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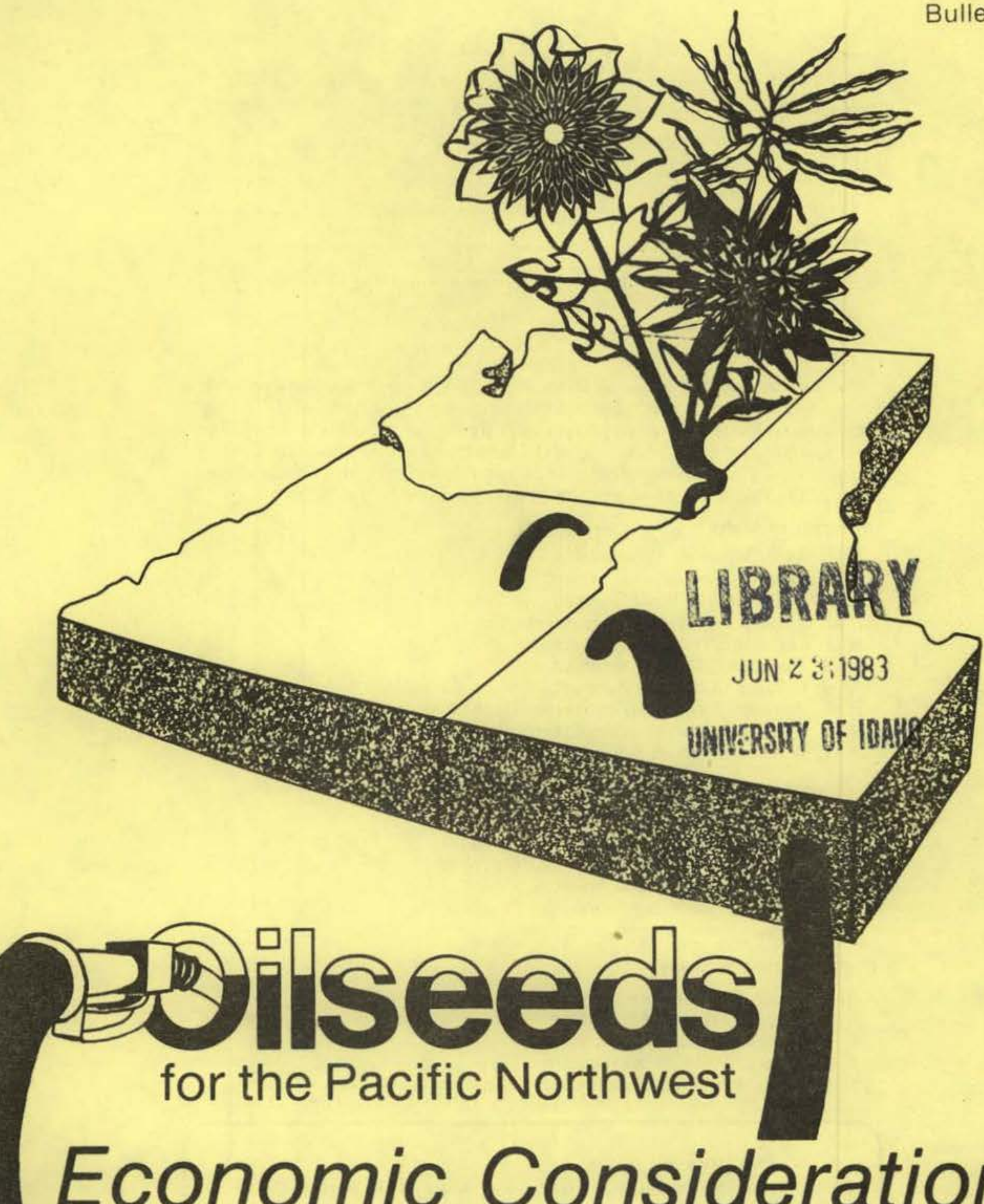

Oilseeds for the Pacific Northwest

Economic Considerations

C. S. McIntosh
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Contents

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Oilseeds for the Pacific Northwest: Economic Considerations

C. S. McIntosh, R. V. Withers and Gary Belcher

Dryland farming areas of the Pacific Northwest (PNW) have traditionally been limited to few alternative crops. Additional crops that could be grown economically would be welcome to provide more diversification and make better use of resources. Some oilseed crops lend themselves to production in the dryland areas and some irrigated locations in the PNW. Of the several oilseed crops that have been and are being tested in the PNW, sunflower, safflower and rapeseed appear to be the most likely to have commercial significance.

The advantages of sunflower and safflower include drought tolerance, utilization of machinery used for grain production and harvesting times that do not coincide with wheat, barley, peas and lentils currently being grown. Oilseed processing in the area would also provide a local source of protein meal. Currently, most protein meal is shipped into the area from the central states at a considerable expense to the buyers of these products.

A 2-year project funded by the Pacific Northwest Regional Commission studied the various questions related to the production of oilseed crops in the area. Research workers in agricultural experiment stations in Oregon, Washington and Idaho participated in the project. Disciplines represented by the study team were agronomy, weed science, entomology, animal nutrition and agricultural economics. Study objectives were:

1. To determine those areas of the PNW in which sunflower, safflower, winter rape, soybeans and other oilseed crops are adapted.
2. To identify, through testing, varieties that produce maximum yields with minimal losses to insects, weeds and diseases.
3. To develop cultural practices including seeding dates, seeding rates and fertilizer rates that produce maximum yields.
4. To test existing and new herbicides, cultural practices and crop rotations to develop economic means to control weeds in these three crops.
5. To determine which, if any, insects cause economic losses and to develop practical chemical, cultural or biological control methods.
6. To study the potential for domestic and export markets for these oilseed crops.
7. To determine the overall economic feasibility of production and marketing of adapted oilseed crops.

This report deals with objectives 6 and 7 and will explore production costs and marketing potential for three oilseeds — sunflower, safflower and winter rape.

This publication is divided into two principal sections. The first deals with production costs for the three oilseeds for different locations and under both dryland and irrigated farming conditions. The second section looks at supply and demand conditions along with various economic considerations in the marketing and use of oilseed crops.

Part I — Production Costs and Management Considerations for Oilseed Crops

Budget Development

Beginning in the summer of 1979, researchers studied the economic aspects of oilseed production. Research objectives included determining typical production methods and developing production budgets for oilseed crops in several locations throughout the PNW.

Personal interviews were conducted with oilseed growers. Information obtained served as the basis for developing crop enterprise budgets, identifying cultural practices, machinery and implement use, rates and formulations of fertilizers and chemicals and other aspects of crop production typical of a given study area. Interviews with farm chemical and fertilizer dealers determined variable inputs for each location.

All machinery used in the budgets is valued at its 1978 cost. For some growers, this assumption may result in an overstatement of capital and ownership costs because many use machinery and implements purchased before 1978. This assumption, however, may provide an indication of an enterprise's ability to replace its depreciable assets. The ability to replace depreciable assets at new or near new costs is important when considering the longrun viability of any particular enterprise. The current high rate of inflation may also lend credibility to these cost values because the dollars used to purchase older equipment were more valuable than present dollars (Withers, et al. 1980).

The production information provided by the budgets in Tables 1 to 6 estimates the 1981 direct and indirect (i.e. variable and fixed) costs of crop production. Each table includes estimated costs for both oilseeds and traditional crops of those areas. The tables contain six sections:

1. Direct or operating costs which vary directly with production.
2. Labor costs.
3. Indirect or fixed costs consisting of depreciation, interest, insurance and taxes.

Table 1. Estimated 1981 cost/acre for dryland sunflower, safflower, winter rape, winter wheat, spring barley and spring peas in northern Idaho.

Production item	Sunflower	Safflower	Winter rape	Winter wheat	Spring barley	Spring peas
Direct costs						
Seed	$ 8.40	$ 12.50	$ 1.68	$ 9.76	$ 6.90	$ 24.82
Fertilizer	23.20	25.58	35.96	50.37	21.93	2.10
Herbicides	7.31	7.54		28.49	17.65	12.03
Pesticides	9.85		6.38			12.70
Machinery	12.08	11.38	12.88	13.36	11.73	13.56
Tractors	12.92	13.59	11.20	13.90	17.49	11.23
Crop insurance				6.05	3.24	8.40
Interest on operating capital	3.24	3.08	4.77	8.94	2.93	3.40
Total direct costs	$ 77.00	$ 73.67	$ 72.87	$130.87	$ 81.87	$ 88.24
Labor	$ 9.69	$ 8.33	$ 9.24	$ 9.56	$ 8.42	$ 9.06
Indirect costs						
Machinery	$ 23.38	$ 18.92	$ 18.60	$ 23.48	$ 18.72	$ 21.91
Tractors	18.26	18.16	16.50	17.85	15.16	17.11
Overhead	3.23	3.00	2.95	4.88	3.26	3.53
Total indirect costs[1]	$ 44.87	$ 40.08	$ 38.05	$ 46.21	$ 37.14	$ 42.55
Total production costs[1]	$131.56	$122.08	$120.16	$186.64	$127.43	$139.85
Expected yield	12 cwt	0.5 ton	18.5 cwt	65.0 bu	1.5 tons	17.0 cwt
Break-even point[1]	$10.96/cwt	$244.16/ton	$6.50/cwt	$2.87/bu	$84.96/ton	$8.23/cwt

[1]Does not include a cost for land investment, real estate taxes, management or risk.

4. Total production costs consisting of direct costs, labor and indirect costs.
5. Expected yield, based on area averages assuming good management.
6. Break-even point, calculated by dividing total production costs by expected yield.

Costs for land investment or rental, real estate taxes, management or risk are not included in the budgets. When applying these budgets to a particular area, the user should include whatever land, management and risk costs are appropriate for his or her situation.

The production cost budgets presented here do not include costs for crop storage, drying or cleaning. These costs are omitted because of the widely varying circumstances on farms in the PNW. These costs may be substantial for some growers, and each should estimate his or her own costs to be applied to these items.

Table 2. Estimated 1981 cost/acre for dryland sunflower, safflower, winter wheat, spring wheat and spring barley in Power County, Idaho.

Production item	Sunflower	Safflower	Winter wheat[2]	Spring wheat	Spring barley
Direct costs					
Seed	$ 8.40	$ 11.40	$ 5.50	$ 6.20	$ 6.00
Fertilizer	24.70	12.44	14.25	14.25	14.25
Herbicides	7.54	7.54	5.47	5.47	6.95
Pesticides					
Machinery	14.82	14.51	18.06	15.59	17.04
Tractors	15.05	11.39	7.37	3.82	7.12
Interest on operating capital	3.24	2.76	3.44	1.86	1.94
Total direct costs	$ 73.75	$ 60.04	$ 54.09	$ 47.19	$ 53.30
Labor	$ 9.60	$ 8.82	$ 8.71	$ 6.76	$ 8.61
Indirect costs					
Machinery	$ 20.81	$ 22.56	$ 74.22	$ 21.48	$ 21.53
Tractors	20.17	20.24	9.85	4.94	9.78
Overhead	3.10	2.85	2.37	1.99	2.31
Total indirect costs[1]	$ 44.08	$ 45.66	$ 36.44	$ 28.41	$ 33.62
Total production costs[1]	$127.43	$114.52	$ 99.24	$ 82.36	$ 95.53
Expected yield	12 cwt	0.5 tons	29.0 bu	22 bu	1.0 tons
Break-even point[1]	$10.62/cwt	$229.04/ton	$3.43/bu	$3.75/bu	$95.53/ton

[1]Does not include cost for land investment, real estate taxes, management or risk.
[2]Includes the cost of summer fallowing.

Table 3. Estimated 1981 cost/acre for dryland sunflower, green peas, winter wheat and spring wheat for Walla Walla County, Washington.

Production item	Sunflower	Green peas[3]	Winter wheat[3]	Spring wheat[3]
Direct costs				
Seed	$ 8.40	$ 44.00	$ 10.37	$ 10.98
Fertilizer	9.50	13.50	18.25	22.25
Herbicides	7.54	4.88	11.42	
Pesticides	7.75	6.16		
Machinery	12.14	7.03	18.77	11.06
Tractors	14.41	7.37	5.19	8.65
Interest on operating capital	2.44	2.67	5.36	2.88
Total direct costs	$ 62.18	$ 85.61	$ 69.36	$ 55.82
Labor	$ 9.32	$ 6.94	$ 11.42	$ 8.31
Indirect costs				
Machinery	$ 18.42	$ 15.98	$ 11.26	$ 18.75
Tractors	22.85	26.24	47.58	34.80
Overhead	2.77	4.52	4.16	3.33
Total indirect costs[1]	$ 44.04	$ 46.74	$ 63.00	$ 56.88
Total production costs[1]	$115.54	$139.29	$143.78	$121.01
Expected yield	16 cwt	1.0 ton	70 bu	60 bu
Break-even point[1]	$7.23/cwt	$13.93/ton	$2.06/bu	$2.02/bu

[1]Does not include cost for land investment, real estate taxes, management or risk.
[2]Harvesting and hauling are done by processor.
[3]Based on "Selected 1980 Crop Enterprise Budgets for Walla Walla County, Wash.," EM 4549, WSU Cooperative Extension, March 1980.

Table 4. Estimated 1981 cost/acre for center pivot irrigated sunflower, spring barley, grain corn, winter wheat and hard red spring wheat for the Columbia Basin, Washington.

Production item	Sunflower	Spring barley[3]	Grain corn[3]	Winter wheat[3]	HRS wheat[3]
Direct costs					
Seed	$ 8.94	$ 22.80	$ 23.40	$ 13.60	$ 27.60
Fertilizer	34.80	70.56	131.57	63.92	97.20
Herbicides[2]	11.04	8.01	16.50	9.55	7.51
Pesticides	9.35			5.90	
Water assessment	18.00	18.00	20.60	18.00	18.00
Machinery	12.98	11.54	19.17	14.91	10.91
Tractors	25.14	10.56	16.27	4.48	7.15
Irrigation	23.10	23.10	30.80	26.18	26.95
Custom harvest		30.00	30.00		30.00
Interest on operating capital	6.13	5.25	12.69	8.57	7.51
Total direct costs	$149.88	$199.82	$301.00	$165.11	$232.83
Labor (machinery)	$ 11.77	$ 10.57	$ 16.27	$ 9.71	$ 9.96
Labor (irrigation)	2.64	2.64	3.52	2.99	3.08
Indirect costs					
Machinery	$ 12.17	$ 12.96	$ 37.37	$ 32.27	$ 13.34
Tractors	23.38	9.12	17.56	4.73	6.54
Irrigation	46.80	56.80	62.40	53.04	54.60
Overhead	7.46	10.65	16.04	8.89	12.29
Total indirect costs[1]	$ 89.81	$ 79.53	$133.37	$ 98.93	$ 86.77
Total production costs[1]	$254.10	$292.56	$454.16	$276.74	$332.64
Expected yield	25 cwt	2.5 tons	3.6 tons	100 bu	80 bu
Break-even point[1]	$10.17/cwt	$117.03/ton	$126.16/ton	$2.77/bu	$4.16/bu

[1]Does not include cost for land investment, real estate taxes, management or risk.

[2]Sunflower cost includes aerial application of a defoliant.

[3]Based on 1981 Estimated Production Costs in the Columbia Basin, WSU Cooperative Extension Service, Oct., 1980, center pivot irrigation.

Table 5. Estimated 1981 cost/acre for irrigated sunflower, spring wheat and spring barley for Power County, Idaho.

Production item	Sunflower	Spring wheat	Spring barley
Direct costs			
Seed	$ 10.08	$ 10.00	$ 9.00
Fertilizer	48.30	49.27	48.05
Herbicides	7.54	5.47	5.47
Water assessment	8.00	8.00	8.00
Machinery	15.52	18.55	18.55
Tractors	23.06	15.48	15.48
Irrigation	23.45	23.45	23.45
Interest on operating capital	5.93	4.17	4.09
Total direct costs	$141.88	$134.39	$132.09
Labor (machinery)	$ 12.69	$ 9.43	$ 9.43
Labor (irrigation)	3.56	3.56	3.56
Indirect costs			
Machinery	$ 18.84	$ 12.92	$ 12.92
Tractors	22.64	11.56	11.56
Irrigation	52.99	52.99	52.99
Overhead	6.48	5.65	5.58
Total indirect costs[1]	$100.95	$ 83.12	$ 83.05
Total production costs[1]	$259.08	$230.59	$228.13
Expected yield	25 cwt	95 bu	2.2 tons
Break-even point[1]	$10.37/cwt	$2.43/bu	$103.70/ton

[1]Does not include cost for land, investment, real estate taxes, management or risk. Side roll sprinkler irrigation.

Table 6. Estimated 1981 cost/acre for sunflower silage and spring barley plus sunflower silage (double crop).

Production item	Sunflower silage[3]	Spring barley & sunflower silage[4] (double crop)		
		Spring barley	Combined	Sunflower silage
Direct costs				
Seed	$ 10.20	$ 22.80		$ 10.08
Fertilizer	46.70	70.56		46.40
Herbicide	7.54	7.51		
Water assessment	8.00		$ 18.00	
Irrigation	23.45		36.66	
Machinery	10.62		10.49	
Tractors	26.54		33.18	
Custom combine[2]			30.00	
Interest on operating capital	5.94		6.78	
Total direct costs	$138.99		$292.46	
Labor (machinery)	$ 12.34		$ 15.64	
Labor (irrigation)	3.56		3.90	
Indirect costs				
Machinery	$ 18.76		$ 20.14	
Tractors	43.79		65.22	
Irrigation	24.01		39.26	
Overhead	6.49		10.16	
Total indirect costs[1]	$ 93.06		$134.78	
Total production costs[1]	$247.95		$446.81	
Expected yield	18 tons	2.5 tons		15 tons
Break-even point[1]	$13.78/ton	—		—

[1]Does not include costs for land investment, real estate taxes, management or risk.

[2]Custom combining of barley.

[3]Side roll sprinkler irrigation, Power County, Idaho.

[4]Center pivot sprinkler irrigation, Columbia Basin, Washington.

Budget Interpretation

Crop enterprise budgets are useful tools for comparison of particular production activities. They allow the analyst to make economic evaluations of alternative activities on a detailed basis, including both fixed and variable costs. Enterprise budgeting facilitates such comparisons because of the uniform treatment of depreciation, interest, repair, maintenance, fuel and other costs.

As a result of the processes used in budget development the budgets should be viewed as representative or typical only. They should not be misinterpreted as a simple average of costs incurred by the growers surveyed or for a particular area. Costs and returns which differ substantially from those employed throughout the following analysis may result when factors such as machinery, cultural practices, irrigation systems or production inputs differ from those assumed for each particular enterprise. Methods used in developing the budgets are designed to provide uniform treatment of fixed and variable costs based on actual production data.

Oilseeds' Place on Farms

Variable costs of producing sunflower are similar to those for grain and pea crops in most areas of the PNW under both dryland and irrigated conditions. Average returns to dryland sunflower production have been lower, however, than those obtained from grain or pea production. While some growers were able to obtain substantial returns, averages were lower because of poor yields.

Sunflower is a new crop in the PNW, and its particular production requirements differ from those with which some growers are familiar. Among the factors contributing to low average yields are:

1. Farmers' unfamiliarity with row crop planters and sunflower harvesting requirements.
2. Optimum cultural practices were not established in many areas.
3. Farmers, unwilling to experiment on good land, seeded sunflower in marginally productive areas.
4. Blackbirds and rodents destroyed some crops.
5. Insect and disease problems, particularly the sunflower headmoth, *Homoeosoma electellum* hurt yields.
6. Varieties were poorly adapted in some areas.

Sunflower's physical growing requirements are such that the crop can easily fit into the rotational patterns of many areas of the PNW. Sunflower is a spring annual, and yields are generally highest when preceded by a legume. But, this rotation is not recommended where *Sclerotina* and *Verticillium* (fungul pathogens common to both sunflowers and legumes) are a problem. Possibly the best crops to precede sunflower are grains which are immune to these pathogens and allow for chemical control of broadleaf weeds.

Studies conducted in Minnesota indicated that sunflower yields are the same after either small grains or summer fallow (Carter 1978). Because of the sunflower's ability to extract moisture from the soil, it is a good crop to seed after winter wheat in areas where summer fallowing is necessary to conserve soil moisture. This would allow the grower to obtain income from his land 2 out of 3 years rather than every other year. Some growers have indicated also that wheat yields are higher on land that included sunflower in the rotation.

One factor favoring sunflower production is that planting and harvesting dates are later than those for most crops produced in the PNW. This enables growers to make more efficient use of machinery, equipment and labor by extending planting and harvesting periods. A linear programming model developed for north Idaho dryland crop production, based on 1980 costs and returns, indicated that, in situations where labor is a limiting factor, adding sunflower increased net income by 15 percent (McIntosh 1981).

Sunflower performs very well under irrigation and requires less water than corn but about the same amount as spring grains. Yields as high as 2,500 pounds per acre have been achieved by growers producing irrigated sunflower. Under irrigation, returns to sunflower production are competitive with those obtained from spring-seeded wheat and barley.

Safflower production costs are similar to those from grains and peas. Safflower is grown on dryland in the PNW. Safflower, like sunflower, is a spring annual that is well adapted to dryland production. Safflower is more drought tolerant than many spring-seeded crops and may provide an alternative in rotations that require summer fallowing to conserve moisture. In Power County, Idaho, both safflower and sunflower have been used to delay summer fallowing for a season by providing drought tolerant spring crops that can be seeded after winter wheat.

Safflower does not provide the timing advantages that sunflower does because its planting and harvesting dates correspond directly with those of spring grains. Linear programming analysis indicates that under limited labor conditions safflower does not provide an advantage for making more efficient use of available labor or machinery.

Safflower is a relatively new crop in the PNW. Average yields have been low for some areas partly because growers were unfamiliar with required cultural practices.

Winter rape has been produced in the PNW for several years. It is a high yielding crop that has proven to be economically competitive with most crops in the Palouse area. Winter rape is a winter annual generally seeded in July, unlike its Canadian counterpart spring rape. Winter rape production costs are similar to those of the traditional crops in the region. Average yields are approximately 18 to 20 cwt/acre which demonstrates the potential of winter rape to provide a relatively high net income per acre. The major disadvantage to winter rape production is its early seeding date which generally requires that it be planted on summer fallow. In some years, however, high rainfall during the spring may prevent farmers from getting spring grains seeded at the desirable time. When this is the case winter rape can provide an alternative to recropping winter wheat. Many growers indicate that winter rape, which has a strong tap root, improves soil aeration particularly in hardpan areas, and being a very vigorous crop, aids in weed control as well.

Linear Programming Analysis

A linear programming model was developed for dryland farms in Power County, Idaho. This model illustrated how sunflower or safflower might fit into the rotational patterns of that area.

The study area for the model is located primarily near Rockland in Power County, Idaho. This area receives average annual precipitation of 10 to 12 inches. Because of this low precipitation, farmers are required to conserve ground moisture by the use of summer fallow. Area farmers became interested in these oilseed crops because of their drought tolerant characteristics. In recent years, some area growers have experimented with planting sunflower or safflower on their winter wheat ground allowing them to delay summer fallowing for one more season.

The linear programming model consisted of five rotational alternatives:

1. Winter wheat — summer fallow.
2. Winter wheat — sunflower — summer fallow.
3. Winter wheat — safflower — summer fallow.
4. Winter wheat — spring wheat — summer fallow.
5. Winter wheat — spring barley — summer fallow.

The model farm consisted of 2,000 acres.

Labor was assumed to be available in the amount of 30 hours for each day except Sundays and holidays (three full-time workers). Short term capital was assumed to be unlimited. The model's objective was to maximize net income over variable costs indicating the most profitable crop rotations to produce. Variable costs consisted of operating costs, labor and interest on operating capital.

The solution obtained from the model indicated that the most profitable crop rotations, as measured by the total dollar value of the objective function, were:

- 252 acres of winter wheat — sunflower — summer fallow.
- 198 acres of winter wheat — safflower — summer fallow.
- 217 acres of winter wheat — spring barley — summer fallow.

Note, however, that these solutions were extremely sensitive to fluctuations in commodity prices or changes in production costs. Changes of $2 to $6 in the net income of any rotation could cause substantial changes in the solution. This indicates that while the above mentioned rotations were the most profitable, as evaluated by the model, their advantages were not so great as to warrant abandonment of those rotations which did not enter the solution. The analysis illustrates the profit advantages of having a spring-seeded crop that is tolerant to low moisture levels available as an economically feasible alternative to the standard winter wheat — summer fallow rotation.

A similar analysis based on 1980 production costs and returns was developed for northern and southern Idaho dryland production. Two models were analyzed in each area, one with an unlimited amount of labor available and the other with labor limited to the farm operator plus two hired workers. The labor coefficients apply to machinery, tractor and truck operations only. The model was designed to maximize net income over variable costs. Crops were considered on an individual basis rather than in set rotations. Through the application of parametric programming techniques, solutions were estimated over a range of oilseed crop prices. All of these solutions maximized net income as defined by the objective function.

This information was then used to estimate short-run supply curves for the individual farm in northern and southern Idaho under conditions of both unlimited and limited labor. Figs. 1 to 4 illustrate the supply curves. While both sunflower and safflower appear on each graph, the two curves are independent of each other and are illustrated in this manner to facilitate comparison only. The curves should be considered as separate. Each curve indicates the increases in acreage resulting from an increase in that commodity's net-to-grower price with all other factors held constant. As the acreage of either oilseed crop increases, the acreages of other crops must decrease because of the total acreage limitation.

Sunflower Silage

While the majority of sunflowers produced in the PNW are harvested for their oil bearing seeds, the entire sunflower plant can be used for livestock forage. Roughly two-thirds of the dry matter in a sunflower plant is in the leaves and stalk. When the plant is harvested for the seeds, a large amount of potential cattle feed goes unused.

Sunflower may gain popularity as a forage crop for several reasons. Sunflower yields, in terms of dry matter per acre, are comparable to those of corn in many sunflower producing areas. Sunflower is more water efficient than corn and has a greater ability to extract moisture from the soil. Sunflower may be planted as a second crop after early maturing grains or peas in some areas. Ensiling sunflower may prevent total loss when a killing frost occurs before the seeds have reached maturity. In some cases, it may be possible to ensile a sunflower crop that is too damaged by insects or diseases to be harvested for seeds.

Research is underway to study the composition and feed value of sunflower silage. Recent studies indicated that sunflower silage contains slightly more crude protein, more fat, more fiber and slightly less net energy than corn silage. Research was conducted at the University of Idaho comparing milk production of cows fed alfalfa-grass silage to those fed sunflower silage as 60 percent of their total diet. The remaining 40 percent of the ration consisted of a mixture of barley, soy meal and minerals. The study concluded that "sunflower silage is an acceptable forage for cows in mid to late lactation" (Thomas, et al. 1981).

Sunflower's ability to serve as a forage crop as well as an oilseed crop provides the grower with a good management tool, particularly in areas of the PNW where the growing season is too short for corn. It is doubtful that sunflower will ever replace corn as a major forage crop, but many areas that receive early frosts or have restrictive water quantities or costs may turn to sunflower as an alternative.

Sunflower silage production is relatively new to the PNW, and data concerning the production process were scarce. Table 6 presents two budgets for sunflower silage production — one for a single crop with sideroll sprinkler irrigation; the other a double crop situation including both crops under center pivot irrigation. The budgets are designed to represent production costs for Power County, Idaho, and the Columbia Basin in Washington, respectively.

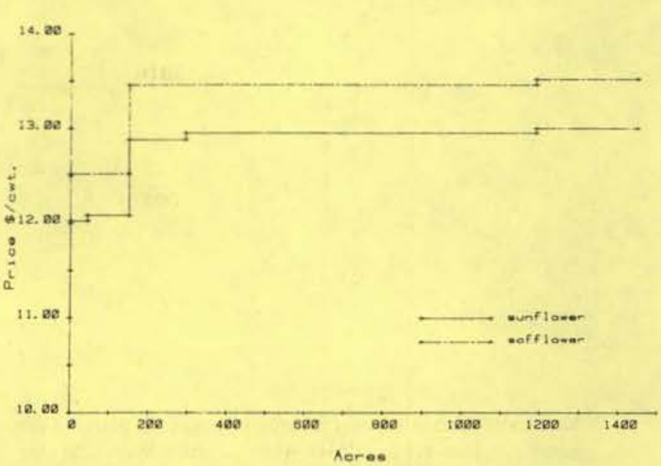

Fig. 1. Shortrun supply curves for sunflower and safflower, southern Idaho unlimited labor model.

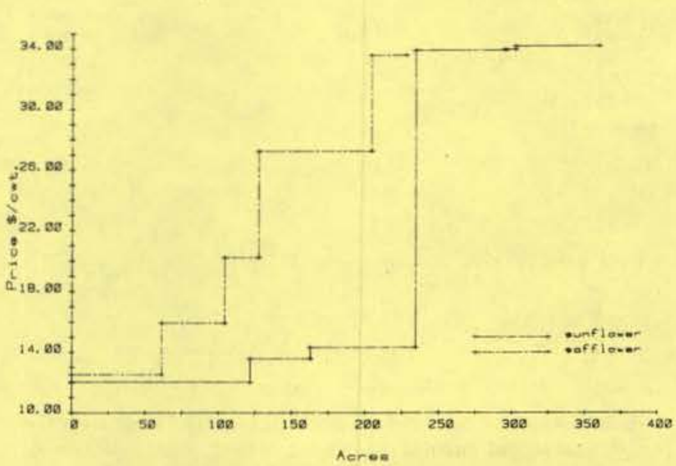

Fig. 2. Shortrun supply curves for sunflower and safflower, southern Idaho limited labor model.

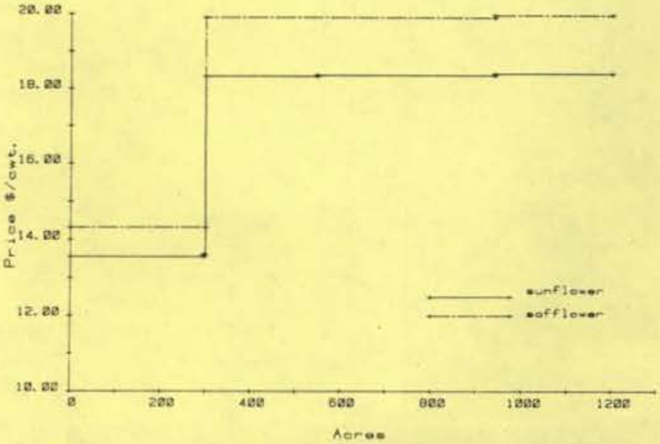

Fig. 3. Shortrun supply curves for sunflower and safflower, northern Idaho unlimited labor model.

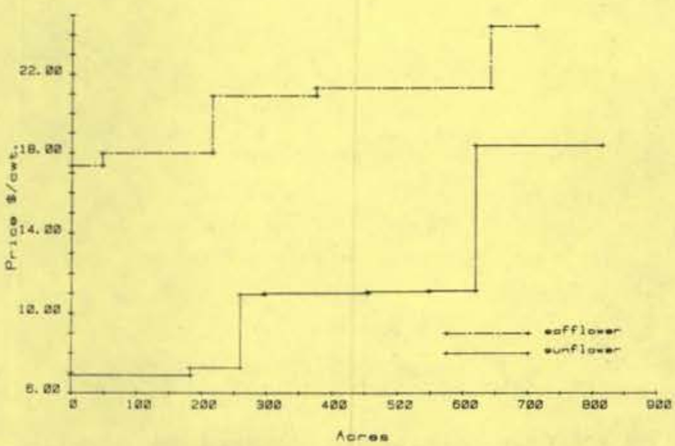

Fig. 4. Shortrun supply curves for sunflower and safflower, northern Idaho limited labor model.

These are preliminary estimates. No costs are included for silage storage facilities, storage or feeding of silage. In the future, more information will be available on optimum production practices, varieties of sunflower best suited for silage and storage and feeding costs.

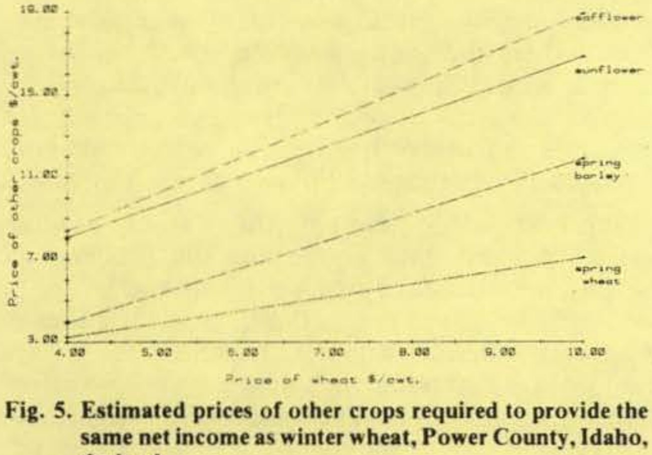

Fig. 5. Estimated prices of other crops required to provide the same net income as winter wheat, Power County, Idaho, dryland.

Relative Profitability Comparisons

Production costs in the budgets may be used for comparing the relative profitability of different crops over a range of prices. The approach was to examine the impact of price changes on the profitability of each crop, based on net income over variable costs.

Winter wheat appeared to be the most profitable of the crops raised in the dryland areas. The profitability of other crops can be evaluated in relation to winter wheat by comparing prices required for the other crops to provide the same net income as winter wheat. This comparison can be made using any crop as a basis. Winter wheat was used as the basis for the dryland areas and spring wheat for irrigated areas in Figs. 5 to 9.

The figures compare crops on a dollars per hundredweight basis. The profitability of a given crop and hence the slope of the crop profit lines depend upon costs of production, yield and price. All of the production costs and yields are taken from Tables 1 to 5 presented earlier. A table for converting

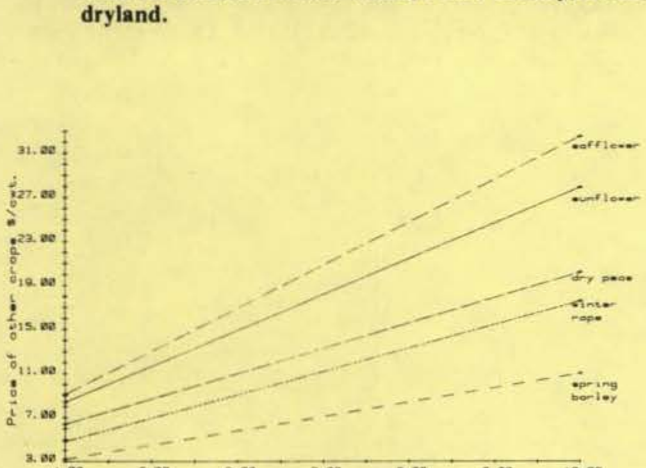

Fig. 6. Estimated prices of other crops required to provide the same net income as winter wheat, northern Idaho, dryland.

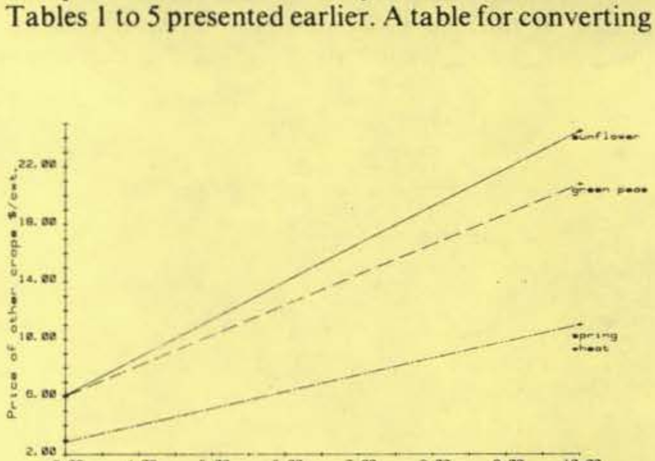

Fig. 7. Estimated prices of other crops required to provide the same net income as winter wheat, Walla Walla, Washington, dryland.

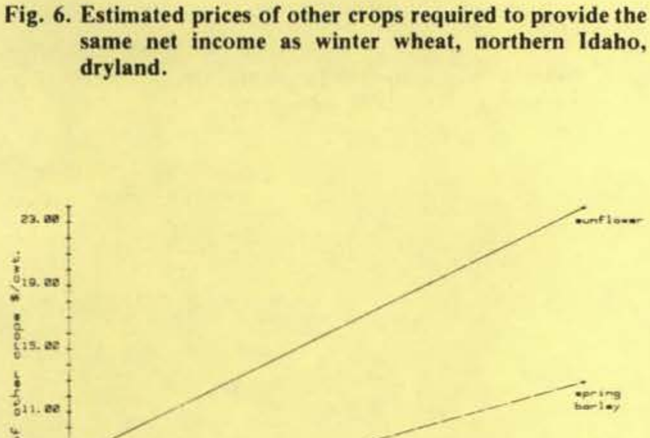

Fig. 8. Estimated prices of other crops required to provide the same net income as spring wheat, Power County, Idaho, irrigated.

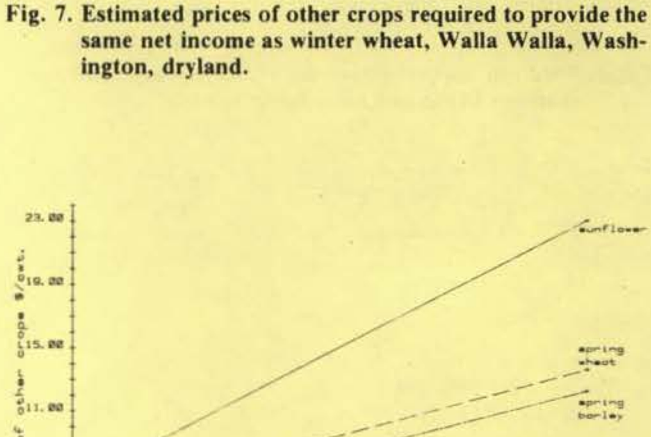

Fig. 9. Estimated prices of other crops required to provide the same net income as winter wheat, Columbia Basin, Washington, irrigated.

wheat prices from dollars per bushel to dollars per hundredweight and barley prices from dollars per bushel or dollars per ton to dollars per hundredweight is presented in the appendix.

The horizontal axis indicates the price of wheat in dollars per hundredweight. By drawing a vertical line from a given price along this axis until it intersects the desired crop profit line and then drawing a horizontal line from that point to where it intersects the vertical axis will indicate the price required for that particular crop to provide the same net income as the base crop.

Part II — Marketing and Use of Oilseeds

Because production of oilseeds in the PNW is still in the trial stage, no definite marketing patterns have been established. The following section deals with the marketing and possible marketing problems associated with an oilseed industry in the PNW. The material presented is tentative and needs to be updated as more information becomes available.

Factors Affecting Oilseed Markets

Marketing of an oilseed requires a review of the entire oilseed market because of the high degree of substitutability of the various vegetable oils and, in some cases, animal fat. Factors affecting the U.S. sunflower market include relative prices, transportation availability and costs, changing foreign demand, political changes, soybean production, oilseed production and use in other countries, the strength of the dollar, demand for oil meal, port strikes and many others. Safflower and rapeseed are affected by similar forces. Constantly changing conditions make marketing of these products a complex process. The information presented in this section is primarily based on published data and will illustrate these price-determining forces.

Government sponsored farm programs, embargoes and other nonmarket actions have direct effects on the profitability of oilseed production. Embargo policies, such as the U.S. embargo on soybean exports in 1973, cause importers to enlarge their number of suppliers, especially Japan.

Marketing Oilseeds

Sunflower and safflower oils compete with other edible oils such as soybean, palm and cottonseed in today's markets. Soybean oil supplies about 60 percent of the total fats and oils and 80 percent of all vegetable oil used for food in the U.S. (Doty and Lawler 1971). Soybean production has increased dramatically during the past three decades, and large domestic and foreign markets have been developed. Wide acceptance of soybean oil and meals provides strong competition for the fledgling sunflower and safflower industries.

Prices for oils other than soybean are largely determined by soybean prices even though there are some important differences in these oils. Sunflower and safflower oils are lower in saturated fat and have made some progress in the healthfood industry as salad oils and margarine. The European market buys a considerable part of sunflower seed and oil produced in the U.S. Europeans have been using sunflower products for several years, usually obtaining the seed from Eastern Europe or the Soviet Union. A potential market for these seeds and their oils may also exist in the Pacific Rim countries. The U.S. domestic market for sunflower oil products is slowly expanding but not fast enough to keep up with production. Because of this, the U.S. industry is largely dependent upon the export market.

Oilseed Prices

The price a PNW sunflower, safflower or rapeseed grower receives is based on the contract price at Portland, Oregon, minus the transportation and storage costs. Portland is used as the PNW location for oilseed price quotations for several reasons. Portland is the regional agricultural market and price quotation source for most other PNW grains and seeds. A single regional location for price quotation eliminates much confusion. Also, Portland is a major export center for farm products, and pricing it there allows an export option for PNW oilseeds.

The PNW contracted sunflower price in 1981 was 13 cents per pound at Portland, compared to 11.25 cents in 1980. The 1981 price of safflower was $275 to $300 per short ton (15¢/lb) while the 1980 price was $180 to $200 per short ton. The 1981 price of rapeseed was about 11 cents per pound compared to 10 cents per pound in 1980. These rapeseed prices were those received by farmers for locally delivered seed. Sunflower prices were quoted as delivered at Portland, Oregon. Farm prices in the PNW were Portland price less 1.0 to 0.6 cents per pound. The 1981 farm price for sunflower produced in southern Idaho was about 12 cents per pound. It was slightly higher at locations nearer to Portland.

The farm price for sunflowers (at 28 percent protein) in Minnesota and North Dakota was 11.2¢/lb as of April 15, 1981, compared to a May 15 price of 10.7¢ and 7.9¢ in April 1980. The 1981 price for the first half of the year averaged 10.9 cents for oil sunflower. It peaked at 14 cents per pound in February. Table 7 presents average 1975-80 prices for sunflower in four major producing states. Sunflower oil meal prices ranged from less than $100 per ton to around $120 per ton for the 1975-80 period (*The Sunflower* May/June 1981).

Table 7. Average 1975-1980 prices for sunflowers in four major producing states.

State and varietal type	Season avg. price per cwt					
	1975	1976	1977	1978	1979	1980
Oil varieties						
Minnesota	$10.60	$10.50	$10.00	$11.60	$ 9.48	$10.70
North Dakota	10.40	10.80	10.50	10.40	8.76	10.50
South Dakota	—	—	8.50	10.30	8.43	10.70
Texas	—	—	8.00	10.20	10.60	13.00
Non-oil varieties						
Minnesota	12.20	12.90	10.50	10.50	12.20	12.80
North Dakota	11.70	11.70	10.90	10.90	11.70	13.30
South Dakota	—	—	9.50	10.80	11.80	12.60
Texas	—	—	12.00	12.50	13.00	—

Source: Field Crops 1975-80 Production, Disposition and Value Crop Reporting Board, ESCS-USDA [CPR-1(81), April 1981; and Stat. Bull. No. 659, March 1981].

Contracting Seed

Most PNW growers sign production contracts to assure a market for their oilseed crops. However, contracting has declined in the northcentral states as sunflower production has increased (Cobia 1975).

Contracting guarantees a market for the crop reducing the grower's risk. However, a non-contracting grower has greater marketing options than a contracted grower. The major noncontract options are:

1. The grower can harvest and sell directly to the elevator for a cash price.
2. The grower can store his crop hoping for a more favorable price.
3. The grower may hedge on the futures market.

A typical sunflower grower contract includes the following specifications:

a. Identification of the buyer and grower of the seed.
b. Specified required quality and type of seed.
c. Acreage and location of fields.
d. Minimum price to be paid at a specified delivery point. For the PNW, the delivery point is usually Portland, Oregon. Moisture and oil content requirements are specified. Any price reductions for quality below the minimum or additional payments for better than minimum quality are specified.
e. Sampling procedures and seed analysis methods are indicated.
f. Delivery requirements are spelled out.
g. Time and method of payment are explained.
h. Other conditions such as restrictions on pesticide use, failure to deliver for causes not controlled by the grower and other details are included. The contract is signed by the grower and by the buyer's representative.

A grower must carefully study contract provisions and be familiar with his production costs in evaluating the best selling method.

The safflower contract was basically the same as the sunflower contract except that prices and seed specifications were different. Rapeseed was grown under contract and purchased locally in the Palouse region of northern Idaho and eastern Washington, the only area where rapeseed is grown commercially in the PNW.

Utilization

Oilseed crops have highly diverse end uses, including human food as oils or solids, animal feed, industrial lubricants and many more. The sunflower plant can be harvested before maturity for silage or biomass fuel. Oilseed crops have proven to be versatile, and additional uses will undoubtedly be developed through applied research.

Several uses have been discovered for sunflower seed. Sunflower is mostly important for its oil since it is high in linoleic acid, a polyunsaturated fatty acid. Sunmeal, a coproduct of sunflower, is low in lysine and high in fiber. Sunflower seed yields a 28 percent protein meal. Dehulled seed yields a 44 to 55 percent protein meal. In comparison, hulled soybean meal is 44 percent protein and dehulled 49 percent with low fiber. The whole sunflower also has potential as a silage crop.

Safflower is another oilseed plant with varied uses. Historically, safflower was used for its color as a dye. In the U.S., safflower initially was grown for use as a drying oil and for production of alkyd resins. Approximately 20 percent of the domestically consumed crop is now used in competition with linseed oil in paint, ink and calking materials.

Because of the concerns about the effects of cholesterol upon the human body, the public generally prefers cholesterol-free oils such as safflower, sunflower, soy and corn oil. Safflower oil has the highest level of polyunsaturates of all commercially available edible oils (Doty and Lawler 1971). Most safflower oil is used as margarine and salad oil. Safflower oil is not widely used in cooking because it is unstable at high temperatures. Safflower meal is high in protein and can be used in livestock rations.

Varieties of winter rape grown in the PNW are marketed for industrial purposes or in birdseed. High erucic acid makes oil from these rapeseed varieties unusable in human food. The meal, because of glucosinolate content, is unsuited as feed for monogastric livestock in general but may be of some value as a supplement for nonlactating ruminants (Thomas 1981). Canadian researchers have developed rapeseed with low erucic acid and glucosinolates that is useful both as human food and for livestock, but this is a spring rape that is not well adapted to the PNW.

Commercial Processing

Basically, two products are derived by crushing oilseeds — the oil that is either pressed out or extracted in a solvent process and the meal that remains once the oil is separated.

Sunflower and safflower are currently processed outside the PNW region in California and Montana. Most rapeseed grown in the northern Idaho area is processed locally. The raw, whole rapeseed is not crushed but bagged only. The small portion of rapeseed merchandised as oil and meal is crushed in Montana.

Current PNW production does not provide a large enough volume of seed to warrant an oilseed crushing facility. A standard 750 ton/day processing facility would exhaust present PNW supplies in a few weeks each year. It is most unlikely that there would be any interest in transporting non-PNW oilseeds in to this region to crush because of high transportation costs.

The feasibility of developing an oilseed processing plant in the PNW will depend upon several factors such as:

1. Cost of a processing plant.
2. Oilseed supply.
3. Price of oilseeds.
4. Disposition of meal.
5. Desirable freight rates.
6. Location.

Considering the geography of the PNW, where production areas are widely scattered, it would be difficult to serve all three PNW states with one plant, but present production volume is not large enough to satisfy more than one typical oil extraction plant.

A 1977 report concluded that an 800 ton/day processing plant that would require about 250,000 acres at 40 bushels an acre could be built in the PNW (Divine et al. 1977). Estimated at that time was that such a processing plant could be built for $13 million. In addition, the processor must finance oil and meal inventories and accounts receivable, which would probably amount to another $15 million or more (Steed 1980).

Some advantages would be gained if a processing plant were built. Regional processing could reduce the transportation cost to the plant. Also, meal imports into the region could be lessened. Currently, large quantities of soybean and other meals are imported into the PNW for livestock feeding. However, no one wants to build a plant in the area without a reliable supply of seed, and not many want to grow seed without a reliable market.

Nationally, there appears to be excess capacity in oilseed processing, especially sunflower. According to the USDA, "In 1980-81 seed crushing capacity in the northcentral states is 1.3 million metric tons while the season's crush was projected to be 0.6 million metric tons. This represents a 45 percent usage of crushing capacity" (USDA 1981).

Much of the sunflower processing takes up excess capacity in northern flaxseed mills and southern cottonseed mills (sunflowers are readily adaptable to cottonseed mills whereas substituting soybeans necessitates major equipment alterations). Additional crushing capacity is scheduled over the next few years in the northcentral states.

On-farm Processing

On-farm processing of oilseeds may be an option available to PNW growers. Small, mechanical expellers and accessories can be purchased from several sources. Additionally, local contractors are willing to contract for oil only with the grower retaining the meal byproduct and providing that the farmer can accumulate and store enough oil to fill a rail tanker (about 8,000 gallons). The profitability for a grower investing in such equipment will depend on equipment cost, labor costs, the grower's oilseed yield and production cost, disposition of the meal byproduct, storability of the oil and meal and the cost of housing the equipment. Cost estimates for on-farm crushing facilities vary widely by type and size of equipment.

With the mechanical screw expeller, there are four general processes which should be done progressively to obtain oil from the oilseed: (1) **cleaning** the seed; (2) **heating** the seed; (3) **pressing** to remove oil; and (4) **filtering**. Dehulling is desirable but not essential.

Transportation and Storage

Four transportation routes are of interest to the PNW oilseeds industry: (1) interior PNW supply points to PNW seaports; (2) northcentral states to PNW seaports; (3) interior PNW points to California mills, and (4) interior PNW points to eastern Montana or Dakota mills.

Transportation of oilseeds within the PNW is generally by truck and rarely by rail. At least one railroad has proposed reduced rates from the upper Midwest to PNW ports on multiple car or unit train shipments. Currently, the rate is $3.74/cwt. Little if any moves at this rate. The proposed rates are: $2.74/cwt for 52 cars and single origin, $2.79/cwt for 26 cars and single origin and $2.84/cwt for 26 cars and multiple origin (Miller 1981). If a greater volume of seed were shipped to Pacific ports, perhaps a more dependable market would develop for PNW seed.

Although a good barge system exists in the PNW, this system is not currently used for oilseeds transported within the region because the volume produced is limited, and markets have not been well developed. Increased production in the future could change this situation. Trucking seed to Lewiston, Idaho, could extend the barge area as far as eastern Montana. The truck-barge system would not be feasible for the major sunflower production areas further eastward.

Barge shipment could be used in the PNW in the future if the oilseed industry expands. Enough volume exists regionally for barge-size loads, but the production is dispersed all over the PNW making consolidation at any one river port impractical. It is difficult to assemble the approximately 15,000 tons necessary for a bulk grain ship. Currently most PNW safflower seed is transported as a backhaul on trucks returning to California.

The possibility of shipping sunflower out of PNW seaports to Mexico or Latin American markets has been discussed. Wheat has been shipped out of the PNW to western Mexican seaports. The biggest problem for doing so is that inadequate quantities are currently available in the PNW. Rail movement to PNW ports from northcentral states would facilitate the Mexican market if the freight rates become competitive (as discussed earlier).

One problem cited by the oilseed industry is that oilseed growers need elevator space at public elevators, but elevator managers are reluctant to allocate space if a steady supply is not forthcoming. Wheat and barley, as the premier PNW crops, get preference in elevator storage, and even then excess wheat is stored on the ground in harvest months. The problem of elevator space allocation also retards the use of rail transportation.

Sunflower, rapeseed and safflower are all free-flowing materials that enhance handling and transportation. These oilseeds can be handled and transported similarly to grains. Storage in conventional elevators is possible although one report points out that sunflower flows better through steeper angled spouts again because of its lighter weight. Methods of loading and unloading sunflower, safflower or rapeseed are essentially the same as for wheat.

Table 8. Sunflower production, selected states, 1975-78.

	1975		1976		1977		1978	
	1,000 acres	yield/acre	1,000 acres	yield/acre	1,000 acres	yield/acre	1,000 acres	yield/acre
		(bu)		(bu)		(bu)		(bu)
Oil varieties								
Minnesota	174	1,150	180	1,240	449	1,590	640	1,540
North Dakota	349	1,100	420	1,000	1,155	1,270	1,731	1,340
South Dakota					131	960	159	1,120
Texas					230	720	29	700
Non-oil varieties								
Minnesota	37	1,030	30	1,130	69	1,350	58	1,490
North Dakota	149	1,100	180	1,000	165	1,160	179	1,260
South Dakota					1	800	1	940
Texas					5	600	1	1,500

Source: USDA

Production of Selected Oilseeds

U.S. production of sunflower has centered in the northern plains states of North Dakota (65 percent), South Dakota and Minnesota, especially along the Red River Valley, and Texas with minor acreages in many other areas including the PNW. Table 8 presents production data on the four major sunflowerseed states. Rapeseed production is limited to the PNW. Most North American rapeseed production is in the prairie provinces of Canada. Safflower production traditionally has been in Arizona and California, but recent production areas have also included eastern Montana and the PNW. Table 9 gives U.S. production of selected oilseeds.

Nationally, oilseed production has greatly expanded over the last 15 years. Soybean, our major oilseed, has been grown commercially in the U.S. for about 40 years. Sunflower, a native crop, became commercially viable after breeding research in the 1960s by Russian agronomists produced sunflower varieties with greatly improved oil content (from 20 percent up to 40 percent). Further breeding advances in hybridization by French and American plant geneticists in the late 1970s led to yield increases of about 25 percent (Doty and Lawler 1975).

Most U.S. sunflowers are now hybrids rather than open-pollinated. In addition to higher yields, hybrid sunflowers have several distinct advantages over open-pollinated varieties. Every plant in a hybrid field has the same genetic background, so all the plants tend to have similar flowering, maturing, timing, height, seed oil content and rust resistance (*Western Hay and Grain Grower* 1980). According to sunflower plant breeders, a large reservoir of genetic material is available with which to improve sunflower in the future.

U.S. oil variety sunflower was first grown commercially in 1967 on about 200,000 acres in North Dakota and Minnesota. Harvested acreage reached about 6 million acres by 1979 (USDA 1981). The 1981 sunflower acreage was 3.915 million acres, up 4 percent from 1980. Recently, substantial carryovers of sunflower have occurred from one year to the next. The carryover provides a reservoir from which buyers can draw on a year-round basis and adds stability to the price.

Sunflower production was down in 1980 and 1981. Prices of alternative crops were up in the northcentral states, especially in the multicropping Red River Valley area. A 1980 drought cut sunflower production but helped maintain the price. Competing oils, such as soybean, suffered greatly from the same drought. Record supplies of oilseeds on the world market also caused sunflower prices and hence production to decline in 1980. Figs. 10 and 11 present several years' data on sunflower and safflower markets.

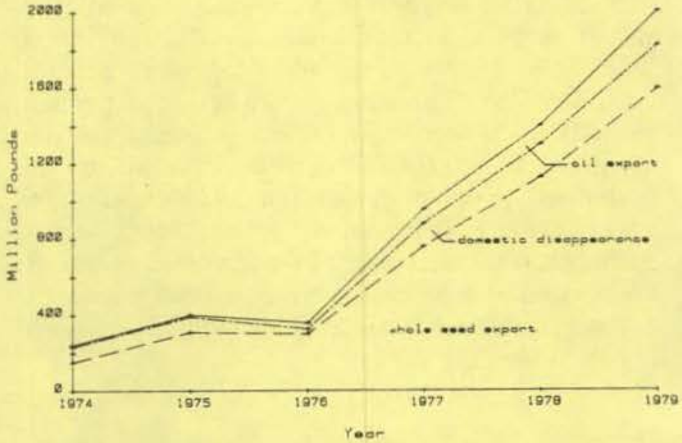

Fig. 10. Export and domestic disappearance of U.S. produced sunflower.

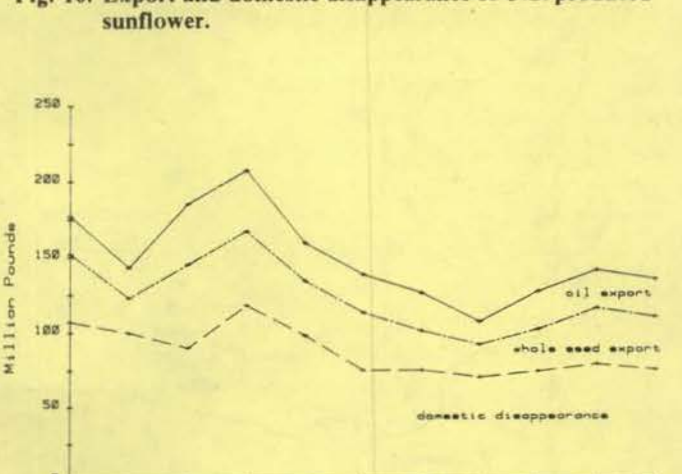

Fig. 11. Export and domestic disappearance of U.S. produced safflower.

Table 9. U.S. production of selected oilseeds, 1970-80 (in 1,000 metric tons).[1]

Type	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Soybeans	30,675	32,008	34,580	42,117	33,102	42,113	35,042	47,947	50,898	61,714	48,301
Cottonseed	3,690	3,846	4,892	4,550	4,091	2,919	3,739	5,009	3,873	5,240	3,990
Peanuts	1,351	1,363	1,485	1,576	1,664	1,750	1,701	1,690	1,809	1,805	1,042
Sunflowers	86	196	334	353	272	541	463	1,330	1,840	3,484	1,988
Safflower	199	263	234	179	157	196	69	159	168	185	87
Flaxseed	747	462	353	409	358	395	199	384	264	344	402
Total	36,748	38,138	41,878	49,184	39,644	47,914	41,213	56,519	58,852	72,772	55,810

[1]Split year includes crops harvested in the late months of the first year shown combined with certain crops harvested in the early months of the following year.

Source: World Oilseeds and Products Outlook, USDA FAC.

Safflower production has been decreasing in California, the major producing state, because of competition from other crops. Newly introduced hard red wheats are attractive to California growers because new crop wheat can be delivered to Japan 2 months in advance of Great Plains wheat. Urban sprawl and higher water costs in southern California and Arizona have cut into the production base. The lower production has contributed to a higher price. Safflower crushing plants in California have purchased eastern Montana safflower to stay in operation. This situation could improve the PNW environment for safflower production.

Nationally, soybean is the premier oilseed crop. In terms of U.S. raw oilseed production (as an average of 1979-81), soybeans led at 85 percent, cottonseed at 7 percent, sunflower at 4 percent, peanuts at 3 percent, flaxseed at .4 percent and safflower at less than .4 percent. In terms of U.S. edible oil production (over a 1979-81 average), soybeans led at 71 percent while sunflower is second at 20 percent. Other edible oil percentage shares are cottonseed at 6 percent, corn 3 percent, peanuts at 1 percent and safflower at .3 percent.

PNW Production

Sunflower has attracted sporadic interest in the PNW. A University of Idaho student in 1919 wrote a thesis concerning the use of the Mammoth Russian variety as silage (Campbell 1919). Only oil sunflower varieties are currently grown in the PNW. Confectionary sunflowers are grown in other regions. Fig. 12 is a map of PNW locations where oilseed production is being tested.

The PNW has about 13 million cropland acres with 20,000 to 25,000 acres in oilseeds in 1981, indicating considerable production potential should these crops become economically feasible. Sunflower acreage was estimated at 15,000 to 20,000 acres in 1981 in the three-state PNW area. This compares to about 500 acres in 1977, 12,000 in 1978, 15,000 in 1979 and 20,000 in 1980. Safflower and rapeseed were estimated to total 5,000 acres in 1981. A 1979 estimate for safflower and rapeseed in the PNW was 7,000 acres each.

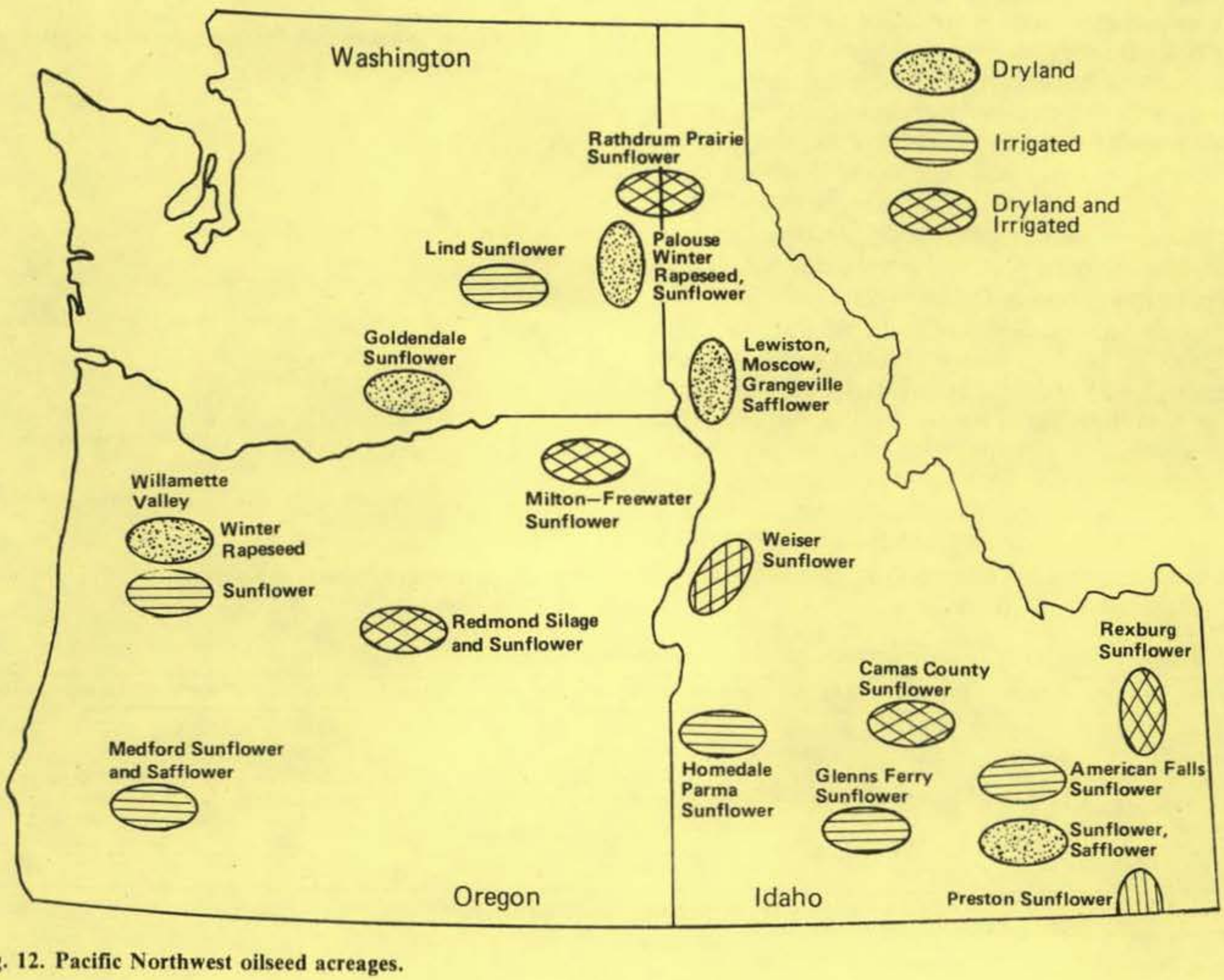

Fig. 12. Pacific Northwest oilseed acreages.

World Production

World production of fats and oils increased by about 83 percent between 1963 and 1979. Even with a world population growth of 36 percent during that period, average availability of fats and oils increased from 22 to about 30 pounds per person. Statistics on world oilseed production are included in Appendix Table 13.

Exports

The export market is the most important outlet for U.S. oilseeds. U.S. production is much greater than domestic consumption. Approximately 50 percent of U.S. sunflower production was exported in the 1980-81 marketing year, while 25 to 40 percent of safflower, an unknown percentage of rapeseed and 60 percent of soybeans were exported.

Table 10 presents figures on U.S. sunflower oil exports by quantity by major countries of destination for 1979 and 1980. Table 11 gives sunflowerseed exports by country or area.

Two markets of particular interest to the PNW are Mexico and the Far East. The PNW's advantage in relation to Asian markets is easier accessibility. Sailing time from the PNW to Japan is much less than from Great Lakes or Gulf ports. Also, in years of generally low sunflower supplies, PNW sunflower could be in demand during the 4 winter months that the St. Lawrence Seaway, the principal sunflowerseed export route, is closed by ice. About 80 percent of U.S. sunflowerseed is exported out of the Great Lakes ports of Duluth and Superior.

The Mexican market has been handicapped by a rail infrastructure that is not adequate to handle the amount of foodstuffs imported from the U.S. At one time in 1980, more than 45,000 U.S. rail cars were stalled in Mexico. Eventually, Mexico declared a temporary embargo on U.S. railcars. It is reported that Mexico will spend $3 to $4 billion on rail modernization (*Sunflower* May/June 1981). Mexico has a port congestion problem also, especially on the eastern Gulf coast.

China's transportation and marketing problems are similar to Mexico's. Ports, transportation and processing facilities need to be greatly improved and expanded to accommodate increased food imports. In 1979-80, Americans consumed 66 pounds of fat per capita, Indians 16 pounds and the Chinese 8 pounds. An increase of the Chinese fat intake only a few pounds could create a tremendous export market for oilseeds. The ability of the Chinese to generate foreign exchange to pay for huge imports may take some time, however.

Japan imported an average of 5.68 million tons of oilseeds and 661,000 tons of meal during the 1978-80 period. Of this, soybeans averaged 72 percent of the total and rapeseed about 18 percent. Sunflower and safflower imports were much smaller. Canada had the lion's share of Japan's rapeseed market because of production and transportation advantages.

Western Europe is the major outlet for U.S. sunflowers. The traditional supplier, the U.S.S.R., phased out all sunflower exports by 1976, and the U.S. picked up the slack. Europeans prefer sunflower oil and have experience with feeding the meal.

Table 10. U.S. sunflower oil exports (in metric tons) by country in calendar years 1979 and 1980.

Sunflower oil	1979	1980
Canada	194	18
Mexico	0	9,593
Panama	0	1,449
Venezuela	15,219	54,827
Ecuador	0	2,391
Netherlands	0	3,690
Switzerland	0	806
Poland	4,490	0
Spain	0	10,919
Iraq	2,000	0
Japan	4,886	5,955
Australia	508	2,071
New Zealand	2,704	3,481
Algeria	0	32,065
Egypt	0	30,735
Others	47	101
Total	30,048	158,109

U.S. Foreign agricultural trade statistical report, calendar year 1980, ESCS-USDA.

Table 11. U.S. sunflowerseed exports by country or area, 1977-80 (all figures are in short tons).

Country	1977	1978	1979	1980
Canada	5,489	42,437	23,265	19,943
Mexico	23,381	352,018	1,262	338,988
Netherlands	210,577	422,781	455,764	589,679
Belgium	2,756	3,307	64,404	78,655
France	49,626	52,368	103,398	41,245
West Germany	202,781	297,956	358,292	187,312
Czechoslovakia	30,741	18,749	16,937	—
Spain	13,981	66	1,711	—
Portugal	98,088	134,307	163,548	230,457
Italy	39,130	110,331	146,903	148,372
South Africa	—	14,551	45,268	46,513
North Africa and Middle East	16	81	21	—
Latin America (excluding Mexico)	49	541	2,111	—
Yugoslavia, Hungary and Bulgaria	5,812	9	31,733	—
Oceania	24	27	55	—
Japan, Taiwan, Hong Kong	7	280	226	—
Others	3,146	1,470	46,265	—
Total	685,604	1,451,279	1,461,163	1,692,589

Source: 1977-79 EA-622 Foreign trade statistics: Bureau of the Census, U.S. Dept. of Commerce.
1980 Data courtesy of Steve Tinnaman, Port of Seattle.

The European common market has import restrictions on vegetable oils but not on raw oilseed. In effect, the benefits of adding the processing value are accrued by the European importer. Also, crushing the seed in Europe allows the Europeans to obtain the meal byproduct. Developing countries, however, that lack large scale processing facilities, import vegetable oils rather than seed.

Foreign exchange rates have a direct effect on foreign purchases of U.S. oilseeds. A "strong" dollar results in higher prices for U.S. products and translates potentially into lower export sales. Conversely, a "weak" dollar actually improves export sales by making our products cheaper. In 1981, the dollar was strong, and European buyers cut back on U.S. oilseed purchases.

Summary and Conclusions

Sunflower, safflower and winter rape are being tried as possible alternative crops in the PNW. Research has determined that these crops will grow in many areas of Washington, Idaho and Oregon. This publication discusses the economic feasibility of producing and marketing these three crops.

In some PNW areas, oilseed crops can compete with spring barley and peas. Winter rape does well in the eastern Palouse area of northern Idaho and eastern Washington, but sunflower and safflower seem to produce better in areas having a warmer growing season such as the Columbia Basin or parts of southern Idaho.

An analysis of crop rotations was done by linear programming. The results indicated that a small increase in oilseed prices relative to other crops would make oilseed production a viable alternative to peas and barley.

Marketing of oilseeds is a problem in the PNW. Since no processing facilities are available in the area, crops have to be shipped elsewhere for oil extraction. This condition is likely to continue unless acreage can be expanded enough to warrant a plant in the area. Most production currently is shipped and priced at Portland, Oregon.

Recent interest in vegetable oil as a substitute for diesel fuel has led to a study of on-farm extraction of vegetable oils to use as fuel. This study is not yet complete, but early indications are that oilseeds cannot compete with traditional fuels at today's prices.

The study arrived at the following conclusions:

1. Sunflower, safflower and winter rape will each grow well in parts of the PNW.
2. With a few exceptions, oilseed production has been economically marginal. This is partly caused by the variety of conditions and practices under which crops have been grown.
3. A substantial increase in demand for oilseeds relative to traditional crops grown in rotation with wheat could make oilseed production feasible.
4. As farm operators become more familiar with oilseed crop production, oilseeds will be more competitive with peas, barley and other crops grown in rotation with wheat.
5. Many of the economic benefits of oilseed production in the PNW have not been fully evaluated. These possible benefits include improved soil conditions, availability of a protein meal for livestock, the possibility of producing an extra crop on some farms and better utilization of machinery and equipment resulting from lengthening planting and harvest seasons.
6. Marketing channels need to be developed if oilseed production is to become common in the PNW. At present, domestic markets are limited because sunflower and safflower oils are too expensive to compete with soybean oil and animal fats in the food processing industry.

These oilseed crops have shown enough promise in some areas to warrant continued development of better varieties of seeds and attempts to find cultural practices that are the most effective in specific areas. Also, additional studies are needed to determine whether suitable markets can be developed for PNW oilseed crops.

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Appendix

Table 12. Conversion table.

Wheat[1]		Barley[2]		
price/bu	price/cwt	price/bu	price/ton	price/cwt
$2.25	$3.75	$1.25	$ 52.08	$2.60
2.50	4.17	1.50	62.50	3.13
2.75	4.58	1.75	72.92	3.65
3.00	5.00	2.00	83.33	4.17
3.25	5.42	2.25	93.75	4.69
3.50	5.83	2.50	104.17	5.21
3.75	6.25	2.75	114.58	5.73
4.00	6.67	3.00	125.00	6.25
4.25	7.08	3.25	135.42	6.77
4.50	7.50	3.50	145.83	7.29

[1]Wheat 1 bu = 60 lb or .6 cwt
[2]Barley 1 bu = 48 lb or .48 cwt

Table 13. World oilseed production estimates (000 m.t.).

	1979-80	% share	1980-81	% share
Soybeans	93,371	53.6	81,774	50.7
Cottonseed	26,197	15.0	26,065	16.2
Peanut	17,682	10.1	17,188	10.7
Sunflower	15,242	8.7	12,708	7.9
Rapeseed	10,180	5.8	11,118	6.9
Sesameseed	1,767	1.0	1,921	1.2
Safflower	1,116	.6	815	.5
Flaxseed	2,667	.5	2,363	1.5
Castor beans	908	.5	875	.5
Copra	4,706	2.7	5,049	3.1
Palm kernels	1,382	.8	1,441	.9
Total	174,218	100.0	161,317	100.0

Source: USDA

Table 14. U.S. sunflowerseed acreage, yield and production, 1973-1981.

Year	Acres	Yield	Production
	(000)	(lb/acre)	(million lb)
1972	813	904	735
1973	793	1,045	829
1974	650	921	599
1975	1,188	1,002	1,190
1976	1,050	970	1,018
1977	2,319	1,235	2,864
1978	2,944	1,362	4,010
1979	5,693	1,347	7,668
1980	3,945	1,013	3,996
1981	4,128	1,148	4,739

Source: USDA p. 38. FOP-9-81.