Costs and Returns Associated with Soybean Production in East-Central North Dakota

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As soybean acreage continues to grow in east-central North Dakota and as producers look to soybeans as an additional cash crop, growing emphasis must be placed on knowing the costs and returns for producing this crop. With the continued expansion of soybean acres it is imperative that producers know and understand their own cost of production. There exists a wide gap between the most efficient and the least efficient producers. The opportunity for financial reward and continued success can be greatly enhanced by knowing the true cost of production and the true rate of return associated with this or any other enterprise.

Data for this study was compiled through the Carrington Area Farm Business Management Program in conjunction with Region III of the North Dakota Farm Business Management Education Program. Region III includes Sheridan county and the area east and south of Sheridan county, ending at the South Dakota border and at the western edge of the Red River Valley. The data summarized in this report was generated from fields operating under a land cash rental arrangement. This arrangement was selected because the total land cost is more recognizable as opposed to that found within owned or share-crop arrangements. The data was collected over a three-year period from 1999 through 2001.

The total acreage involved over the three year period was 18,512 acres. This included 86 farms with a total of 145 fields of soybeans. Farms within the study, growing soybeans for more than one year during this time frame, were counted as one farm in each production year. Data is shown in three categories; the average of all producers, the average of the low 20 percent producers and the average of the top 20 percent producers. Producer data was determined to be in the top or low 20 percent based on the return to overhead or fixed costs by this particular crop or enterprise. It was possible for a producer to have fields in both the high and low profit groups due to low or high gross returns which, when associated with their costs of production, placed a particular field in one group or the other.

The data for this study was collected from the operators' field record books or computerized accounting programs in conjunction with all other financial and enterprise records for that farm unit. Whenever possible actual scale tickets and assembly sheets were used for determining yield quantities, but some quantities were based on estimated bin measurements as recorded by the appropriate producers.

The average cost per acre, excluding any allowance for operator labor or principal payments, but including a cost of depreciation for capital item utilization, shown in table 1 is $151.53 per acre. The average yield was calculated at 33.1 bushels per acre, with the highest profit group averaging 37.6 bushels per acre and the lowest profit producers averaging 22.9 bushels per acre. While high profit producers raised an average of 14.7 more bushels per acre they accomplished this feat with an average of $26.25 less expenses per acre. The value assigned per bushel was only slightly different with the high profit producers at $5.13 per bushel and the low profit producers at $4.91 per bushel, while the average of all producers was calculated to be $4.92 including all loan deficiency payments. The average cost of production for all producers was $4.58 per bushel while the low profit producers had a cost of $7.13 and the high profit producers achieved a cost of $3.65 per bushel.

When the Agricultural Market Transition Act payments, including both PFC and MLA payments, were included in the income transactions, the average breakeven yield based on the listed value per unit was calculated at 25.6 bushels for the average producer and at 28.0 and 20.3 bushels for the respective low

profit and high profit producers. When an additional charge totaling $35.00 per acre was assigned for operator labor and non-operating loan principal payments, the breakeven yields rise to 32.7 bushels, 35.1 bushels and 27.2 bushels for the respective average, low profit and high profit producers.

Discussion as to the appropriateness or adequacy of a combined $35.00 per acre charge would certainly be appropriate. Smaller farm units may require a larger operator labor charge per acre and farms carrying large debt loads may also require more consideration to meet existing principal payments. Individual producers are encouraged to determine their own profitability levels based on their own costs and returns.

Table 1. Soybean Costs and Returns for 1999-2001 (Per acre basis)				
		Average	Low 20%	High 20%
Number of Fields		145	20	17
Number of Farms		86	16	16
Total acres of crop		18,512	1,758	2,587
Yield in bushels per acre		33.1	22.9	37.6
Value per bushel (Includes LDP)	$	4.92	4.91	5.13
Total crop income per acre	$	163.06	112.37	192.89
Misc. income per acre (Insur. & other)	$	3.36	4.31	6.33
Gross income per acre	$	166.42	116.68	199.22
Direct Costs/Acre				
Seed		19.84	23.19	18.74
Fertilizer		6.88	13.52	3.74
Crop chemicals		20.44	22.28	18.28
Crop insurance		7.56	6.88	6.10
Fuel and oil		8.58	8.14	9.41
Repairs		12.00	12.05	12.49
Custom hire		5.25	8.35	2.20
Land rent		34.75	33.53	36.37
Misc.		0.38	0.60	0.00
Operating interest		4.15	4.06	2.71
Total Direct Costs/Acre	$	119.83	132.60	110.04
Return over Direct Costs/Acre	$	46.59	(15.92)	89.18
Overhead Costs/Acre				
Hired labor		6.10	6.24	2.41
Machinery & building leases		3.04	1.98	1.66
Farm insurance		2.61	2.54	2.89
Utilities		1.85	1.65	1.57
Dues and prof. fees		0.64	0.45	0.02
Interest		4.65	3.73	5.94
Machinery and building depreciation		9.94	10.69	9.62
Miscellaneous		2.87	3.49	2.97
Total Overhead Costs/Acre	$	31.70	30.77	27.08
Total Listed Costs/Acre	$	151.53	163.37	137.12
Net Return per Acre	$	14.89	(46.69)	62.10
Direct Costs per bushel	$	3.62	5.79	2.93
Total Listed costs per bushel	$	4.58	7.13	3.65
Net Return per bushel	$	0.45	(2.04)	1.65
Breakeven yield per acre at listed value		30.1	32.4	25.5
Gov't. payments (PFC & MLA) per acre	$	22.38	21.79	26.51
Breakeven yield with Gov't. payments		25.6	28.0	20.3
Total costs including $35/acre for estimated operator labor and principal payments	$	186.53	198.37	172.12
Breakeven yield including estimated operator labor and principal payments		32.7	35.1	27.2