of freshening, being bred and then removed from the herd. Table 1 furnishes a schedule by which to anticipate dry cow numbers. A range from 9% in the month of April to a high of 16% in the late summer is shown. As indicated by Table 2 about 28% of the herd is turned over each year. The number of available replacements is also significantly affected by calf mortality. A summary of 1974 Telfarm records on 436 farms with dairy herds showed a calf mortality before weaning of 16.5% (this figure includes calves born dead).

It is reasonable to expect the number of calves born to equal the average herd size and one-half of these to be heifers. Many cows calf and are replaced with other fresh cows shortly thereafter due to mastitis, sterility, low production, etc. Offsetting this is an average calving interval of 13 months. The net result is births approximately equal to average number of cows.

Table 2. Percent and Reason For Cows Being Removed from Herds. Virginia DHIA Annual Summary. 1973-74

Reason	Percent of Total Cows
Low Production	10.0
Sterility	7.0
Physical Injury or Disease	4.0
Died	3.0
Mastitis	2.0
Dairy Purposes	2.0
Percent of Cows Removed	28.0

Table 1. Percent of Dairy Cows in the Herd. Michigan DHIA Summary of 294 Herds, 1967.

	Total Cows	Dry Cow	Percent Dry
Jan.	50.6	5.6	11
Feb.	49.9	5.0	10
March	49.7	5.0	10
April	49.2	4.4	9
May	49.0	5.4	11
June	49.0	6.4	13
July	40.2	7.9	16
Aug.	50.7	8.1	16
Sept.	52.0	8.3	16
Oct.	52.8	8.4	16
Nov.	53.0	7.4	14
Dec.	52.0	6.9	13
Aver.	50.7	6.6	13

Table 3. Calf Mortality Prior to Weaning. Telfarm Summary of 436 Dairy Herds. 1974

Average Size of Herd	Average Number Calves Born	Calf Mortality %
37	36	13.1
61	58	15.6
87	84	19.5
142	135	16.7
76	73	16.5

Schedule 1 is to be used in arriving at dairy cattle numbers for estimating feed requirements. In using the budget guide it is suggested that each schedule be completed in numerical order as the reader proceeds through to the final solution. Calculations for the GUIDE FARM will be shown alongside each.

Schedule 1. Arriving at Dairy Cattle Numbers to be used in Establishing Feed Requirements	
1. Cows = Average number of cows in expanded herd	= _____
Replacements	_____
2. Birth to 12 months = (cows) x .45	= _____
3. 12 months to freshening = (cows) x .53	= _____

While doing the budget problem, the reader may lack necessary information. When this is the case, use the information in the GUIDE FARM or from the various catalogs of data provided.

GUIDE FARM Calculation 1.	
Cows =	<u>100</u>
Birth to 12 months =	<u>45</u>
12 months to freshening =	<u>53</u>

Housing requirement are best determined when the number of dairy cows milking and dry are known and when replacement heifers are cataloged according to the stage of development. Schedule 2 accomplishes this handily. Note that the total numbers of animals are identical with either Schedule 1 or 2 -- only the categories change.

CATTLE INVENTORY VALUE

Schedule 2 lends itself to the establishment of value of the dairy herd. To accomplish this it is necessary to assign a dollar value to each category and multiply by number of dairy animals in the group.

Various systems have been used to establish cattle inventory values. For those purchasing replacements this value may be the depreciated value of the dairy cows in the herd. The figure is not available in those herds where replacements are raised since cattle are not normally depreciated. Values might be set equal to the cost of raising heifers to freshening, but this figure is seldom known. The best value to use is one somewhere between the price of purchased replacements and the price of cull cows.

Average cull price may be readily determined based upon the price of utility cattle shown in Table 4 and the average weight of 1271 pounds reported for cows in DHIA herds of southern Michigan (1967 summary). Based upon these data, cull cow value for the 5 year average is \$319 (12.7 cwt x \$25.11).

Schedule 2. For Estimating Dairy Cattle Numbers on Hand at Any Given Time					
Expanded Herd Cows	Calculation Factors		Number I	Livestock Inventory	
	When Total Cows Are Known	When Cows in Milk Are Known		Per Animal II	Total Value III
1. Total cows		milking + dry		\$	\$
2. Milking cows	total X .87				
3. Dry cows	total X .13	milking X .15			
4. Bred heifers	total X .34	milking X .39			
5. Open heifers	total X .41	milking X .47			
6. Calves: 6 wk - 6 mo	total X .15	milking X .17			
7. Calves: birth - 6 wk	total X .08	milking X .09			
8. Total Herd	total X 1.98	milking X 2.28		XXX	

Anyone familiar with cow prices realizes that purchase price of replacement animals varies with year, season, locality, available supply and the quality of the particular animal. Holstein heifers due to freshen are currently selling for approximately \$500, but this price can change rapidly.

GUIDE FARM Calculation 2. Expanded Herd Cows	number I	Livestock Inventory	
		per Animal II	Total Value III
		\$	\$
1. Total cows	100	600	60,000
2. Milking cows	87	XXX	XXX
3. Dry cows	13	XXX	XXX
4. Bred heifers	34	500	17,000
5. Open heifers	41	300	12,300
6. Calves: 6 wk - 6 mo	15	200	3,000
7. Calves: birth - 6 wk	8	75	600
8. Total herd	182	XXX	92,900

Table 4. Average Annual Price of Utility Cows in Detroit ^{1/}

Year	Average Price of Utility Cows
	\$/CWT
1969	20.79
1970	21.54
1971	22.92
1972	25.75
1973	34.57
5 yr Average	25.11

^{1/}US Dept. of Agriculture
Consumer and Marketing
Service, Livestock Div.
Livestock Daily Quotations,
(weekly and annual).

A relatively stable inventory value for animals in the various age groups is acceptable and it reduces computation of annual records and facilitates business analysis.

The livestock values used for the GUIDE FARM are shown in Calculation 2 and are representative of those currently used in many farm account records. The individual using this guide is encouraged to use those livestock values with which the participating dairyman is most comfortable.

The total value in Schedule 2, line 8, Col.III, should also be entered in Schedule 10, line 15 under Column VI.

DAIRY CATTLE SALES

Anticipated dairy cattle sales can be computed from the information available at this point. The number sold is a function of herd size and may be arrived at by completing Schedule 3. An alternative method is to use the value reported by Telfarm co-operators. In 1974 average dairy cattle income (sales in excess of purchases and inventory change) for Telfarm cooperators was \$124.80 per cow.

Schedule 3. Determination of Cattle Sales					
	Total Cows	Multiply by	Number Sold I	Price II	Value III
1. Cull cows and involuntary sales ^{1/}		.28			
2. Sold for dairy purposes ^{2/}		.07			
3. Bull calves ^{3/}		.45			
4.	Total Dairy Cattle Sales				

^{1/} Number based upon DHIA summary. See Table 2.

^{2/} Replacements will exceed needs at stated removal and death rates. Animals sold for dairy purposes include approximately 3% of cow herd and bred heifers equivalent to 4% of cow herd.

^{3/} Assume one-half calves to be bulls and a 10% mortality prior to sale.

GUIDE FARM Calculation 3. Cattle Sales					
	Total Cows	Multiply by	Number Sold I	Price II	Value III
1. Cull cows and involuntary sales	100	.28	28	300	8,400
2. Sold for dairy purposes	100	.07	7	500	3,500
3. Bull calves	100	.45	45	75	3,375
4.	Total Dairy Cattle Sales				15,275

Once an income item has been determined it is also to be entered on the Income Schedule. Total dairy cattle sales calculated and entered in Schedule 3 is also to be entered in Schedule 9, line 2, page 18.

DAIRY PRODUCT SALES

The best estimate for future production of the expanded herd is a measure of what the dairyman in question is currently getting. Production records and/or a record of milk sales on an annual basis are the better sources of data.

If these are not available milk check stubs or milk sales off last year's income tax divided by the number of cows and price received give a useable measure. Lacking other sources the milk pick-up stubs (usually on a hook in the milk house) provide an estimate of milk production. Table 5 estimates annual production from daily sales per cow.

Enter the expected pounds of milk sold per cow in column I of schedule 4.

Table 5. Estimation of Annual Milk Sold from Daily Milk Sales

Daily Milk Sold		Annual Milk Sold per Cow
Per Milking Cow	Per Cow-in-Herd	
1b	1b	1b
30	96	9,000
33	29	10,000
36	31	11,000
39	34	12,000
43	37	13,000
46	40	14,000
49	43	15,000
52	45	16,000

^{1/} Annual milk sales are normally 750 pounds below milk produced per cow, (home use, calves, spillage, etc.)

Income from milk sales can now be computed. Enter the price of milk in column II of Schedule 4. Number of cows is that computed in Schedule 1 or 2. Milk sales should be calculated in Schedule 4 as has been done for the GUIDE FARM in Calculation 4. The sales in column V should also be entered in Schedule 9, line 1, page 18.

Schedule 4. Estimating Dollar Value of Milk Sales				
Milk Sold per cow	Milk Price per cwt.	Milk Sales per cow	Number cows	Value of milk sold
I	II	III	IV	V
lbs.	\$	\$		\$

GUIDE FARM Calculation 4. Milk Production & Sales									
Milk Sold per cow		Milk Price per cwt.		Milk Sales per cow		Number cows		Value of Dairy Products Sold	
I	X	II	=	III	X	IV	=	V	
lbs.		\$		\$				\$	
13,000	X	8.50	=	1,105	X	100	=	110,500	

FEED REQUIREMENTS

A high correlation exists between grain consumption and level of milk production. Table 6, a guide to annual feed disappearance at various levels of milk production, points out this correlation. Grain is given in total pounds and then divided between corn (or corn equivalent) measured in bushels and mill

feed (protein, molasses, mineral, salt, etc.) in dollars. This breakdown into corn and mill feed is convenient for budgeting purposes. The bushels of corn required for dairy feed can be directly compared to corn production and the dollar value of mill feed represents purchased feed on the expense schedule.

Forage consumption is expressed in terms of hay equivalent. This can be a total hay, haylage, or silage feeding program or any combination of these forages. As shown in Table 8, one ton of hay is equivalent in dry matter and feeding value to 1.75 tons of haylage at 50% moisture, 2.25 tons of wilted silage at 60% moisture or three tons of silage at 70% moisture. For example,

Table 6. Annual Feed Disappearance for Various Levels of Milk Production^{1/}

Milk Sold Per Cow	Feed Disappearance Per Cow				Total Feed Cost Per Cow
	Grain			Hay Equivalent	
	Total	Corn	Mill Feed <u>2/</u>		
lb.	lb.	bu.	\$	tons	\$
9,000	4,000	67	108	6.5	536
10,000	4,800	73	120	6.5	562
11,000	5,200	79	108	6.5	566
12,000	5,600	85	108	6.5	581
13,000	6,000	91	125	6.5	613
14,000	6,500	100	158	6.5	668
15,000	7,100	108	158	6.5	688

^{1/} Feed disappearance was based upon Telfarm, DHIA, and research summaries. A 20% waste allowance is included in these values.

^{2/} Mill feed includes protein supplement, molasses, mineral, salt, etc.

Table 7. Annual Feed Requirements for Heifers ^{1/}

Age	Corn	Mill ^{2/} Feed	Hay Equivalent	Feed Cost
	bu.	\$	tons	\$
Birth to 12 months	7	82.50	1.2	148.00
12 months to Freshening	63	5.00	4.4	338.50

^{1/} Based on Estimated Annual Feed Requirements, MSU, by Don Hillman

^{2/} Mill Feed includes milk replacer, starter, protein supplement, etc.

Table 8. Forage Conversion Factors

HAY		HAYLAGE		WILTED SILAGE		SILAGE
12% moisture		50% moisture		60% moisture		70% moisture
1 TON	=	1.75 TON	=	2.25 TON	=	3 TON

a dairyman with soil capable of high corn yields might be feeding 1.5 tons of hay and 15 tons of corn silage (5 ton hay equivalent X conversion factor of 3).

The prices used to arrive at the feed costs determined are shown in Table 9.

Table 9. Feed Prices Used in Determining Feed Cost

Corn	\$ 2.50 per bu.
Oats	1.50 per bu.
Hay	40.00 per ton
Haylage	10.00 per ton
grass silage	13.00 per ton
corn silage	19.60 per ton
pasture	20.00 per acre
mill feed	as specified

Feed requirements for replacement heifers are shown in Table 7. Feed needs are again expressed in bushels of corn, tons of hay equivalent or dollars of mill feed.

If the dairyman planning expansion has good feed records on his present herd, these may be used in preference to the requirements shown. The user is cautioned against using a measure of actual feed consumption without an allowance for feed waste. For example, the feed consumption listed on DHIA records should be increased by 20 percent to reconcile it with actual feed disappearance.

Calculate feed requirements on Schedule 5. Enter the appropriate livestock numbers (from Schedule 1) at the top of each column. Next enter the annual feed disappearance of each type of feed by the heifers of less than one year, by yearling heifers and by cows in columns I, III, and V respectively. Multiply annual feed disappearance of each type of feed by the prices selected and enter directly below quantity. Calculate total feed disappearance and cost of feed by multiplying by number of animals in each classification and summing across classifications. Total feed costs per cow (column V, line 10) is calculated by dividing total number of cows into total feed costs (column VII, line 10). The procedure is demonstrated in GUIDE FARM Calculation 5.

The dollar value of raised feed is not essential to the budget process because the costs of production are included in Schedule 12. The dollar calculation is included for general interest. Where more than mill feed is purchased, the dollars are important.

Schedule 5. For Determining Feed Requirements.

Feeds	Heifers birth - 12 mo. ()		Heifers 12 mo - freshening ()		Cows ()		Total Herd VII
	per heifer I	for heifers II	per heifer III	for heifers IV	per cow V	for cows VI	
1. Corn [bu. \$							
2. Other Grain [bu. \$							
3. Hay [tons \$							
4. Haylage [tons \$							
5. Grass Silage [tons \$							
6. Corn Silage [tons \$							
7. Pasture [acre \$							
8. TOTAL VALUE OF RAISED FEED							
9. Purchased Feed \$							
10. TOTAL FEED COST							

Calculation 5. Determining Feed Requirements for Expanded Herd.

Number of Animals for Schedule 1 or 2		Heifers birth - 12 mo.		Heifers 12 mo - freshening		Cows		Total Herd
Feeds		per heifer I	for heifers II	per heifer III	for heifers IV	per cow V	for cows VI	VII
1. Corn	bu.	7	315	-	-	91	9,100	9,415 bu.
	\$	17.50	787.50	-	-	227.50	22,750	23,537.50
2. Other Grain	bu.	-	-	-	-	-	-	-
	\$	-	-	-	-	-	-	-
3. Hay	tons	1.0	45	2.0	106	3.0	300	451 T
	\$	40.00	1,800.00	80	4,240	120	12,000	18,040.00
4. Haylage	tons	-	-	-	-	-	-	-
	\$	-	-	-	-	-	-	-
5. Grass Silage	tons	-	-	-	-	-	-	-
	\$	-	-	-	-	-	-	-
6. Corn Silage	tons	1.5	68	6.0	318	10.5	1,050	1,436 T
	\$	29.40	1,332.80	117.60	6,232.80	205.80	20,580.00	28,145.60
7. Pasture	acre	-	-	-	-	-	-	-
	\$	-	-	-	-	-	-	-
8. TOTAL VALUE OF RAISED FEED								69,723.10
9. Purchased Feed \$		82.50	3,712.50	5	265	133	13,300	17,277.50
10. TOTAL FEED COST						870		87,000.60

CROP PRODUCTION

The next step is to establish anticipated crop production. It is possible to set either herd size, feed or facilities as the limiting factor and then determine the remaining 2 items. If feed is to be considered the limiting factor, the procedure is to determine crop production and then determine the number of cows that can be fed. If cows are the set factor, determine crop production and plan to purchase any feed shortages.

Schedule 6. Determining Crop Production							
Crop I	Acres II	Yield per acre III	Production bu. or ton IV	Quantity Fed From Sch 5 V	Available for Sale (if any) VI	Price per bu or ton VII	Crop Sales VIII
1. Corn						\$	\$
2. Small Grain							
3. Corn Silage							
4. Alfalfa							
5. Wheat							
6.							
7.							
8.							
9.							
10. Tillable acres			13. Total Crop Sales (sum of col. VIII)				
11. Non-tillable acres			14. Total Value Raised Feed				
12. Total Acres			15. Value of Crop Production				

Tillable acres available for producing crops are determined and entered as a total and for the various crops grown in Schedule 6. The proportion of various crops planned should reflect the soil and climatic potential and the dairyman's intentions.

Yields must be established for the farm in question and should reflect long run average yields for the farm. Hopefully, some sort of crop record will be available for determining accurate yields. Lacking this, the reader may consider table 10 which shows five-year average crop yields on Michigan dairy farms. Production for each crop is acres times yield. The quantity fed is found in Column VII, Schedule 5.

GUIDE FARM Calculation 6. Determining Crop Production

Crop	Acres	Yield per Acre	Production bu. or ton	Quantity Fed From sc. 5 V	Available for Sale VI	Price per bu VII	Crop Sales VIII
I	II	III	IV	V	VI	VII	VIII
1. Corn	127	86	10,922	9,415	1,507	2.50	\$3,767.50
2. Small grain	---	---	---	---	---	---	---
3. Corn silage	103	13	1,339	1,436	---	19.60	---
4. Hay	140	4.0	560	451	109	40.00	4,360
5. Wheat	40	40	1,600	---	1,600	3.00	4,800
6.	---	---	---	---	---	---	---
7.	---	---	---	---	---	---	---
8.	---	---	---	---	---	---	---
9.	---	---	---	---	---	---	---
10. Tillable acres	410			13. Total Crop Sales (sum of col. VIII)	12,927.50		
11. Non-tillable acres	30			14. Total Value Raised Feed	69,723.10		
12. Total acres	440			15. Value of Crop Production	82,650.60		

Table 10. 5 Year Average of Crop Yields
Per Acre 1969-1973 ^{1/}

	<u>5 Year Ave.</u>
Corn (bu)	85.08
Corn Silage (ton)	13.24
Oats (bu)	59.26
Hay Equivalent (ton)	3.69
Pasture (ton)	2.07
Wheat (bu)	39.53
Soybeans (bu)	47.16

^{1/} Telfarm summary sheets-weighted averages of
crops on owned & rented acres.

Feed shortages may appear in Schedule 6. If so, go back to Schedule 5 and be sure that dollar expenditures are high enough to purchase the needed bushels and tons.

CROP SALES

Any excess of production over amounts fed is available for sale. The anticipated price is entered in column VII (the prices should be comparable to those in Schedule 5). Quantity available for sale multiplied by price represents crop sales and is to be included on the income schedule as a part of farm income. The sales of each crop should now be entered in lines 4 through 8 of Schedule 9, Page 18.

FEED BALANCE

The feed balance can give a farmer a quick estimate of his overall feed needs or excesses. The sources should always equal the uses. If uses exceed sources, feed will need to be purchased. If sources exceed uses, feed may be sold. A feed balance should be calculated for each individual feed in units. Use schedules 5 + 6 and the operator's own available beginning and ending inventories for various required figures in Schedules 7a and 7b.

Schedule 7a.		Feed	
Beginning Inventory	_____	Livestock feeding	_____
Farm Grown	_____	Cash Sales	_____
Purchases	_____	Ending Inventories	_____
TOTAL	_____	= TOTAL	_____

Calculation 7a.		Feed	
<u>Source of Feed (feed production)</u>		<u>Uses of Feed (feed requirement)</u>	
Beginning Inventory	0	Livestock Feeding	9,415
Farm Grown	10,922	Cash Sales	1,507
Purchases	0	Ending Inventories	0
TOTAL	10,922	= TOTAL	10,922

Schedule 7b.		Feed	
Beginning Inventory	_____	Livestock feeding	_____
Farm Grown	_____	Cash Sales	_____
Purchases	_____	Ending Inventories	_____
TOTAL	_____	= TOTAL	_____

Calculation 7b.		Feed	
		<u>Corn Silage</u>	
Beginning Inventory	220	Livestock feeding	1,436
Farm Grown	1,339	Cash Sales	0
Purchases	0	Ending Inventories	123
TOTAL	1,559	= TOTAL	1,559

AGRICULTURAL PROGRAM PAYMENTS

If an estimate of agricultural program payments is not available, it is suggested that the average received by Telfarm cooperators be used. The 1974 Telfarm summary shows agricultural program payments to be nearly \$1.00 per acre on Michigan dairy farms. The income computed in Schedule 8 should also be entered in line 9 of Schedule 9, page 18.

OTHER AGRICULTURAL INCOME

If the operator is conscious of other agricultural income which applies to his particular operation enter it directly into Schedule 9.

FARM INCOME

The total farm income to be anticipated from the expanded herd may be determined by adding the values now listed in Schedule 9. If the values have not been entered into Schedule 9, it will be necessary to transfer dairy product sales from column V, Schedule 4; dairy cattle sales from column III, line 4 of Schedule 3; crop sales from column VIII of Schedule 6; and agricultural program payments from column I of Schedule 8.

The income figure arrived at represents both gross income and cash farm income.

Schedule 8. Agr. Program Payments

Tillable Acres I	Ag. Program Payments	
	Per Acre II	Total III
	\$	\$

GUIDE FARM Calculation 8.

Tillable Acres I	Ag. Program Payments	
	Per Acre II	Total III
	\$	\$
410	1.00	410

Schedule 9. Determination of Expanded Farm Income

	Income
	\$
1. Milk Sales	
2. Dairy cattle sales	
3. Other livestock sales	
4. Corn	
5. Hay	
6. Other feed crops	
7. Wheat	
8. Other cash crops	
9. Ag. program payments	
10. Other income (machine bldg, landsales, etc.)	
11. TOTAL	

INVESTMENTS

A good set of records including inventories of crops and livestock along with a depreciation schedule for improvements and equipment will provide the best source of information for establishing total farm investment. In the absence of these, it is suggested that Table 11 will provide a good guide to use in filling out Schedule 10.

LAND

The value of land varies depending upon quality, availability, location and alternative uses.

GUIDE FARM Calculation 9.		Income
Expanded Farm Income		\$
1.	Dairy products	110,500
2.	Dairy cattle sales	15,275
3.	Other livestock sales	----
4.	Corn	3,767.50
5.	Hay	4,360.
6.	Other feed crops	----
7.	Wheat	4,800
8.	Other cash crops	----
9.	Ag. program payments	410
10.	Other income (machine, bldg, land sales, etc)	----
11.	TOTAL	139,112.50

Table 11. Investment Per Acre and Per Cow for Established Dairy Farms
Southern Michigan Dairy Farms (Telfarm 1974) Owned Assets

Item	Herd Size (Number Cows)							
	Under 50		50 - 74.9		75 - 99.9		100 & over	
	Per Acre \$	Per Cow \$	Per Acre \$	Per Cow \$	Per Acre \$	Per Cow \$	Per Acre \$	Per Cow \$
Land, tillable	284	27	285	26	292	28	256	17
Bldg. & improvements	43	301	60	323	72	365	71	293
Machinery	86	183	91	182	93	185	89	165
Livestock	-	725	-	684	-	704	-	703
Crop & Supplies	97	-	104	-	117	-	126	-
TOTAL	510	1,236	540	1,215	574	1,282	542	1,178

Most likely the dairy farmer and/or the individual assisting in the budget will have a fairly good knowledge of land value for the particular location. Enter the value of the presently owned farm in Schedule 10, column IV, lines 1 and 2. (The distinction between land presently for dairy and that for crops

Schedule 10. Estimating Total Expanded Farm Investment

Type of Investment I	Acres or Cows <u>1/</u> II	Multiply by <u>2/</u> III	Present Investment IV	New Investment V	Total Present and New VI
LAND					
1. Present for Dairy	_____	_____	_____	<u>XXX</u>	_____
2. Present for Crops	_____	_____	_____	<u>XXX</u>	_____
3. New Purchases	_____	_____	<u>XXX</u>	_____	_____
IMPROVEMENTS					
4. Present for Dairy	_____	_____	_____	<u>XXX</u>	_____
5. Present for Crops	_____	_____	_____	<u>XXX</u>	_____
6. New Facilities	<u>XXX</u>	<u>XXX</u>	<u>XXX</u>	_____	_____
MACHINERY					
7. Present for Dairy	_____	_____	_____	<u>XXX</u>	_____
8. Present for Crops	_____	_____	_____	<u>XXX</u>	_____
9. New Purchases	_____	_____	<u>XXX</u>	_____	_____
LIVESTOCK - see Schedule 11					
10. Present Livestock	_____	_____	_____	<u>XXX</u>	_____
11. Additional Livestock	_____	_____	<u>XXX</u>	_____	_____
FEED & SUPPLIES					
12. Present feed and supp.	_____	_____	_____	<u>XXX</u>	_____
13. Additional feed & supp.	_____	_____	<u>XXX</u>	_____	_____
14. Present, New and Total Investment	XXX	XXX			

1/ Use number of cows and acres presently on the farm to compute present investments.

2/ Use farmer's values or Table 11 values.

is for ease of calculation and may be ignored if it simplifies arriving at the land value). If additional land is to be purchased enter the value in column V, line 3.

Tillable land accounts for the major part of land investment. This value is assigned to the crops line. Another use of land is for the farmstead, fences, lanes, etc. These uses are valued on a per cow basis on the dairy line.

GUIDE FARM Calculation 10. Estimating Total Expanded Investment					
Type of Investment I	Acres or Cows <u>1/</u> II	Multiply by <u>2/</u> III	Present Investment IV	New Investment V	Total Present and New VI
		\$	\$	\$	\$
LAND					
1. Present for Dairy	50 cows	26	1,300	XXX	
2. Present for Crops	410 t.a.	285	116,850	XXX	
3. New Purchases	-	-	XXX	-	118,150
IMPROVEMENTS					
4. Present for Dairy	50 cows	323	16,150	XXX	
5. Present for Crops	410 t.a.	60	24,600	XXX	
6. New Facilities	XXX	XXX	XXX	74,800	115,550
MACHINERY					
7. Present for Dairy	50 cows	182	9,100	XXX	
8. Present for Crops	410 t.a.	91	37,310	XXX	
9. New Purchases	XXX	XXX	XXX	40,000	86,410
LIVESTOCK - see schedule 11					
10. Present Livestock	50 cows		46,450	XXX	
11. Additional Livestock	50 cows		XXX	46,450	92,900
FEED & SUPPLIES					
12. Present feed & supp	50 cows	104	5,200	XXX	
13. Additional feed & supp.	50 cows	126	XXX	6,300	11,500
14. Present New and Total Investment	XXX	XXX	256,960	167,550	424,510

1/ Use number of cows and acres presently on the farm to compute present investment.

2/ Use farmer's values or Table 11 values.

IMPROVEMENTS

Improvements investments include buildings, site preparation, fences, tile and water systems. The first step in establishing improvements investment is to get an estimate on existing facilities. The present buildings are normally used in one form or another as part of the expanded operation and will make up a portion of the total improvement investment. The better estimate is the depreciated value taken directly off the dairyman's records. The value of present improvements should be entered in column IV, lines 4 and 5 of Schedule 10.

In the absence of better information it is suggested that the values per acre and per cow from Table 11 be used to estimate the value of improvements prior to expansion. The crops improvements in this estimate includes silos and other feed storages.

Step 2 is to determine the cost of the enlarged or new facilities. Prior to expansion of the dairy herd, the facilities to be built should be given considerable thought and planned in detail. It is not necessary, however, to have a finished housing plan to accurately budget expected income.

One method to determine anticipated investment on new facilities is to draw the barn plans and estimate construction costs or obtain bids based upon the completed plan. A second--and much faster system--is to use estimated cost figures like those developed by C. R. Hoglund and shown in Tables 12 through 16. Investments for milking parlors and equipment are shown in Table 12. Investments for open lot, cold covered and warm enclosed dairy housing are included in Tables 13 and 14. Feeding systems investments are listed in Table 15. Waste handling systems investments are found in Table 16.

Table 12. Investments For Three Herringbone Parlor Sizes and Four Levels of Mechanization, 1975 Costs^{1/}

Item	Double 4 Herringbone	Double 6 Herringbone	Double 8 Herringbone
	\$	\$	\$
Investments			
Base system ^{2/}	20,200	25,350	29,800
Parlor ^{3/}	15,000	19,000	23,400
Plus			
Power gate	3,800	3,800	3,800
Feedbowl covers	1,000	1,500	2,000
Detaching units ^{3/}	11,600	16,500	20,000
Accumulated totals			
Base system & parlor	35,200	44,350	53,200
Plus			
Power gate	39,000	48,150	57,000
Feedbowl covers ^{4/}	40,000	49,650	59,000
Detaching units ^{5/}	51,600	66,150	79,000

Source: Daily Systems Analysis Handbook, by C. R. Hoglund.

^{1/}Adapted from Bickert, et al. Study (1) adjusted for changes in milking rates and to 1975 costs.

^{2/}Base equipment includes stalls, feeders, feed distribution and storage, pipeline milking system with one unit per two stalls, ventilation, plumbing, hot water, electrical and other.

^{3/}An additional milker unit per two stalls is included in detaching unit cost.

^{4/}Includes power gate and feedbowl covers.

^{5/}Total investment is for a semi-automated parlor including power gate, feedbowl covers and detaching units.

TABLE 13. Unit Space Requirements and Costs for Free Stall Open Lot and Covered Housing Systems, 100-200 Cow Capacity Systems, 1975 Costs

Item	Unit	Free Stall Open Lot	Free Stall Covered Housing	
Free Stalls	Number	100	100	150-200
Requirements/free stall				
Barn structure ^{1/}	Square feet	45-55	72-100 ^{2/}	72- 95 ^{2/}
Concrete alleys and floors	Square feet	20-25	55- 70 ^{2/}	55- 65 ^{2/}
Concrete lot or slab ^{3/}	Square feet	100	0- 20	0- 15
Feed bunk, one side	Linear feet	2/cow + 10 ft.	2	2
Feed bunk, both sides	Linear feet	1/cow + 10 ft.	1	1
Mechanical feeder	Linear feet	1/cow + 10 ft.	1	1
Free stalls	Number	1/cow	1/cow	1/cow
Costs per unit				
		Dollars	Dollars	Dollars
Barn structure	Square foot	2.80	3.00	3.00
Concrete alleys and floors	Square foot	1.25	1.25	1.25
Concrete lot or slab	Square foot	.90	.90	.90
Feed bunk, one side	Linear foot	18.00	15.00	15.00
Feed bunk, both sides	Linear foot	21.00	18.00	18.00
Mechanical feeder ^{4/}	Linear foot	27.00	27.00	25.00
Free stalls steel ^{5/}	Each	50.00	50.00	50.00
wood ^{5/}	Each	35.00	35.00	35.00
Insulation ^{6/}	Free stall	--	110.00	105.00
Mechanical ventilation ^{6/}	Free stall	--	40.00	38.00
Heated waterers	Each	220.00	220.00	220.00

Source: Dairy Systems Analysis Handbook, by C. R. Hoglund.

^{1/} Clear span building with 6" x 6" pressure treated poles, 8' O.C., trusses 4' O.C., 28 GA steel, 2 oz. galvanized coating or 1" T & G lumber for sides, corrugated steel or aluminum roofing, lift panels in alternative bays both front and back and 3 or 4, 10 ft.-12 ft. wide sliding doors.

^{2/} Low requirement is for high density housing as described by Robert Light, University of Massachusetts.

^{3/} For covered housing, areas used for manure handling and loading, and outside lot for cows.

^{4/} Complete conveyance system including drive unit, motor and delivery mechanism. Costs are for 12" auger and travel feeders. Costs for belt feeders are about \$20 more per foot of front area.

^{5/} Includes cost of concrete in which stalls are imbedded and attachments for front end of stalls.

^{6/} For warm enclosed housing only.

TABLE 14. Estimated Investments for Open Lot and Covered Free Stall Housing Systems, 100, 150, and 200 Cows, 1975 Costs

Item	Free Stall Open Lot	Free Stall Covered Housing		
	100	100	150	200
Number of Free Stalls	100	100	150	200
Investments, conventional <u>1/</u>	Dollars	Dollars	Dollars	Dollars
Barn structure	14,000	27,000	40,500	54,000
Concrete alleys and floors	2,750	8,125	11,625	15,500
Concrete lot or slab <u>2/</u>	9,000	1,350	1,520	1,800
Feed bunk (feed both sides)	2,310	1,800	2,700	3,600
Mechanical feeders <u>3/</u>	2,970	2,700	3,900	5,000
Free stalls, steel	5,000	5,000	7,500	10,000
Water system and wiring	4,000	4,000	4,800	5,600
Total Investments	40,030	49,975	72,545	95,500
Per Cow	400	500	483	478
Investments, high density <u>1/</u>				
Barn structure		21,600	32,400	43,200
Concrete alleys and floors		6,500	9,300	12,400
Concrete lot or slab <u>2/</u>		1,350	1,520	1,800
Feed bunk (feed on one side)		1,600	2,400	3,200
Mechanical feed wagon		6,000	7,500	9,000
Free stalls, steel		5,000	7,500	10,000
Water system and wiring		4,000	4,800	5,600
Total Investments		46,050	65,420	85,200
Per Cow		460	436	426
Additional investments for: Insulation and mech. vent.		15,000	22,000	28,600
Total Investments <u>4/</u>		64,975	94,545	124,100
Per Cow		650	630	621

Source: Dairy Systems Analysis Handbook, by C. R. Hoglund

1/ Investments based on 90 square feet per cow for conventional and 72 square feet per cow for high density covered housing and 50 square feet per cow for open lot, free stall housing.

2/ Based on 100 sq. ft./cow for open lot and 15 sq. ft./cow for covered housing.

3/ Based on using auger or travel feeders. Investment does not include equipment to convey feed from storage into mechanical feeder.

4/ For conventional warm enclosed housing.

Table 15. Quantities of Feed Storage Needed and Investments for Fixed and Mobile Feeding Systems
Adapted to Group Feeding, 100, 150, and 200 Cows, 1975 Costs

Item	Fixed Feeding System			Mobile Feeding System		
	100 Cows	150 Cows	200 Cows	100 Cows	150 Cows	200 Cows
Feed storage requirements <u>1/</u>						
Corn silage, T.	1,200	1,800	2,400	1,200	1,800	2,400
Haylage, T.	600	900	1,200	600	900	1,200
High moisture shelled corn, bu.	8,500	12,750	17,000	8,500	12,750	17,000
Silo sizes						
Corn silage	(2) 22' x 60'	(2) 26' x 70'	(2) 30' x 70'	(2) 22' x 60'	(2) 26' x 70'	(2) 30' x 70'
LMS	20' x 60'	24' x 60'	26' x 70'	20' x 60'	24' x 60'	26' x 70'
Shelled Corn	16' x 60'	20' x 55'	22' x 60'	16' x 60'	20' x 55'	22' x 60'
Investments	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Silos, corn silage & LMS <u>2/</u>	33,725	49,925	63,165	33,725	49,925	63,165
Silos, high moisture grain <u>2/</u>	7,300	9,200	11,875	7,300	9,200	11,875
Unloaders, silage <u>2/</u>	6,100	6,965	7,600	6,100	6,965	7,600
Unloaders, high moisture grain <u>2/</u>	2,570	2,850	3,250	2,570	2,850	3,250
Mechanical conveying equipment	2,800	2,800	2,800	2,800	2,800	2,800
Feed bunk	1,800	2,700	3,600	3,000	4,500	6,000
Mechanical feeder <u>3/</u>	2,800	3,900	5,000			
Feed room, mix & weight equip. <u>4/</u>	5,700	5,700	5,700	2,850	2,850	2,850
Mechanical mixing wagon				6,000	7,500	9,000
Wider feeding alleys <u>5/</u>				1,500	2,250	3,000
Total Investments	62,795	84,040	102,990	65,845	88,840	109,540
Per Cow	628	560	515	658	592	547

Source: Dairy Systems Analysis Handbook, by C. R. Hoglund.

1/ Based on annual feed inputs per cow of 12T. 32% DM corn silage, 6 T. 40% DM low moisture alfalfa silage (LMS) and 85 bu. high moisture shelled corn. Assumes that silo storing LMS is refilled after summer feeding.

2/ Based on using concrete tower silos. Investments in sealed storage would be somewhat more than doubled.

3/ Using auger or shuttle feeders. Belt feeders would add about \$20 to investments per cow.

4/ Feed room for all systems, and mixing and weighing equipment for fixed system.

5/ Assumes need for wider building to accommodate mechanical feeding wagon.

TABLE 16. INVESTMENTS FOR MANURE HANDLING SYSTEMS
Free Stall and Stanchion Barns, Per Cow

Barn and System	Investment Dollars Per Cow		
Free Stall Systems:			
Number of Cows	<u>100</u>	<u>150</u>	<u>200</u>
Solid Systems			
Daily Spreading	\$ 68	\$ 56	\$ 52
6 months Storage	206	181	166
Liquid Systems			
Below Building Storage			
Tractor Scraper	459	417	388
Mechanical Scraper	505	450	416
Slotted Floor	480	434	408
Slurry-Outside Storage			
Silo Storage	341	275	248
Earthern Storage	300	245	215
Stanchion Barn Systems:			
Number of Cows	<u>40</u>	<u>75</u>	<u>100</u>
Solid			
Gutter Cleaner	\$135	\$100	\$ 94
Gutter Cleaner-Stacker	392	300	274
Liquid			
Hydraulic Flushing	467	330	302
Basement Storage	552	458	437

Source: Dairy Systems Analysis Handbook, by C. R. Hoglund.

MACHINERY

Ideally the value of machinery presently on the farm will be obtained from the dairyman's depreciation schedule. The value obtained should be entered in Schedule 10, column V, lines 7 and 8. The machinery investment includes machinery used for crops (plow, drill, corn picker, etc.) and equipment for the dairy herd (bulk tank, milker, feed auger, etc.). It is not necessary to make the distinction if the pieces of crop and dairy equipment are mixed within the dairyman's depreciation schedule.

To the value of present machinery must be added the investment cost of new equipment. Some estimates of the cost of dairy equipment are given in Tables 12 through 16 along with the cost of dairy improvements. There is usually an increase in the crop machinery needed as the herd is expanded--either from farming more acres to feed the herd or a shift in the kinds of crops grown. Herd expansion frequently is associated with an increase in the number of acres worked and/or a shift to more silage. These changes should be considered and reflected in the new machinery purchases.

LIVESTOCK

The livestock inventory for the expanded herd has previously been determined in Schedule 2, column III, line 8. It is necessary to divide this value between present livestock inventory and additional livestock so that interest costs may be determined. The division is done in Schedule 11 by dividing the total livestock inventory of the expanded herd by number of cows in the expanded herd. The result is the inventory value of a cow and her replacement. This figure may be multiplied by the size of the existing herd to get the present inventory value. Enter the value determined in Schedule 10 under Livestock inventory.

Schedule 11. Dividing Value of Livestock Between Existing and Additional Livestock Inventory.

Inventory Value
of Expanded Herd

÷

Number of Cows
in Expanded Herd

=

Livestock Investment
per Cow and Replacement

Livestock Investment
per Cow and Replacement

x

Number Cows in
Present Herd

=

Present Livestock
Investment

Inventory Value
of Expanded Herd

-

Present Livestock
Investment

=

Additional Livestock
Investment

FEED AND SUPPLIES

This budgeting plan assumes that the feed belongs to the cropping program until it is fed. Unless better information is available, it is suggested that the investment may be estimated at \$100 to \$125 per tillable acre (Table 11). If you are planning a farm where all of the feed is purchased, this total probably will be less to the extent that feed is purchased "hand to mouth." Some farms that buy most of their feed pay for very little of it until after it has been fed.

GUIDE FARM Calculation 11. Livestock Inventory Value of the Existing Herd and for Addition Cows.

$$\begin{array}{rcl} \text{Inventory Value} & & \text{Livestock Investment} \\ \text{of Expanded Herd} & & \text{per Cow and Replacement} \\ \$92,900 & \div & 100 = \$929.00 \end{array}$$

$$\begin{array}{rcl} \text{Livestock Investment} & & \text{Present Livestock} \\ \text{per Cow and Replacement} & & \text{Investment} \\ \$929.00 & \times & 50 = \$46,450 \end{array}$$

$$\begin{array}{rcl} \text{Inventory Value} & & \text{Additional Livestock} \\ \text{of Expanded Herd} & & \text{Investment} \\ \$92,900 & - & \$46,450 = \$46,450 \end{array}$$

EXPENSES

The determination of anticipated production, income and investments has been completed. It is time to establish the expenses for the expanded dairy operation. For budgeting purposes, expenses have been divided into eight categories shown in Schedule 22. This separation makes it easier to grasp the organization of the dairy farm. The separate schedule for each of the 8 categories follows schedule 12. A breakdown into slightly different categories shown in Table 17 points out the relative importance of the various costs.

Expenses have also been separated into cash and non-cash expense. A division of this kind allows for the calculation of net cash income, the use of a cash flow analysis and the computation of management and labor incomes.

Table 17. Percent of Total Non-Feed Cost in Each Major Expense Category. Telfarm, 1973

Type Expense	Cash Expense	Non-Cash Expense	Total Expense
- - - -Percent of Total- - -			
Labor	7.3	20.6	27.9
Improvements	3.6	6.9	10.5
Machinery	9.6	12.1	21.7
Crop	11.2	1.4	12.6
Livestock	10.2	3.4	13.6
Land charge	5.9	5.3	11.2
Other	2.5	- - -	2.3
Total Non Feed	50.3	49.7	100.00

LABOR REQUIREMENTS AND COST

Sufficient labor must be budgeted into the program to perform all tasks and management functions. Normally this will include care for the dairy herd, raise replacements and production of feed. If some of these operations are excluded i.e. -- purchase of a part or all of the feed, the labor requirements will be affected. The method provided for determining labor allows requirements to change as enterprises change. Table 18 consists of a list of expected hours of labor based upon the number of animals and acres of various kinds of crops. The values listed reflect the greater efficiency experienced with large herds and increased acreage.

Table 18. Hours per Acre and per Head for Different Sized Crop and Livestock Enterprises

CROPS									
	Acres to be Grown								
	20	40	60	80	100	150	200	300	400
	HOURS PER ACRE								
Corn silage	10.3	8.8	8.4	8.1	8.0	7.8	7.7	7.6	7.5
Hay/Haylage	13.7	12.5	12.1	11.9	11.8	11.6	11.5	11.4	11.4
New seeding (alone)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Corn	7.9	6.7	6.3	6.0	5.9	5.8	5.7	5.6	5.5
Small grain	6.5	4.3	3.6	3.2	3.0	2.7	2.5	3.3	2.3
Soybeans	7.6	5.3	4.5	4.1	4.0	3.7	3.5	3.3	3.3
Field beans	10.6	8.6	7.9	7.5	7.3	7.1	7.0	7.0	7.0
Sugar beets	32.2	23.5	20.7	19.2	18.4	17.2	17.0	16.5	16.0

LIVESTOCK									
Dairy									
Number of cows	30	40	60	80	100	150	200	300	400
Hours per head	96	82	68	61	57	51	48	46	44
Beef Feeders									
Number of feeders	30	40	60	80	10	150	200	500	1000
Hours per head	21	14	11	10	9	8	7	6	6

SCHEDULE 12. Estimating Labor Requirements

I	Acres Number II	Hours	
		<u>Acre</u> <u>Head</u> III	Total IV
Corn silage			
Hay equivalent			
Corn			
Small grain			
Soybeans			
Field beans			
Sugar beets			
Sub Total on Crops			
add 10% for overhead labor			
Total on Crops			
Dairy cows			
Beef feeders			
Sub Total on Livestock			
add 10% for overhead labor			
Total on Livestock			
Total Hours of Labor			
Men equivalent (Hours ÷ 3000)			
Operators Labor			
Family Labor			
Total Unpaid Labor			
Hired Labor			
			TOTAL

Required labor is figured in Schedule 12. Number of animals and acres of crops may be brought forward from Schedules 1 or 2 and 6 and entered in column II. Hours are estimated or taken from Table 18 and entered in column III.

Hours should now be multiplied by cows or acres to get total hours for each crop and live-stock enterprise. Hours for crops is obtained by summing individual crop hours plus a 10% overhead charge

	Wages per Hour V \$	Labor Cost VI \$
TOTAL LABOR COST		

GUIDE FARM. Calculation 12. Labor Requirements

I	Acres Number II	Hours	
		Acre Head III	Total IV
Corn silage	103	8.0	824
Hay equivalent	140	11.8	1,652
Corn	127	5.9	749
Small grain	40	4.3	172
Soybeans	-	-	-
Field beans	-	-	-
Sugar beets	-	-	-
Sub Total on Crops			3,397
add 10% for overhead labor			340
Total on Crops			3,737
Dairy cows	100	57	5,700
Beef feeders	-	-	-
Sub Total on Livestock			5,700
add 10% for overhead labor			570
Total on Livestock			6,270
Total Hours of Labor			10,007
Men equivalent (Hours ÷ 3000)			3.3
Operators Labor	3,100		
Family Labor	850		
Total Unpaid Labor	3,950		
Hired Labor	6,057		
TOTAL LABOR COST			32,837.50

is added to get total crop hours. The same procedure is followed for livestock hours: The two sums - crop and livestock - are added to obtain the total labor hours required for the farm. We must now consider the total labor hours available. Total labor hours available should equal the sum of hours required for the crop and livestock enterprises plus any off-farm work. This is called the labor balance. It looks like Calculation 13. If the uses of labor exceeds the sources of labor, plan to hire more labor or cut back on some of the enterprises. If all the operator plus family labor is not used by this plan, the excess hours could be "sold" in the form of off-farm labor. Fill in schedule 13.

Wages per Hour V	Labor Cost VI
\$	\$
3.25	10,075.00
3.25	2,762.50
	12,837.50
	20,000.00
TOTAL LABOR COST	32,837.50

SCHEDULE 13: Labor Balance (in hours)

Sources of Labor

Operator	_____
Unpaid family labor	_____
Hired labor	_____
Total hours	_____

Uses of Labor

Crop enterprise	_____
Livestock enterprise	_____
Off-farm work	_____
Total hours	_____

=

CALCULATION 13: Labor Balance (in hours)

Sources of Labor

Operator	3,100
Unpaid family labor	850
Hired labor	<u>6,057</u>
Total hours	10,007

Uses of Labor

Crop enterprise	3,737
Livestock enterprise	6,270
Off-farm work	<u>-</u>
Total hours	10,007

Now return to Calculation 12. Hired labor on the farm is generally not paid by the hour but rather by the month. The labor hired for the farm is the residual after total unpaid labor (3,950 hours) is subtracted from the total labor requirements (10,007 hours). A sufficient number of men must be hired to cover this residual (of 6,057 hours). Next, wage rates must be established. Wages entered for hired labor should reflect the current cost. In the GUIDE FARM Calculation 12 a rate of \$3.25 per hour was allowed for unpaid labor. A charge must be made for unpaid labor if management and labor incomes are to be determined at a later point in this budget. After completing schedule 12, the cost of labor established should be entered below in Schedule 21. Unpaid operator and family labor should be recorded under non-cash expense (column II, Lines 1 and 2, respectively). Hired labor is a cash expense and is entered in column I, Line 3.

IMPROVEMENT EXPENSES

Schedule 14 is for the three types of improvements costs: repairs, depreciation and insurance. Logically, the interest charges on improvements could be included as a part of improvement expense. In this budget guide interest charges are made on the total investment without regard to the type.

SCHEDULE 14. Estimating Farm Improvements Expenses.

1. Repairs	Present value of improvements x 2	\$ _____			
	Plus cost of new improvements	\$ _____			
	Total estimated improvement cost	\$ _____	X	.016 =	\$ _____
2. Depreciation	Total estimated improvement cost	\$ _____	X	15% =	\$ _____
3. Insurance	Value after expansion of:				
	Improvements	\$ _____			
	Machinery	\$ _____			
	Livestock	\$ _____			
	Feed & Supplies	\$ _____			
	TOTAL VALUE	\$ _____	X	.75 X	ins. rate .0085 = \$ _____

GUIDE FARM. Calculation 14. Estimating Farm Expense

1. Repairs	Present value of improvements x 2	\$ <u>81,500</u>			
	Plus cost of new improvements	\$ <u>74,800</u>			
	Total estimated improvement cost	\$ <u>156,300</u>	X	.016 =	\$ <u>2,501</u>
2. Depreciation	Total estimated improvement cost (from above)	\$ <u>156,300</u>	X	.15% =	\$ <u>23,445</u>
3. Insurance	Value after expansion of:				
	Improvements	\$ <u>115,550</u>			
	Machinery	\$ <u>86,410</u>			
	Livestock	\$ <u>92,900</u>			
	Feed & Supplies	\$ <u>11,500</u>			
	TOTAL VALUE	\$ <u>306,360</u>	X	.75 X .0085 =	\$ <u>1,953</u>

Repairs: If desired, the cost of upkeep and repairs on improvements may be estimated by the method shown in Schedule 15. The present value of improvements (found in Schedule 10, column IV, lines 5 and 6) is multiplied by 2 and added to the cost of new improvements (Schedule 10, column V, line 7). The rate of repairs is normally about 1.6 percent of the original cost. Present improvements are multiplied by 2 on the assumption they are 50 percent depreciated. If the dairy farmer has a record of upkeep on present buildings, one could project repairs for new improvements from past experience.

Depreciation: It is generally suggested that improvements should be depreciated in no more than 15 years in the face of today's changing technology. Yet, few

buildings are actually depreciated this rapidly on farm account records. An average depreciation rate of 15 percent was used in Schedule 14. To use the schedule, bring total estimated improvement costs down from directly above and multiply by .15. Any rate of depreciation desired may be substituted.

Insurance: The investment values needed to compute insurance cost are in Schedule 10, column VI. Enter the investment totals for improvements (line 6), Machinery (line 9), livestock (line 11), and feed and supplies (line 13). If the budget guide is followed, insurance cost will be computed at \$8.50 per \$1,000 on 75 percent on the original investment.

SCHEDULE 15. Estimating Machinery Expenses. 1/

1. Repairs	Present value of machinery X 2	\$ _____		
	Plus the cost of new machinery	\$ _____		
	Total estimated machinery cost	\$ _____	X .04 =	\$ _____

2. Depreciation	Total estimated machinery cost (from above)	\$ _____	X .10 =	\$ _____
-----------------	---	----------	---------	----------

3. Fuel for power Transport & Truck & auto Lisc., reg., etc.	Power units from Schedule <u>15</u>	_____	X <u>2/</u> =	\$ _____
--	--	-------	---------------	----------

4. Custom Hire (estimate according to your plan) \$ _____

- 1 Obtain present value of machinery, cost of new machinery from Schedule 10.
- 2 Use the following amount per power unit in computing item 3.
For farms with less than 160 tillable acres use \$1.20; 160 to 259 use \$1.06; 260 to 359 use \$1.00; 360 to 459 use \$0.94; 460 and over use \$0.88.

GUIDE FARM Calculation 15. Machinery Expense

1. Repairs	Present value of machinery x 2	\$ 92,820		
	Plus the cost of new machinery	\$ 40,000		
	Total estimated machinery cost	\$ 132,820	x .04	= \$ 5,313
2. Depreciation	Total estimated machinery cost (from above)	\$ 132,820	x .10	= \$ 13,282
3. Fuel for power Transport & Truck & Auto Lisc., reg., etc.	Power units from Schedule 16	5,148	x .94	= \$ 4,839
4. Custom Hire (Estimate according to your plan).....				0

MACHINERY EXPENSE

The cost of owning and operating machinery is divided into three categories: repairs, depreciation and fuel plus miscellaneous. Custom hire is also included under machinery expense. Interest charges are computed for all investments later in the guide.

Repairs:

The expense of machinery repair is arrived at in the same manner as improvement repairs. As shown in Calculation 15, line 1, the present value of machinery (Schedule 10, column IV, lines 7 and 8) is doubled and added to the cost of new machinery (Schedule 10, column V, line 9). Total estimated machinery cost is multiplied by 4 percent to get the anticipated machinery repairs.

Depreciation:

Machinery is being depreciated at an average rate of 10 years (10 percent) by the budget guide. Some pieces of machinery last and are functional longer than this -- i.e., disc, cultipacker, etc., while other pieces can be expected to be replaced in 6 to 8 years (feed auger, forage chopper, etc). The individual using the budget guide is free to determine his own rate of depreciation on machinery.

In using Schedule 15 to determine machinery depreciation, enter the total estimated machinery cost in line 2 and multiply by 10 percent.

Carry Schedule 15 entries forward to Schedule 21.

Fuel for power and transport:

To compute the cost of fuel and transport expense, it is necessary to make use of Schedule 16 and establish power units for the farm in question. Power units serve as a common denominator for tractor power and transportation in producing crops and taking care of livestock. These units -- as with other rates for improvement and machinery expense -- were arrived at from Telfarm data on Southern Michigan dairy farms.

Enter the average number of dairy cows (from Schedule 1) into column II, line 1 of Schedule 16 and multiply by 6.0. The acreages (from Schedule 6, column II) are entered and multiplied by the given power units. Units are to

Schedule 16. Estimating Power Units			
Item I	Head, acres, etc. II	Units per head, acre III	Total units IV
1. Average Number Dairy Cows		6.0	
2. Hay		8.0	
3. Corn Silage		15.8	
4. Small Grain		10.1	
5. Corn		11.0	
6. Soybeans		12.5	
7. Beans		14.2	
8. Sugar Beets		17.1	
9. TOTAL			

GUIDE FARM Calculation 16. Power Units			
Item I	Head, acres, etc. II	Units per head, acre III	Total units IV
1. Average Number Dairy Cows	100	6.00	600
2. Hay	140	8.00	1120
3. Corn Silage	103	15.8	1627
4. Small Grain	40	10.1	404
5. Corn	127	11.0	1397
6. Soybeans	--	12.5	--
7. Beans	--	14.2	--
8. Sugar Beets	--	17.1	--
9. TOTAL			5148

be totaled and entered in line 9 of Schedule 16 and in line 3 of Schedule 15. Once the power units have been entered into line 3, they are to be multiplied by a price which varies according to size of farm. For farms with less than 160 tillable acres, use \$1.20; 160 to 259 use \$1.06; 260 to 359 use \$1.00; 360 to 459 use 94¢; 460 and over use 88¢. The product arrived at is the anticipated cost of gas, diesel fuel, oil, truck and auto expense, registration, etc.

Custom hire:

The cost of custom work is dependent upon the organization of the farm being budgeted. On many farms, little custom work is employed. On others, a major portion of the harvesting may be by custom hire. It will be necessary to establish the dairyman's plans regarding custom hire and enter the expense accordingly.

CROP EXPENSE

The expense of producing crops may be determined by at least 3 methods: (1) use information from the dairyman's records; (2) calculate fertilizer, lime, seed, herbicide, pesticide and other expense separately; (3) estimate expense based upon kind and quantity of crops with consideration given to soil potential. The latter method has been chosen for the budget guide (in the case where the dairyman's records are not used).

Table 19 lists expected costs for the more common crops grown. These costs are for all fertilizer, lime, seed and spray expense for each crop.

To estimate the crop expense for a particular farm by this method, enter acres (from Schedule 6) and the estimate of the charge per acre for each

Table 19. Crop Expense per Acre as Determined by Type Crop & Land Quality

Crop	Crop Fed Expense Per Acre		
	Yield Potential of Land		
	Lower	Mid	Higher
Corn	\$36	\$56	\$63
Oats	26	-	38
Oatlage	-	38	-
Hay	22	-	28
Pasture	0	-	3
Barley	-	39	-
Haylage	22	-	28
Corn Silage	51	68	80
Wheat	39	48	49

Schedule 17. Establishing Crop Expense

Crop	Acres	Crop Expense Per Acre	Total
I	II	III	IV
Corn			
Oats			
Wheat			
Hay			
Pasture			
Beans			
Beets			
TOTAL		XXX	

GUIDE FARM Calculation 17. Crop Expense

Crop	Acres	Crop Expense Per Acre	Total
I	II	III	IV
Corn	230	\$56	\$12,880
Oats	-	-	-
Wheat	40	49	1,960
Hay	140	25	3,500
Pasture	-	-	-
Beans	-	-	-
Beets	-	-	-
TOTAL		XXX	18,340

crop in Schedule 17. The products of the two values should be summed and entered into Schedule 21 under cash expense for crops and under total crop expense (Column III).

LIVESTOCK EXPENSE

Schedule 18 is provided for calculating livestock expenses. Once established, they may be transferred to Schedule 21, lines 17 through 20.

Breeding Expense:

The fee paid to the inseminator or the cost of purchasing semen and maintaining a nitrogen bottle is the breeding expense. Where actual costs are not available, use the cost as reported by 1974 Telfarm Cooperators -- \$6 to \$19, with a \$12.21 average per cow. The lower figure might best be used for those breeding only their mature cows artificially.

If all cows are bred by natural service, no cost will be shown for breeding expense. It will not show in this budget -- unless an adjustment is made -- but in actual practice, the cost of maintaining a bull is normally as great as maintaining a cow (additional feed, labor, facilities, veterinary and medicine expense, and interest on investment).

Veterinary and Medicine Expense:

Veterinary and medicine expense varies widely between farms and from year to year on the same farm. It is higher on herds with high production than on herds with low production. Table 20 shows Telfarm summary costs for 1974.

Table 20. Veterinary and Medicine Cost
1974 Michigan Dairy Telfarmers

Production Per Cow	Vet. and Medicine Per Cow
Under 13,000 lbs.	\$23.68
13,000 lbs. and over	31.09

Marketing Expense:

Hauling, ADA, and in some cases amounts withheld for cooperative revolving funds are included in marketing expense. It also includes the cost of marketing livestock -- although this is a small part of the total. Cost varies with the level of production and location in the state.

The best estimate of marketing costs is the amount the dairyman has been paying as indicated on recent milk check stubs. Lacking this information, the amount can be estimated on the basis of the hundred weight of milk sold. In 1974, milk and other marketing costs ranged between \$0.40 and \$0.50 per cwt. of milk shipped.

Schedule 18 Determination of Livestock Expense				
BREEDING EXPENSE				
Per Cow Cost of Artificial Insemination	x	Number Cows	=	Breeding Expense
\$ _____	x	_____	=	_____
VETERINARY & MEDICINE				
Veterinary and Medicine Charge Per Cow	x	Number Cows	=	Veterinary & Medicine Expense
\$ _____	x	_____	=	_____
MARKETING EXPENSE				
Marketing Cost Per CWT	x	CWT Milk Sold Per Cow	x	Number Cows
\$ _____	x	_____	x	_____
			=	Marketing Expense
MISCELLANEOUS LIVESTOCK EXPENSE				
Per Cow Cost of Production Records	x	Number Cows	=	Production Record Expense
\$ _____	x	_____	=	_____
Milk House Supplies Per Cow	x	Number Cows	=	Cost of Milk House Supplies
\$ _____		_____		_____
TOTAL LIVESTOCK EXPENSE				

Other Livestock Expense:

Included in other expenses are cost of production records, registration fees, milk house supplies, etc. Production records vary in cost according to type of test.

The average annual per cow cost of the three record systems is \$6.21 for DHIA, \$4.38 for Owner Sampler and \$2.19 for Tri-Monthly Testing.

Milk house supplies include equipment, washing materials, filler pads, disinfectant, etc. It varies between farms, but Telfarm summaries indicate that \$10 to \$15 per cow is a fair estimate.

GUIDE FARM Calculation 18. Livestock Expense				
BREEDING EXPENSE				
Per Cow Cost of Artificial Insemination	x	Number Cows	=	Breeding Expense
\$ 12.00	x	100	=	\$ 1,200
VETERINARY & MEDICINE				
Veterinary and Medicine Charge Per Cow	x	Number Cows	=	Veterinary & Medicine Expense
\$ 31.00	x	100	=	\$ 3,100
MARKETING EXPENSE				
Marketing Cost Per CWT	x	CWT Milk Sold Per Cow	x	Number Cows
\$.50	x	130	x	100
			=	Marketing Expense
			=	\$ 6,500
MISCELLANEOUS LIVESTOCK EXPENSE				
Per Cow Cost of Production Records	x	Number Cows	=	Production Record Expense
\$ 6.50	x	100	=	\$ 650
Milk House Supplies Per Cow	x	Number Cows	=	Cost of Milk House Supplies
\$ 13.00		100		\$ 1,300
TOTAL LIVESTOCK EXPENSE				\$ 12,750

INTEREST EXPENSE

Interest cost is estimated in two components -- interest paid and interest on owned assets. These are determined in Schedule 19 and are recorded on lines 21 and 22 of Schedule 21. First enter the present investment from line 14, column IV of Schedule 10. This is the investment prior to expansion. Subtract from this the present indebtedness to determine the current value of owned assets. (The present indebtedness should be known by the farmer by referring to his records of loans, past due bills and other debts outstanding. On page 49 Schedule 23, lines 10-16 will list and total all liabilities. The total liabilities will be the figure to use in Schedule 19 for "Present Total Indebtedness."

The next step is to estimate the funds to be borrowed. The total new investment has been determined in Schedule 10, column V. Subtract from this the amount of the new investment that can be made from cash reserves and the balance will be the amount of new money that will have to be borrowed.

Schedule 19: Determination of Interest Costs										
Present Investment	-		Present Total Indebtedness	=		Present Owned Assets				
\$ _____	-		\$ _____	=		\$ _____				
New Investment	-		Cash Capital Purchases	=		Funds to be Borrowed				
\$ _____	-		\$ _____	=		\$ _____				
Present Owned Assets	+		Cash Capital Purchases	=		Owned Assets	x	Rate of Interest	= Interest on Owned Assets	
\$ _____	+		\$ _____	=		\$ _____	x	_____ %	= \$ _____	
[Present Indebtedness]		x	[Interest Rate]		+	[Funds to be Borrowed]		x	[Interest Rate] = Interest Paid	
[\$ _____]		x	[_____ %]		+	[\$ _____]		x	[_____ %] = \$ _____	

Interest on owned assets is calculated by adding the current value of owned assets to the cash capital purchases and multiplying by an acceptable rate of interest. In making the estimate for the guide farm, the rate of 7% was used.

Interest paid is determined by adding the interest paid on present indebtedness to the interest on the new money borrowed. The rate on these two components may vary widely. Due to the Modified Cash Flow Analysis at the end of the Budget Guide, it will be necessary to use the same interest rate on both present indebtedness and funds to be borrowed. This is because the old loans will be consolidated into one new plan. Most money lenders insist on consolidation of loans when refinancing for expansion.

PURCHASED FEED

This value has been determined in Schedule 5, column VII, line 9. Record it on Schedule 21, line 23.

OTHER COSTS

The four components under this item are cash rent of land, taxes, utilities and miscellaneous. Calculate in Schedule 22 and enter into Schedule 12.

GUIDE FARM Calculation 19. Determination of Interest Cost.						
Present Investment	-	Present Total Indebtedness	=	Present Owned Assets		
<u>\$256,960</u>	-	<u>\$46,790</u>	=	<u>\$210,170</u>		
New Investment	-	Cash Capital Purchases	=	Funds to be Borrowed		
<u>\$167,550</u>	-	<u>\$12,200</u>	=	<u>\$155,350</u>		
Present Owned Assets	+	Cash Capital Purchases	=	Owned Assets	x	Rate of Interest
<u>\$210,170</u>	+	<u>\$12,200</u>	=	<u>\$222,370</u>	x	<u>7%</u>
						= <u>\$15,566</u>
Present Indebtedness	x	Interest Rate	+	Funds to be Borrowed	x	Interest Rate
<u>\$46,790</u>	x	<u>10%</u>	+	<u>\$155,350</u>	x	<u>10%</u>
						= <u>\$20,214</u>

Rent:

The amount of land to be rented will be determined when the cropping program is being planned. Cash rent will usually vary from \$5 to \$30 an acre with an average of \$20.00 per acre, depending on location and land quality.

Taxes:

Suggested guides for estimating taxes, utilities and miscellaneous expense have been determined from Telfarm data. Taxes should be estimated at amount actually paid. If this is not known, it is suggested that a rate of \$9.00 per tillable acre owned be used. Income tax is not included in this figure.

Utilities:

Utilities including farm share of electricity and telephone averaged \$22.04 on Michigan dairy farms in 1974. If the farm being planned buys public water, it will be necessary to determine the cost of this item.

Miscellaneous Expense:

Miscellaneous expense averaged \$5.06 per cow on dairy farms enrolled in Telfarm. It includes accounting fees and legal fees.

Schedule 20. Establishment of Other Expense			
1. Tillable Acres	x	Rent per Acre	= Rent
_____	x	_____	= _____
2. Tillable Acres	x	Taxes per Acre	= Taxes
_____	x	_____	= _____
3. Number Cows	x	Utility Fee per Cow	= Utilities
_____	x	_____	= _____
4. Number Cows	x	Misc. Expense per cow	= Misc. Expense
_____	x	_____	= _____

GUIDE FARM Calculation 20 Other Expenses			
1. Tillable Acres	x	Rent per Acre	= Rent
__	x	__	= __
2. Tillable Acres	x	Taxes per acre (tillable)	= Taxes
410	x	\$9.00	= \$3,690
3. Number Cows	x	Utility Fee per Cow	= Utilities
100	x	\$22	= \$2,200
4. Number Cows	x	Misc. Expense per Cow	= Misc. Expense
100	x	\$5	= \$500

Schedule 21. Establishment of the Expanded Farm Expenses

		Cash Expense I	Non-Cash Expense II	Total Cost of Farm Production III
		\$	\$	\$
LABOR	1. Operator.....	XXX		
	2. Family.....	XXX		
	3. Hired		XXX	
IMPROVEMENTS	4. Repairs.....		XXX	
	5. Insurance		XXX	
	6. Depreciation	XXX		
MACHINERY	7. Repairs		XXX	
	8. Gas, Oil, Power & Trans.....		XXX	
	9. Custom Hire.....		XXX	
	10. Depreciation	XXX		
CROP EXPENSE	11. Fertilizer		XXX	
	12. Lime		XXX	
	13. Seed.....		XXX	
	14. Herbicide		XXX	
	15. Pesticide		XXX	
	16. Other (or total - schedule 18)		XXX	
LIVESTOCK	17. Breeding.....		XXX	
	18. Veterinary & Medi- cine		XXX	
	19. Marketing.....		XXX	
	20. Other		XXX	
INTEREST	21. Interest Paid.....		XXX	
	22. Interest on Owned Assets.....	XXX		
FEED	23. Purchased Feed		XXX	
OTHER COSTS	24. Rent		XXX	
	25. Taxes		XXX	
	26. Utilities.....		XXX	
	27. Miscellaneous		XXX	
TOTAL	28.			

GUIDE FARM Calculation 21. Establishment of the Expanded Farm Expenses

		Cash Expense	Non-Cash Expense	Total Cost of Farm Production
		I	II	III
		\$	\$	\$
LABOR	1. Operator	XXX	\$10,075	
	2. Family	XXX	2,762	
	3. Hired	\$20,000	XXX	\$32,837
IMPROVEMENTS	4. Repairs	2,501	XXX	
	5. Insurance.....	1,953	XXX	
	6. Depreciation	XXX	23,445	27,899
MACHINERY	7. Repairs	5,313	XXX	
	8. Gas, Oil, Power & Trans.	4,839	XXX	
	9. Custom Hire	---	XXX	
	10. Depreciation	XXX	13,282	23,434
CROP EXPENSE	11. Fertilizer		XXX	
	12. Lime		XXX	
	13. Seed		XXX	
	14. Herbicide		XXX	
	15. Pesticide		XXX	
	16. Other (or total - schedule 18)	18,340	XXX	18,340
LIVESTOCK	17. Breeding	1,200	XXX	
	18. Veterinary & Medicine	3,100	XXX	
	19. Marketing	6,500	XXX	
	20. Other	1,950	XXX	12,750
INTEREST	21. Interest Paid	20,214	XXX	
	22. Interest on Owned Assets .	XXX	15,566	35,780
FEED	23. Purchased Feed	17,278	XXX	17,278
OTHER COSTS	24. Rent	0	XXX	
	25. Taxes	3,690	XXX	
	26. Utilities	2,200	XXX	
	27. Miscellaneous	500	XXX	6,390
TOTAL	28.	109,578	\$65,130	\$ 174,708

CASH FLOW ANALYSIS

The objective of the modified cash flow analysis of the expanded farm is to determine if the operator will have sufficient cash available to meet his new annual loan payments. Fill in Schedule 22; note the following explanations.

Schedule 22. CASH FLOW ANALYSIS	
CASH INCOME AVAILABLE	
1. Beginning Balance of Cash on Hand	\$
2. Cash Operating Receipts	
3. Non-farm Income	
4. TOTAL CASH AVAILABLE	\$
CASH EXPENDITURES REQUIRED	
5. Cash Operating Expense minus Interest Paid (Line 28, col I minus line 21, col I, Sched. 21)	\$
6. Annual Capital Purchases (Cash not borrowed)	
7. Family Living	
8. Income and Personal Social Security Taxes	
9. Ending Balance of Cash on Hand	
10. TOTAL CASH EXPENDED	\$
11. DEBT PAYMENT CAPACITY PER YEAR (Line 4 - line 10)	\$

BEGINNING BALANCE OF CASH ON HAND: A business usually has cash in a checking account. This cash may be used for expansion needs. Place the present amount of cash on hand in this blank.

CASH OPERATING RECEIPTS: This will be from Schedule 9, line 11.

NON-FARM INCOME: A farmer may do custom machine work or have a business on the side, like selling seed corn. Spouses often work off the farm. Don't overlook these. They can be vital in bridging the cash gap in the early days of expansion.

CASH OPERATING EXPENSES: This will be taken from Schedule 21, line 28, column I.

CAPITAL PURCHASES: It is important in planning to estimate annual capital purchases needed to replace worn out or obsolete equipment or other capital items. Underestimating capital needs is one of the items overlooked or underestimated. However, for this item on this modified cash budget, only include the amount taken from cash on hand and not borrowed. This may be the same as "cash capital purchases" on Schedule 19.

FAMILY LIVING AND TAXES: The cash cost of family living varies widely among families. Put the expected family withdrawals on line 7. If a partnership, allow for withdrawals by all partners. Estimate the personal income plus Social Security taxes and place on line 8.

ENDING BALANCE OF CASH ON HAND: Make sure there is enough to cover daily operations and emergency needs.

DEBT PAYMENT CAPACITY: Debt payment capacity is what remains after subtracting cash expenditures from cash income and thus is the amount available to pay off debt.

It is now time to find out if the expansion will generate enough cash. Fill in Schedule 23. The annual loan payments in Schedule 23 are the total of interest and principal payments which must be made after the expansion is completed. The farmer may already know this as a result of talking with a money lender. Tables 21 and 22 may be used with the information from Schedule 19 if Schedule 25 is not yet completed.

Guide Farm Calculation 22. CASH FLOW ANALYSIS	
CASH INCOME AVAILABLE	
1. Beginning Balance of Cash on Hand	\$16,212
2. Cash Operating Receipts	139,112
3. Non-farm Income	--
4. TOTAL CASH AVAILABLE	\$155,324
CASH EXPENDITURES REQUIRED	
5. Cash Operating Expense minus Interest Paid (Line 28, col I minus Line 21, col. I, Sched. 21)	\$89,364
6. Annual Capital Purchases (Cash not borrowed)	12,200
7. Family living	12,000
8. Income and Personal Social Security Taxes	1,500
9. Ending Balance of Cash on Hand	4,012
10. TOTAL CASH EXPENDED	\$119,076
11. DEBT PAYMENT CAPACITY PER YEAR (Line 4 - line 10)	\$ 36,248

Schedule 23. IS EXPANSION POSSIBLE?	
Debt Payment Capacity (Schedule 22 line 11)	\$
MINUS Annual Loan Payments required (Schedule 25 line 16, after expansion)	
SURPLUS OR DEFICIT	\$

Guide Farm Calculation 23. IS EXPANSION POSSIBLE?	
Debt Payment Capacity (Schedule 22 line 11)	\$36,248
MINUS Annual Loan Payments required (Schedule 25 line 16, after expansion)	\$22,270
SURPLUS OR DEFICIT	\$13,978

Calculation 23 indicates this operator's plan will meet annual cash requirements.

FARM EARNINGS

Comparisons of profits among farms or between years on the same farm requires some measures of earnings. Schedule 24 helps figure the better measures. Net cash income has the most meaning as a major component of cash flow. Labor income measures the return to the farm operator for his labor and management. If management income is zero, the labor income will be the same as the amount that was arbitrarily charged against the business for the operator's labor. In the guide farm example, this was \$3.25 per hour.

Rate earned on investment is the percent that the return for investment and management is of the total operator's investment. Most managers become concerned if the rate earned does not exceed -- or at least equal the going rate of interest on farm loans.

SCHEDULE 24. Expanded Farm Earnings Summary

	Schedule	Column	Line	Amount
1. Total income	9		11	\$
2. Cash farm expenses	21	I	28	\$
3. Non-cash farm expenses	21	II	28	\$
4. Total expenses (line 2 + line 3)	21	III	28	\$
5. Net cash income (line 1 - line 2)				
6. Management income (line 1 - line 4)				
7. Labor income (line 6, Sched. 24, plus line 1, Sched. 21)				
8. Return on investment & management (line 6 plus lines 21 and 22, Sched. 12)				
9. Rate earned on investment (line 8 ÷ Sched. 10, col. VI, line 19)				

GUIDE FARM. Calculation 24. Expanded Farm Earning Summary

	Schedule	Column	Line	Amount
1. Total income	9		11	\$139,112
2. Cash farm expenses	21	I	28	\$109,578
3. Non-cash farm expenses	21	II	28	\$ 65,130
4. Total expenses (line 2 + line 3)	21	III	28	\$174,708
5. Net cash income (line 1 - line 2)				\$29,534
6. Management income (line 1 + line 4)				-\$35,596
7. Labor income (line 6, Sched. 24, plus Line 1, Sched. 21)				-\$25,521
8. Return for investment & management (line 6, plus lines 21 and 22, Sched. 21)				\$ 184
9. Rate earned on investment (line 8 ÷ Line 14, col. VI, Sched. 10)				0%

FINANCIAL STATEMENT

One of the best measures of business progress is the gain in net worth. To determine this requires a financial statement at the beginning and end of the accounting period such as Schedule 25. In our example, we have no definite time period between the "present" and "after expansion." It is customary

SCHEDULE 25. Expanded Farm Financial Statement				
Assets			Present	After Expansion
1. Cash on hand (same as line 1, Sched. 22)			\$	\$
2. Accounts Receivable and other assets				
3. Feed and supplies (Sched. 10, lines 12 & 13, Col. IV & VI)				
4. Dairy cattle (Sched. 10, lines 10 & 11, Col. IV & VI)				
5. Other livestock				
6. Machinery (Sched. 10, lines 7, 8, & 9, Col. IV & VI)				
7. Improvements (Sched. 10, lines 4, 5 & 6, Col. IV & VI)				
8. Land (Sched. 10, lines 1, 2 & 3, Col. IV & VI)				
9. TOTAL ASSETS			\$	\$
Liabilities	Annual Payments		Present Loans Outstanding	After Expansion Loans Outstanding
	Present	After Expansion		
10.	\$	\$	\$	\$
11.				
12.				
13.				
14.				
15.				
16. TOTALS	\$	\$	\$	\$
17. Net Worth (line 9 minus line 16)			\$	\$

to measure the net worth at the end of the accounting year. Schedule 25 provides a form for bringing the data together. By recording the annual payments for each debt, we generate information needed in our cash flow statement in Schedule 22.

It is assumed the operator will consolidate all his previous loans and thereafter pay monthly or annual installments to only one or two lenders. It is, therefore, necessary to sum the balances by group for long-term, intermediate and short-term loans. Add "funds to be borrowed" from Schedule 19 (\$155,350) to present loans outstanding from Schedule 25 (\$46,790) and place sum in the Schedule 25 after expansion column. These total \$202,140 for Calculation 23.

To find the annual principal payment (line 13, after expansion) on \$202,140, use Table 21. Once the operator knows the interest rate available to him and the time desired to pay the loan off, he can find the interest factor in Table 21, which will be multiplied by the loan amount to yield the annual payment required. In the GUIDE FARM, a rate of 10 percent for 25 years was used. This gives a factor of .11017 which is multiplied by \$202,140 giving \$22,270, the annual payment required. If monthly payments are desired, use Table 22 and follow the same method as in using Table 21.

GUIDE FARM. Calculation 25. Expanded Farm Financial Statement

Assets			Present	After Expansion	
1.	Cash on hand (same as line 1, Sched. 22)		\$ 16,212	\$ 4,012	
2.	Accounts Receivable and other assets		6,110	6,110	
3.	(Sched. 10, lines 12 & 13 Feed and supplies Col. IV & VI)		5,200	11,500	
4.	(Sched. 10, lines 10 & 11 Dairy cattle Col. IV & VI)		46,450	92,900	
5.	Other livestock		-	-	
6.	(Sched. 10, lines 7, 8, & 9, Machinery Col. IV & VI)		46,410	86,410	
7.	(Sched. 10, lines 4, 5 & 6 Improvements Col. IV & VI)		40,750	115,550	
8.	Land (Sched. 10, lines 1, 2 & 3, Col. IV & VI)		118,150	118,150	
9.	TOTAL ASSETS		\$279,282	\$434,632	
Liabilities		Annual Payments		Present Loans Outstanding	After Expan- sion Loans Outstanding
		Present	After Expansion		
10.	PCA	\$ 7,937	\$	\$ 21,300	\$
11.	Bank	4,732		10,100	
12.	FLB	4,068		15,390	
13.	SES Insurance Co. (Consolidated all loans)		22,270		202,140
14.					
15.					
16.	TOTALS	\$16,737	\$22,270	\$ 46,790	\$202,140
17.	Net Worth (line 9 minus line 16)		\$232,492	\$232,492	

CONCLUSIONS

If you have completed all the schedules, you have completed a detailed whole farm planning process for a dairy farmer considering expansion. One alternative plan has been analyzed. Guide farm calculations have been presented. The guide farm plan is not an acceptable plan. Schedule 23 indicated a surplus of cash, but Schedule 24 indicated negative management income, negative labor income and no real return on investment. By these standard earnings measures, the plan is a failure.

Should expansion take place on the guide farm? Advisors may find "no" too harsh an answer. After all, the guide farm plan was only one alternative. Other plans could be worked through. A better plan must be able to increase income or reduce expenses, or preferably both. More land might be purchased to increase crops sales, but the added expense must be considered also. Are the improvements more grandiose than necessary? Can capital investment be reduced without reducing income? Can used machinery be purchased instead of new machinery? Can the next two years be used to increase cow numbers so that when the improvements are finally purchased, cow purchases will not be needed? Could a spouse take a non-farm job without reducing the farm labor force? The guide farm was a plan for going from 50 to 100 cows. Would expanding to 75 cows, or 125 cows, be safer and more profitable?

The budget guide will help the reader analyze these questions. After the first plan is completed, adjusted plans can be readily calculated. Too much is at stake to be less than thorough.

Table 21. ANNUAL PAYMENT FACTORS TO AMORTIZE A LOAN OF \$1.00 - EVEN PAYMENT PLAN^{1/}

Period in Years	Annual Percentage Rate							
	4%	7%	8%	9%	10%	12%	15%	18%
2	.53020	.55309	.56077	.56848	.57620	.59170	.61512	.63872
3	.36035	.38105	.38803	.39507	.40212	.41635	.43798	.45993
4	.27535	.29523	.30192	.30870	.31548	.32924	.35027	.37174
5	.22463	.24389	.25046	.25713	.26380	.27741	.29832	.31978
6	.19077	.20980	.21632	.22297	.22961	.24323	.26424	.28592
7	.16661	.18555	.19207	.19874	.20541	.21912	.24037	.26237
10	.12330	.14238	.14903	.15589	.16275	.17699	.19926	.22252
12	.10656	.12590	.13270	.13973	.14677	.16144	.18449	.20863
15	.08995	.10979	.11683	.12415	.13148	.14683	.17102	.19641
20	.07359	.09439	.10185	.10966	.11746	.13383	.15977	.18683
25	.06402	.08581	.09368	.10193	.11017	.12750	.15470	.18292
30	.05784	.08059	.08883	.09746	.10608	.12415	.15231	.18127
35	.05358	.07723	.08580	.09475	.10369	.12232	.15114	.18056
40	.05053	.07501	.08386	.09306	.10226	.12131	.15057	.18025
Never (interest only)	.04000	.07000	.08000	.09000	.10000	.12000	.15000	.18000

Example: The equal annual payments on a 10-year loan of \$5,400 at 8% would be .14903 times \$5,400 equals \$804.76.

^{1/} Computed by the annuity formula

Source: Wright, K. T., and Telplan Program No. 32, Form 0.

Table 22. MONTHLY PAYMENT FACTORS TO AMORTIZE A LOAN OF \$1.00 - EVEN PAYMENT PLAN^{1/}

No. of Months	Annual Interest Rate						
	6%	8%	10%	12%	15%	18%	24%
2	\$.50384	\$.50500	\$.50631	\$.50755	\$.50940	\$.51130	\$.51506
3	.33678	.33790	.33907	.34019	.34190	.34361	.34706
4	.25317	.25420	.25524	.25630	.28787	.25946	.26263
5	.20304	.20403	.20503	.20605	.20757	.20910	.21216
6	.16962	.170589	.17156	.17256	.17404	.17553	.17853
7	.14575	.146697	.14766	.14864	.15009	.15155	.15451
8	.12785	.12879	.12974	.13070	.13314	.13360	.13652
9	.11393	.11491	.11579	.11675	.11817	.11961	.12252
10	.10279	.10371	.10465	.10560	.10700	.10844	.11132
12	.086080	.086995	.087917	.088860	.090260	.091683	.094562
15	.069336	.070282	.071198	.072129	.073528	.074947	.077827
18	.058241	.059144	.060058	.060986	.062386	.063808	.066704
21	.050290	.051192	.052106	.053034	.054438	.055868	.058786
24	.044328	.045230	.046146	.047071	.048487	.049926	.052872
27	.039692	.040596	.041514	.042448	.043867	.045317	.048294
30	.035985	.036891	.037812	.038751	.041179	.041641	.044651
36	.030427	.031338	.032268	.033216	.034665	.036154	.039234
42	.026460	.027379	.028317	.029277	.030750	.032265	.035418
48	.022489	.024415	.025363	.026335	.027831	.029376	.032602

Example: The monthly payments on a 12-month loan of \$650 at an annual interest rate of 10% would be \$57.15 (\$650 X .087917).

^{1/} Computed by the annuity formula

Source: Wright, K.T., and Telplan Program No. 32, Form 0.

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