AGRICULTURAL EXPERIMENT STATION
Oregon State College
Wm. A. Schoenfeld, Director
Corvallis, Oregon
and
Soil Conservation Service
and
Bureau of Agricultural Economics
United States Department of Agriculture
Cooperating

Station Circular of Information No. 247 May 1941

CULLING WHEAT LAND IN EASTERN OREGON

by

H. L. Thomas/1

The time-honored practice of culling dairy herds or poultry flocks to increase productive efficiency is being applied to wheat lands in Eastern Oregon, where farmers are finding it desirable to retire "marginal" or "border" acres from wheat production to the growing of grass. The practice of culling wheat land was slow of adoption, however, because the prospective income from any suitable substitute crop was too low to encourage a rapid change-over.

During the period of low wheat prices, and the program of reduced wheat acreages carried on by the Agricultural Adjustment Administration, the culling of wheat land has been carried on extensively so that between 1934 and 1940 an aggregate area of approximately 180,000 acres has been retired from wheat and seeded to crested wheat grass.

Soil erosion is recognized as one of the major immediate as well as long-time problems of the Columbia Basin wheat belt. The alternate cropping and fallow system of farming leaves land exposed for long periods, leading both to sheet erosion, or the gradual removal of top soil from large areas, and gully erosion, which may seriously interfere with normal field operations.

Early in 1939 a questionnaire was released from the Oregon Experiment Station as a means of gathering information on the kind and quality of wheat land now being retired to grass. The replies indicate that wheat land retirement is a culling process which removes shallow, low-yielding, as well as steep

---

The author wishes to acknowledge the assistance of the Department of Farm Management, Oregon State College, in the preparation of this paper.

/1 Associate Agricultural Economist, Division of Economic Research, Soil Conservation Service, cooperating with the Oregon Agricultural Experiment Station and the Bureau of Agricultural Economics, United States Department of Agriculture.

erosive land, from cultivation. The practice may result in an improvement in operating economy on some farms. This point can be illustrated by a financial analysis of a large Sherman County farm.

The farm considered for analysis is located in a relatively low yielding section, where farming units are generally large with livestock as an important source of income. The soils are light in texture, low in organic matter, and rather susceptible to wind erosion. The latter is a constant menace and may cause serious damage in some years.

The farm under consideration comprises 2,642 acres, of which about 2,000 acres are in a wheat-fallow rotation. The balance consists of native pasture, and miscellaneous waste land, farmsteads and roads. The average yield of wheat for the farm as a whole is about 11 bushels per acre.

Livestock constitutes an important part of the farm organization. The average number from 1934 to 1938, consisted of 18 horses, 35 cattle, 100 sheep, 30 hogs, and 100 poultry. The farm has been seriously over-grazed in some years, resulting in material depletion of pasture resources.

The soil conservation program for this farm is typical of many wheat farms. It provides for the permanent retirement of 384 acres of steep or shallow wheat land to grass. Of this amount, 112 is to be retired for a temporary period of from 5 to 6 years to permit improvement in soil fertility. At the end of the grass period, this land will be broken for wheat and another seeded to grass. Thus, this portion of the land retired to grass marks the beginning of a long-time grass-wheat rotation, which will ultimately affect all the wheat land.

On the basis of a carrying capacity of two acres per animal unit month, 384 acres of crested wheat grass will permit an increase of about 19 animal units of cattle. The increase in income from this enterprise will partially compensate for the loss of income from not growing wheat.

A financial summary of the farm organization and farm business for the farmer's original plan and the proposed soil conservation plan is presented in Table 1. The analysis takes into account the financial effect of culling wheat land in accordance with soil conservation recommendations. It is assumed that the farm is stocked to its carrying capacity with beef cattle.

Table 1. A Typical Wheat-Livestock Farm Selected From the Moro Soil Conservation Area

Item		Soil depleting program	Soil conserving program	Change
Land Use and Crop Production:				
Wheat	acres	1,035	843	-192
Fallow	"	1,034	842	-192
Crested wheat grass	"	-	384	+384
Native pasture	"	534	534	-
Farmstead	"	39	39	-
TOTAL	"	2,642	2,642	-
Wheat yield per acre		843 A. @ 12.0 bu.	843 A. @ 12.0 bu.	
Wheat yield per acre		192 A. @ 8.6 bu.		
Wheat production	Bu.	11,768	10,116	-1,652
Carrying Capacity of Pasture:				
Animal month of grazing		335	487	+152
Animal units of beef cattle		42	61	+19
Cash Income:				
Wheat @ 60¢ per bushel		$ 7,061	$ 6,070	$ -991
Cows @ $4.30 per Cwt		183	266	+83
Yearlings @ $6.10 per Cwt		190	276	+86
Calves @ $6.50 per Cwt		438	636	+198
TOTAL		$ 7,872	$ 7,248	$ -624
Cash Expenses:				
Labor @ 84¢ per acre		$ 869	$ 708	-161
Fuel and Oil @ 39¢ per acre		404	329	-75
Machinery repair @ 37¢ per acre		383	312	-71
Seed @ 75¢ per acre		776	632	-144
Sacks @ 10¢ each		523	450	-73
Hauling charge @ 3¢ per sack		140	121	-19
Warehouse and elevator @ 6¢ per sack		280	242	-38
Machinery depreciation*		592	533	-59
Winter feed @ $5 per A.U.**		210	305	+95
Taxes on livestock @ 60¢ per A.U.		25	37	+12
Misc. livestock expenses @ 56¢ per A.U.		24	34	+10
TOTAL		$ 4,226	$ 3,703	-523
NET RETURN		$ 3,646	$ 3,545	-101

* It is estimated that approximately 10 per cent of the annual depreciation on wheat machinery will be saved by reducing its use about 20 per cent. Depreciation is partly the result of obsolescence and, for that reason, the saving is not expected to be in proportion to the reduction in use.

** This cost includes one-half ton of wheat hay at $8 per ton, and one ton of wheat chaff at $1 per ton. The latter covers only the cash cost of hauling chaff.

The results show a probable decrease in income from wheat of $991. To compensate for this loss of income, there results an increase of about $367 in income from livestock. In addition, there is an estimated cash saving in expense of $523 from not growing wheat. A reduction in net income from this farm of about $101 is expected from culling wheat land for grass.

The Economic Effect of Retiring Individual Fields to Grass

The land retired to grass includes many small fields and patches. Some of these are located on shallow, low-yielding land while others are located on steep land which ordinarily yields between 12 and 15 bushels per acre. The aggregate economic effect of culling wheat land depends upon the yield of wheat for individual fields.

The data contained in Table 2 has been compiled to show the change in income for individual fields and patches. Of the total 384 acres, 227 ordinarily yield less than 8 bushels of wheat per acre. At 60 cents per bushel, these acres are apparently submarginal for wheat./2 The balance of the retired land

---

/2 The author's estimate of the average farm price of wheat for the immediate future.

---

consists of steep, north slopes which yield between 12 and 15 bushels per acre. Apparently, this land would return more to the farm business if it were left in wheat.

The question of which land, and how much land to take out of wheat production, must be decided by the farm planner and the farmer for individual farms, based upon individual needs and circumstances. Indeed, the urgency of soil conservation on the one hand and farm income on the other must be considered for each individual field and parcel of land. Some farmers would regard the possible sacrifice of $101 per year as a low rate of insurance against further damage from soil erosion or a nominal price to pay for many intangible benefits which accrue through the years from soil conservation. Other farmers would be forced by economic circumstances to consider carefully the question of immediate financial returns and to forego, as far as possible, any danger of immediate loss of farm income.

The danger of loss of income from culling wheat land depends quite largely upon the price of wheat and the yield of the land in question. At 60 cents per bushel, land which normally yields more than 8 bushels per acre will probably return more to the farm business if used for wheat. The results contained in Table 2 show that land which yields less than 8 bushels per acre will probably return more in grass. Income for the soil conserving plan will have increased approximately $300 above the soil depleting plan if low yielding land only had been retired to grass. This indicates the possibility of maintaining or even increasing income through careful farm planning.

Table 2. A comparison of Returns from Wheat and Grass by Individual Fields

Size of field of seeding	Acres in wheat **	Yield per acre ***	Wheat production	Value at 60¢ per bushel	Estimated value of stubble and volunteer wheat (17¢ per acre)	Total returns	Cash expenses ($3.32 per acre)	Net return from wheat	Return from grass (83¢ per acre) ****	Increase or decrease
Acres		Bushels	Bushels							
143	71.5	4	286	$ 172	$ 24	$ 196	$ 238	$ -42	$ 119	$ +161
33*	16.5	15	248	149	6	155	55	100	28	-72
5	2.5	15	38	23	1	24	8	16	4	-12
12*	6.0	15	90	54	2	56	20	36	10	-26
13	6.5	11	72	43	2	45	22	23	11	-12
16*	8.0	11	88	53	3	56	27	29	13	-16
22	11.0	10	110	66	4	70	33	37	17	-20
14*	7.0	20	140	84	2	86	23	63	12	-51
42*	21.0	14	294	176	7	183	72	111	35	-76
41	20.5	7	144	86	7	93	68	25	34	+9
20	10.0	5	50	30	4	34	33	1	17	+16
23	11.5	8	92	55	4	59	38	21	19	-2
384	192	8.6	1,652	991	66	1,057	637	420	319	-101

* Steep land.

** Approximately one-half the wheat land is in fallow.

*** Farmer's estimate.

**** The carrying capacity of crested wheat grass is estimated at 2 acres per animal unit month. Thus, 16 acres are allowed each animal unit of beef cattle for an eight-month grazing season. The gross return per animal unit is estimated to be $19.31; the cash expenses $6.16, or a net return of $13.15 per animal unit. (See Table 1, in the Appendix)

The farm planner is obliged to consider first, the needs of the land. This may make it necessary to recommend the retirement of certain steep, erosive land, even though the yield of wheat is considerably above the average for the farm. He may reason that, although the yield and income is relatively high the cost of farming such land is also high, resulting in little change in income for the farm as a whole.

The extent to which this is true or untrue depends upon the steepness of the land in question. In most cases, however, it will probably be necessary to look to other phases of the farm for factors to justify the culling of good wheat land. Other compensating factors worthy of consideration are: (1) The culling of an equal amount of submarginal, low-yielding land. (2) The need for additional pasture on some farms. (3) The farmer's ability and willingness to make grass profitable through efficient livestock production. (4) The farmer's financial status. As mentioned above, some farmers are able and willing to make sacrifices, if necessary on their own account, to avoid the hazard of losing their capital investment in good land by erosion.

Where extensive tracts of land lie near the margin of wheat cultivation, farmers may be forced by circumstances to adopt a long grass-wheat rotation, to build up the soil, and to prevent any decline in yields from erosion. Under these conditions measures must be taken to maintain yields at about their present level, to avoid gross abandonment of wheat land. In taking such action farmers and farm planners reason that increased wheat yields after grass will be sufficient to make up for a nominal loss of production and income during the intervening years.

No One Answer for All Wheat Farms

Soil conditions, managerial ability, and economic opportunity change from one farm to another. Economic conditions vary from year to year and from one period to another. Just how far farmers can go in culling wheat land cannot be answered once and for all for any individual farm, to say nothing for all wheat farms. Soil conservation recommendations aim, first of all, to cull land which has been determined physically unadapted to wheat farming because of steep topography or inaccessibility. This recommendation has general application. Other recommendations should be made with careful consideration of the economics of land use. In this it must be recognized that wheat has a high comparative advantage in the better wheat-farming sections of Eastern Oregon, not only for land but also for labor and capital. These conditions require that only the most erosive land be retired to grass. As physical conditions shift from those which dictate strictly wheat to those which dictate grass, farmers and planners will encounter all degrees of opportunity to cull erosive land without loss of income. Submarginal wheat land can be culled with profit to the farm business. The likelihood of making such a shift with profit is enhanced where conditions favor the utilization of grass through livestock.

The economic advantages of diversification in agriculture are well known. Labor and capital invested in more than one enterprise, and income received from more than one source usually aid in stabilizing farm income. Wheat farmers have had occasion to recognize the advantage of supplementary livestock enterprises during the recent economic depression. Many of them insist that a minor livestock enterprise carried them through otherwise impossible circumstances.

The full benefits from retiring wheat land to grass will accrue only over a long period of time. The most important are: the physical security afforded wheat farms by having the most erodible land in grass, and the economic security which can result on many farms from achieving a better balance between wheat and livestock.

The analysis presented herein indicates that some land can be retired to grass with immediate profit. This is largely true of land which normally yields less than 8 bushels per acre. It may also be true of steep land which offers serious obstacles to cultivating efficiency, thus resulting in excessive operating costs. Between the extremes of low-yield land on the one hand and high-cost land on the other, there may be erosive land which must be retired to prevent excessive loss of land resources. The retirement of this kind of land may justify a soil conservation payment to compensate the farmer for loss of income incurred by taking good wheat land out of cultivation.

APPENDIX

I. Production and Price Schedule Used for Estimating Gross Returns from Cattle

Kind	Number	Number animal units
Cows	100	100
Death loss	3	
Sold	12	
Calves weaned	85	
Sold	53	
Held over	32	19
For breeding	15	
For sale at one year	16	
Death loss	1	
Bulls	4	5
TOTAL ANIMAL UNITS		124

II. Cattle Production for Sale

Kind	Number	Weight each	Total pounds	Pounds per A.U.	Price	Value
Cows	12	1,050	12,600	101.6	$4.30	$ 541
Yearlings	16	575	9,200	74.2	6.10	561
Calves	53	375	19,875	160.3	6.50	1,292
Gross income						$2,394
Income per animal unit						$19.31
Less cost of winter feed						$ 5.00
Less taxes						.60
Less misc. cash expenses						.56
TOTAL						$ 6.16
NET INCOME PER ANIMAL UNIT						$13.15