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WHAT SIZE FARM ....?

.... IS REQUIRED TO PROVIDE AN ADEQUATE INCOME IN NORTH CENTRAL IDAHO

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MINIMUM FARM SIZES REQUIRED TO PROVIDE AN ADEQUATE INCOME ON NORTH CENTRAL IDAHO LAND

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What size farm is necessary to provide an income of $2500 for a family on cutover land in north central Idaho?

What size farm is necessary to earn a 5% return on the investment in land, equipment, and stock in addition to a $2500 family income?

How much does minimum farm size increase when there are farm debts to pay each year?

How much larger must the minimum farm be for a tenant as compared to a farm owner?

Does minimum farm size change with different enterprises?

These questions, and similar ones, are often asked of county agents and other personnel of the College of Agriculture and other farmer counseling services by people contemplating going into farming, by farmers who are considering a change of location, and by farmers who find that no matter what they do, they don't seem to be able to make an adequate income on the farms they are operating. The purpose of this paper is to help answer these questions in view of the findings of a recent research project carried on by the Department of Agricultural Economics of the University of Idaho. The findings were worked out for, and are directly applicable to, the cutover timber land of north central Idaho, specifically various areas of Latah and Nez Perce counties.

To answer these questions certain basic information concerning the farm in question is necessary:

First, soil. The type of soil and the rotations and yields must be known.

In the north central Idaho cutover area three general types of soil productivity predominate and were considered. For the purpose of this paper, we will call the types of soil productivity Area #1, Area #2, and Area #3. Each farmer of the area knows in which "Area" his soil would be classified. The soils of Area #1 will profitably support more grain, peas, and seed crops than forage crops in the rotations. The soils of Area #2 produce most profitably when forage crops are approximately equal to others in the rotations. The soils of Area #3 are best suited for a rotation in which forage crops predominate. In each of these areas there are some operations that utilize Forest Service range during the five summer grazing months.

Secondly, enterprise combinations. In addition to the limitations of soils, each farmer has a choice of the type of operation he wishes to manage. He can sell his grain or he can feed it; if he feeds it there is any number of combinations of types and numbers of animals to choose from. The most common enterprise combinations in the areas considered are: irrigated dairy, non-irrigated dairy, butterfat-hog, beef-hog, calf-hog, calf-crop, and beef-crop. For the purposes of this study the gross income per acre from each of the plausible enterprise combinations for each soil area was computed.

Thirdly, fixed costs. Fixed costs are those costs which do not vary significantly with the size of operation within the limits of the one-man farming operation being considered. They are costs that would be the same no matter how many acres, within the limitations of one man's labor, were cultivated. Fixed costs included in this study were depreciation, insurance and upkeep on buildings and equipment. (Fixed costs per farm for each enterprise combination on the different soil areas were computed.)

Fourthly, variable costs. Variable costs are those costs which vary according to the number of acres under cultivation and the type of enterprise

combination in use. Variable costs include taxes, seed, equipment, fuel, breeding fees, veterinary fees, medicine, insecticides, chemicals, feed supplements and electricity, and miscellanious supplies. The variable costs per acre for each enterprise-soil combination were computed.

Now, to compute the minimum number of acres necessary to provide an income of $2500 from any of the enterprise combinations in any particular soil area, it is only necessary to subtract the per acre costs from per acre gross income, which gives net return per acre. This in turn is divided into the sum of the fixed costs per farm plus $2500 net income desired. The result gives the minimum number of acres required to pay all costs, both fixed and variable, and provide a net income of $2500 yearly. It is easier to understand this when working with a concrete example. Table 1 shows in table form all the information necessary to compute the minimum acres required to provide a $2500 income from various enterprise combinations on different soil areas. Let's consider the dairy enterprise in Area #2. The gross income from milk produced on each acre is $67.36. Variable costs for each acre is $13.17. Variable costs subtracted from gross income gives a return of $54.19 per acre. Fixed costs per farm are $1647.00. If the operator wishes to net a $2500 income the farm will have to produce the $2500 income, plus $1647 to pay fixed costs, or $4147. $4147 divided by $54.19 per acre revenue, equals 76.2 acres as the minimum required. This acreage will support 13 cows and their replacements.

Many farmers are not satisfied to earn wages only. They also want to earn a fair return on their investment in machinery, livestock and real estate. Table 2 (when used with Table 1) shows how much larger farms must be in order to earn a 5% return on investment, in addition to a $2500 yearly income. As investment in land and livestock will vary directly with the number of acres, this investment is considered as "variable capital"; investment in equipment

and buildings is considered as "fixed capital" since a minimum amount of equipment and buildings is needed if the farmer engages in the enterprises shown. A 5% return on both variable and fixed capital investment has been computed and presented in Table 2. Fixed capital return is on a per farm basis and variable capital return is on a per-acre basis. These amounts must now be covered by farm earnings in addition to the costs and returns presented in Table 1.

To illustrate, let's work out further the example used above, the dairy farm in Area #2. Total income per acre is $67.36. Variable costs per acre are $13.17, plus the return to variable capital of $13.01. Net income per acre is now reduced to $41.18. Fixed costs plus labor income return from Table 1 is $4147. In addition we now have to return $711 interest to fixed capital, which adds up to $4858. $41.18 per acre return divided into $4858 equals 117.9 acres, the minimum size farm necessary to return to the operator $2500 labor income, plus a 5% return on his investment. A farm of this size requires a minimum of 20 cows. Note that it takes an additional 41 acres and 7 cows to pay the owner a 5% return on his investment.

The same procedure is used to determine the minimum acreage needed for a farmer with debts to pay. If he has a yearly payment of $1000 principal and interest and no other returns to capital, we would add $1000 to the fixed return. In the dairy example, Table 1, the return will increase from $4147 to $5147. Dividing this sum by the net return per acre of $54.19 gives us a minimum of 95 acres, instead of 76.5.

The minima represented here are for farm owners.. Since, in this area, the tenant commonly pays 1/3 of his grain and 1/2 of his hay as rent he will require more acres in order to earn the same labor income for himself. However, in this situation the landlord pays certain costs and there will be a different proportion of feed available. This changes both the variable costs and the

number of livestock that can be supported. Consequently, the figures in Table 1 cannot be used. It was found, though, that generally a tenant needs about 50% more acres than were shown in Table 1 in order to net the same labor income.

It is interesting to note that if Forest Service range land is available for the five summer grazing months, this reduces the minimum farm size by about 40%, as is shown in the comparison of the two calf-crop enterprises in Area #3, one with Forest Service range land, and one without.

Another interesting fact is that the minimum farm size can be reduced considerably by the addition of another livestock enterprise. This is illustrated in Table 1 in a comparison of the Area #3 calf-crop enterprise to the same area when hogs are added to the farm (the line above). The minimum drops from 221.7 acres to 135.4 acres.

A more extensive bulletin on this subject covering detailed precedure and data is now being compiled and will be published shortly by the College of Agriculture of the University of Idaho.

TABLE 1

*MINIMUM ACRES REQUIRED TO RETURN
$2500 INCOME PER FARM IN NORTH CENTRAL IDAHO

Area	Type of Farm	Gross Income per Acre	Variable Costs per Acre	Fixed Costs & $2500 Income	Minimum Required		
					Acres	Cows	Sows
3	Irr. Dairy	$155.36	$40.53	$4040	35.2	13	
2	Dairy	67.36	13.17	4147	76.5	13	
1	B'fat-hog	81.15	20.72	4023	66.6	10	6
2	B'fat-hog	66.46	17.43	4023	82.0	14	6
1R[1]	Beef-hog	67.87	20.37	3873	81.5	14	8
3	Calf-hog	43.21	14.75	3856	135.4	49	7
3	Calf-crop	24.81	7.56	3825	221.7	69	
3R	Calf-crop	36.86	9.46	3825	139.4	72	
1	Beef-crop	47.88	11.40	3841	106.0	12	
2R	Beef-crop	42.65	10.16	3841	122.0	19	
3R	Beef-crop	45.15	9.90	3857	109.0	29	

R Forest Service range land available.
1 Pasture rented for beef cattle

TABLE 2

*MINIMUM ACRES REQUIRED TO RETURN $2500 TO FARM
AND 5% RETURN ON CAPITAL IN NORTH CENTRAL IDAHO

Acre	Type of Farm	Return to Fixed Capital	Return to Variable Capital	Net Return per Acre	Minimum Required		
					Acres	Cows	Sows
3	Irr. Dairy	$678	$12.56	$102.27	46.1	19	
2	Dairy	711	13.01	41.18	117.9	20	
1	B'fat-hog	610	11.71	48.72	95.0	14	9
2	B'fat-hog	610	9.84	39.19	118.0	12	8
1R	Beef-hog	559	10.55	36.95	120.0	20	11
3	Calf-hog	543	7.83	20.63	213.2	77	11
3	Calf-crop	523	7.36	9.89	439.6	137	
3R	Calf-crop	523	8.25	19.15	227.0	117	
1	Beef-crop	539	10.50	21.90	168.0	19	
2R	Beef-crop	539	8.68	23.81	184.0	29	
3R	Beef-crop	523	7.16	28.09	155.9	41	

* Cost and production figures were compiled from the better managed of each type of farm in each area.