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Practices Used By Wisconsin Top-Profit Corn and Soybean Farmers

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Production contests are popular among farmers and often stir up debate about the "best" production practices for crops. Since 1987, UW Agronomy has been conducting a contest for corn and soybean farmers called PEPS (Profits through Efficient Production Systems). The forerunner of the Wisconsin PEPS contest was the UW Pacemaker Yield Club run from 1956 to 1959. Over 550 farmers participated with the average yield of club members exceeding 100 bu/A in five of six years. In 1981 the Wisconsin Corn Growers Association perceived an over-emphasis on "maximum yields" and sponsored a contest based on net monetary return per land area. From 1982 to 1986, a Conservation Tillage Corn Production contest was run based on the economics of corn production. In 1987 this contest was expanded into the current PEPS contest to include corn, soybeans and wheat. Currently, the contest is divided into three divisions: 1) cash corn, 2) livestock corn (rotation with alfalfa or manure application), and 3) soybean.

Farmers need to manage nutrients and pesticides carefully to both avoid adverse effects on the environment and to reduce costs of purchased inputs. But farmers also must maintain a production level that will result in profitable returns. Unlike other contests that emphasize yield, the PEPS contest emphasizes efficiency and profitability. Its objectives are to recognize the practices utilized by the *most profitable* farmers and to provide other farmers, educators, and researchers insight into ways these farmers integrate practices into a system. The contest also emphasizes soil and water *conservation, efficiency, profitability and competitiveness* versus productivity alone.

Since 1987 a total of 1,358 farmers have participated in the contest. Profit groups were determined by ranking contestants in quintiles by division, district and year.

The largest proportion of costs involve land, fertilizer and fixed + variable equipment (Fig. 1). In the cash corn division, the average cost per acre has been $238 (minimum = $215 during 1995; maximum = $260 during 1992). In the livestock corn division, the average cost per acre is $206 (minimum = $186 during 1993; maximum = $235 during 1987). Average cost per bushel has been between $1.25 and $1.95 in the cash corn division and $1.13 and $1.81 in the livestock corn division. In the soybean division, average cost per acre has been $181 (minimum = $169 during 1988; maximum = $204 during 1987), and average cost per bushel has been between $3.30 and $4.08. Soybean is $25-57/A cheaper to produce than corn. For both corn and soybean, better efficiency (lower cost per bushel) occurs with higher yields.

Seed costs have increased 74% for corn and 59% for soybeans since the inception of the contest in 1987. Fertilizer costs have not changed over time, but varies up to 120% depending upon year. The variability is mostly due to the way in which fertilizer costs are calculated using yield level and consequent P and K removal rates. Variable

equipment costs have increased 30% for both corn and soybeans.

Total acre cost of production between the top and bottom profit group is similar, but grower return is not due to substantially higher yield (Fig. 2 and Table 1). Acre cost difference between top and bottom profit groups is $13-24/A for corn and $16/A for soybean (Table 1). Top corn farmers produce 38-47 bu/A more than the bottom group, while top soybean farmers produce 18 bu/A more. Top corn farmers have 1.6-1.8% lower grain moisture. Farmers in the top profit group tend to use land with lower yield potential, rotate more frequently, plant about 3 to 6 days earlier, and make 0.3-0.5 fewer trips across the field.

A number of common production practices are observed among farmers in the top-profit group in the PEPS contest. Top-profit farmers have or rent land with the capability of yielding 140 to 160 bu/a (5-yr. average) -- and rent it for less than $90/acre. They don't follow corn with corn thereby reducing N costs with credits from previous legume (alfalfa or soybeans). Also, rotation does not require the use of rootworm insecticide, and they can take full advantage of the "rotation effect" increasing yields 5-10%. They select hybrids with high yield potential, fast dry-down, and good standability and try to pay less than $60/bag. Top-profit farmers use tillage sparingly and try to leave 30% residue cover at planting. They question whether each pass is necessary and combine trips (for example; herbicide, fertilizer application and tillage). They soil test and only apply nutrients needed or recommended using the cheapest form of fertilizer per unit of N, P, or K and apply efficiently. They use manure and legume credits to reduce purchased fertilizer costs. For corn they don't cut back on overall N supplied unless they were over applying. They don't use micronutrients unless soil tests recommend it. They plant early, between April 25 and May 5, and plant 26- to 30,000 (lighter soils) or 28- to 32,000 (medium-heavy soils) kernels/acre. They use 30-inch rows. Top-profit farmers monitor insect (European corn borer, corn rootworm) levels and apply insecticides only when economic thresholds occur. They control weeds as "cheaply" as possible by knowing their weed problem. They often use or consider band applications and/or timely rotary hoeing and cultivation and sometimes cultivate increasing yield about 5% beyond weed control benefits. They calibrate their sprayer and don't demand "perfect" weed control. They harvest when kernel moistures are in the low to mid 20's if drying.

Other characteristics of top-profit farmers include a knack for substituting information for more expensive purchased inputs. Information topics include hybrid performance data, soil tests, manure analysis, pest scouting, and crop consultants or their own on-farm trials.

The most profitable years are usually the highest yielding years. High yields still require good weather. Springs need to be dry enough for early planting, but wet enough to activate herbicides and promote good stands with uniform emergence. Ideal summers have timely rain (1-inch per week), lots of sunshine, and temperatures in mid-80's (day) and low 60's (night). Optimum falls have sunny, dry weather to speed dry-down & allow harvest of "22% corn" by November 1.

"Best of the Best" aptly describes the farmers participating in this contest. Results reflect the efforts and costs of the best farmers growing corn and soybeans on the best land available. PEPS costs underestimate actual costs because not all inputs are accounted for completely. Costs reflect only what can be documented. It is difficult to accurately measure all indirect, incidental, and overhead costs associated with a farm system. Also, the required 10-acre contest field is usually placed on the best soils/fields of the farm and managed optimally. Thus, costs are probably higher for most farmers.

In spite of these shortcomings, contest results continue to be useful to farmers and industry. The contest provides an opportunity to identify production practices of top-profit farmers, evaluate acceptance of recommended practices and identifies new research problems in grain production systems.

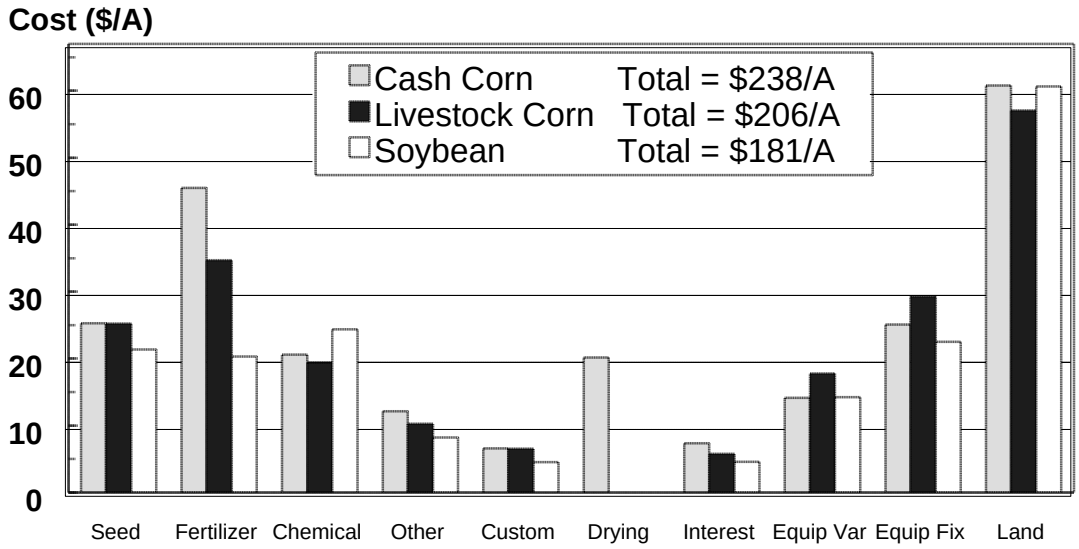

Figure 1. Average Division Production Costs For Farmers in PEPS (1987-1999)

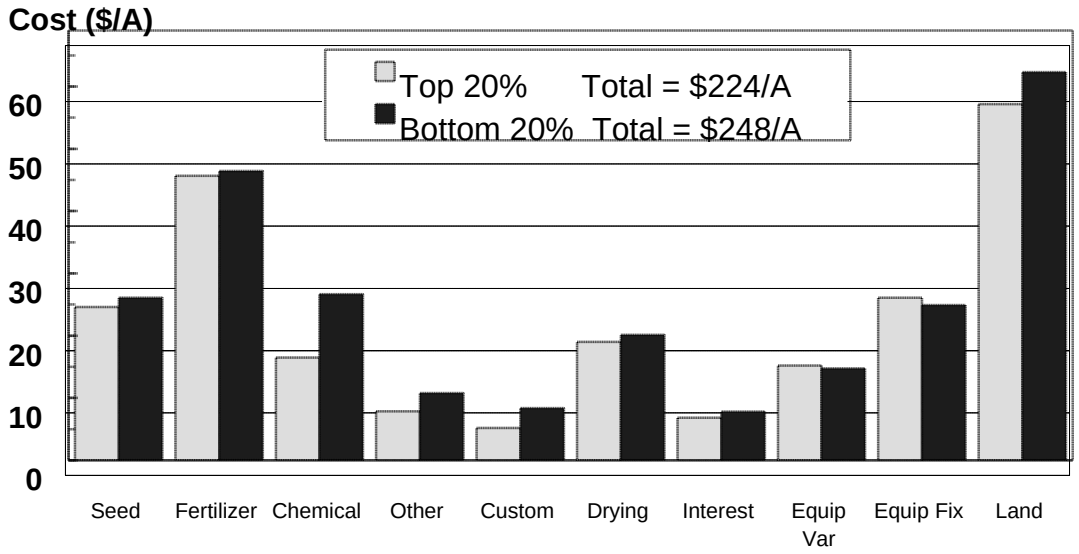

Figure 2. Average Cash Corn Production Costs for Profit Groups in PEPS (1987-1999)

Table 1. Farmer production, cost, and management practices for the top 20% and bottom 20% profit groups in PEPS (1987-1999).

Production, Cost or Management Practice		Cash Corn		Livestock Corn		Soybean	
		Top 20%	Bottom 20%	Top 20%	Bottom 20%	Top 20%	Bottom 20%
Grain yield (bu/A)		182	144	177	130	63	45
Grain moisture (%)		21.0	22.8	22.9	24.5	12.7	13.0
Acre cost ($/A)		$224	$248	$190	$203	$173	$189
Bushel cost ($/bu)		$1.25	$1.79	$1.09	$1.61	$2.77	$4.31
Grower return ($/A)		$187	$74	$213	$94	$198	$74
NRCS yield (bu/A)		111	121	106	109	114	124
Previous crop (%)	Corn	6	30	9	32	87	91
	Legume	71	41	64	43	4	3
	Other	23	29	27	25	9	6
Tillage (%)	No-Till	21	24	7	12	25	31
	Min-Till	33	18	20	13	20	22
	Chisel	31	31	25	22	26	23
	Moldboard	14	27	48	52	29	23
Relative maturity		101	100	100	98	3.3	2.0
Planting date		5 May	8 May	8 May	11 May	15 May	21 May
Seeding rate (no./A)		29,200	33,100	28,700	28,700	166,000	197,000
Row width (%)	<= 30 in.	79	69	70	62	88 *	90 *
	>30 in.	21	31	30	38	12 *	10 *
Field Trips (no.)		5.9	6.2	6.7	7.1	5.3	5.8
Starter (%)		54	50	36	41	6	17
Fertilizer N (lb/A)		128	135	69	83	-	-
Legume N (lb/A)		30	13	82	61	-	-
Insecticide (%)		2	17	3	8	-	-
Inoculant (%)		-	-	-	-	80	91

*** Soybean row spacing categories are < 30 in. and 30 in.**