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# Yields of Corn, Soybeans, and Alfalfa in Western Iowa: 1990 to 2011

## **Abstract**

The ISU Western Research Farm, Castana, Iowa is one of the oldest in Iowa dating to 1946. It also has a unique location in the loess hills of western Iowa. The research farm was set up to study the deep loess soils, particularly crop production and soil conservation methods. Although the work at the research farm has transitioned away from traditional plot work, yields of major crops grown at the farm, and climate data are collected each year. Crop yields are a reflection of current technologies and weather. In western Iowa, rainfall is especially critical and is often the limiting factor.

## **Keywords**

RFR A1183, Animal Science

## **Disciplines**

Agricultural Science | Agriculture | Animal Sciences

# Yields of Corn, Soybeans, and Alfalfa in Western Iowa: 1990 to 2011

## RFR-A1183

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### Introduction

The ISU Western Research Farm, Castana, Iowa is one of the oldest in Iowa dating to 1946. It also has a unique location in the loess hills of western Iowa. The research farm was set up to study the deep loess soils, particularly crop production and soil conservation methods. Although the work at the research farm has transitioned away from traditional plot work, yields of major crops grown at the farm, and climate data are collected each year. Crop yields are a reflection of current technologies and weather. In western Iowa, rainfall is especially critical and is often the limiting factor.

### Materials and Methods

The Western Research Farm has been a National Weather Service recording site since the 1940s. Yields reported here are whole farm yield averages. In all cases, corn followed soybeans. No attempt was made to keep constant the multiple production variables of field, hybrid, population, tillage, fertilizer, herbicide, pest management, row width, machinery, or operator. The only constant was location of the farm.

### Results and Discussion

Annual average whole farm yields of corn, soybeans, and alfalfa and the annual precipitation for 1990 to 2011 are shown in Table 1. The 60-year long-term average precipitation for the farm is 29.89 in. per year,

thus any annual precipitation amount greater than 30 in. is more than the long-term average. There were 8 of the 22 years that were drier than the long-term average.

Yields for all three crops generally increased over the twenty-two year period. For example, for the first four years (1990–1993) the average corn yield was 106 bushels/acre and for the most recent four years the average corn yield was 194 bushels/acre (2008–2011), an 82 percent increase. Soybeans and alfalfa were less dramatic with 36 percent and 21 percent yield increases, respectively (Table 1).

An efficiency of precipitation use by the corn crop was calculated for each year by dividing the average corn yield by the precipitation for that year (Table 1). The precipitation was used to produce corn more efficiently during recent years. For example, for the first four years (1990–1993) the average efficiency of precipitation use was 2.9 bushels/inch. For the most recent four years (2008–2011), the average efficiency of precipitation use was 6.1 bushels/in., a 110 percent increase.

There are many reasons behind the increasing yields. Some reasons may include better crop genetics with better yield potential, improved resistance to pests, and improved plant characteristics (standability, seedling vigor, etc.). Better planting and harvesting equipment may have played a role (seed placement, less harvest loss). Also the farm shifted from tillage to no-tillage, a move that conserved soil moisture, and changed to narrower row widths and higher populations. Also, weed control improved due to herbicide resistant crops and more effective herbicides.

**Table 1. Yield at ISU Western Research Farm, 1990–2011.**

<b>Year</b>	<b>Precip. in.</b>	<b>Corn bu/acre<sup>a</sup></b>	<b>Soybean bu/acre<sup>a</sup></b>	<b>Alfalfa tons/acre</b>	<b>Efficiency of precipitation corn bu/in.<sup>b</sup></b>
1990	32.45	85	34	3.0	2.6
1991	32.69	100	38	2.5	3.1
1992	37.46	138	45	5.0	3.7
1993	45.82	100	40	5.0	2.2
1994	32.30	143	51	3.8	4.4
1995	30.10	130	41	5.0	4.3
1996	39.58	144	41	4.0	3.6
1997	23.08	129	46	4.1	5.6
1998	41.35	151	50	4.8	3.7
1999	30.69	157	45	4.6	5.1
2000	24.45	151	51	5.7	6.2
2001	33.67	138	39	4.3	4.1
2002	27.01	141	42	3.7	5.2
2003	24.07	144	35	3.5	6.0
2004	26.78	193	40	3.5	7.2
2005	26.10	170	50	4.2	6.5
2006	28.40	104	42	4.5	3.7
2007	39.59	178	43	5.4	4.5
2008	36.77	209	41	6.1	5.7
2009	33.17	211	49	4.3	6.4
2010	33.94	161	61	5.6	4.7
2011	24.92	193	62	5.6	7.7

<sup>a</sup>Adjusted to corn @ 15.5 percent and soybeans @ 13 percent.

<sup>b</sup>Efficiency of precipitation = corn yield ÷ annual precipitation.