AGRICULTURAL

MU Guide

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Corn and Soybean Replant Decisions

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Deciding whether or not to replant a sparse stand is one of the more difficult decisions a corn or soybean grower will face. The difficulty of this decision stems from the difficulty of predicting how stand density will be affected by the combination of planting date and changing environmental conditions. However difficult, replant decisions are made by at least some Missouri farmers every year.

You should follow a step-by-step procedure for estimating dollar gain or loss from replanting. This procedure should include a careful study of the field in question and an analysis of yield potential. Follow these steps:

- Determine the cause of the sparse stand.
- Determine the stand density and condition of the stand.
- Determine the yield potential of the sparse stand.
- Estimate the expected gross revenue from the sparse stand.
- Estimate the cost to replant.
- Estimate the yield potential and gross revenue from a replanted stand.
- Determine whether or not the decision to replant pays for itself.

Cause of the sparse stand

Accurate determination of the cause of the sparse stand is an essential first step because a sparse stand can also result from replanting unless the cause is identified and corrected. Before emergence, causes of sparse stands include poor seed quality, improper seeding practices, low moisture availability, soil crusting, saturated soil, herbicide injury, insect feeding, and disease infection. Stand density can be reduced after emergence by weather events, diseases, or animal feeding. Replanting should be contemplated only if the cause for the sparse stand can be corrected.

Tim Schnackenberg and Rick Mammen, University Outreach and Extension, contributed to the development of this guide.

In most instances, planting into existing sparse stands is not recommended because plants of uneven sizes and maturity perform poorly. This is particularly true with corn. You can remove existing stands with either herbicides or tillage. Replanting without tillage saves time and soil moisture without diluting existing preemergence herbicides.

Stand density and condition

An accurate estimate of the remaining live plant population is necessary to determine potential yield of the sparse stand. If possible, wait several days to determine if plants are alive or regrowth is possible. The number of areas to be sampled depends on the uniformity of the damaged stand. With nearly uniform damage, fewer areas need to be sampled. Always remember that some portions of the field may not need to be replanted. Count the number of live plants in the appropriate areas and calculate stand. As you count plants, you must decide if the plant is healthy or at least capable of recovery. Do not count weak plants or those plants damaged beyond reasonable potential for recovery. (To estimate stands after hail or animal damage, it is important to note which parts of the plant are damaged and how they affect the potential for regrowth. Leaf removal, for example, is far less serious than bruising of the lower stem.)

Be sure to note the condition of the remaining plants and the field, including the extent of plant defoliation, presence of large gaps in stands, and the amount of weed pressure.

Count plants in an area for which you know the dimensions so that you can calculate the number of plants per acre. You will simplify your calculation by counting plants in a length of row equal to one-thousandth of an acre. Use the following table.

If row width is . . .	Then a row this long equals 1/1000th of an acre
30 inches	17 feet, 5 inches
20 inches	26 feet, 2 inches
15 inches	34 feet, 10 inches

For drilled soybeans, use the hula hoop method and refer to Table 1.

Table 1. Hula hoop method for estimating population of drilled soybeans.

Number of plants in hoop	Inside diameter of hoop 30"	32"	34"	36"	38"
	— Thousands of plants per acre —				
2	18	15	14	12	11
4	35	31	28	25	22
6	53	47	41	37	33
8	71	62	55	49	44
10	89	78	69	62	55
12	107	94	83	74	66
14	124	109	97	86	77
16	142	125	110	99	89

Yield potential of the stand

Yield is greatly influenced both by environment and genetics. Use Table 2 as a guideline to estimate yield potential. Data in Table 2 are expressed as a percentage of "normal." You or your adviser must determine this normal yield. Neither overestimate nor underestimate your normal yields for the location and soil type in question. An accurate estimate is essential to a proper replant recommendation. Remember that corn and soybean yields are most affected by weather conditions in July and August, respectively. It is nearly impossible to predict in May or early June what weather events will occur in July or August. Unless you have good reason to believe differently, assume normal weather patterns.

Table 2. Estimated corn and soybean yield potential at various plant populations (yield as % of normal).

Corn population	30" rows	Soybean population	30" rows	7" rows
22,000	98%	160,000	100%	100%
20,000	95%	120,000	100%	100%
18,000	91%	80,000	100%	96%
16,000	88%	60,000	94%	92%
14,000	84%	40,000	88%	87%
12,000	80%	20,000	79%	77%
10,000	75%	10,000	64%	58%

Expected gross revenue of the sparse stand

The decision to replant will be based on what you expect the grain to be worth at harvest. Current market price will probably not be the market price at harvest. Use a market advisory service or the futures market (less local basis) to estimate the price at harvest time.

The predicted market price can greatly influence replant decisions — make an honest prediction. Determine income by multiplying predicted yield by the market price.

Cost of replanting

Even if yield from replanting would be greater than that from the damaged field, the cost of replanting may still exceed the value of the additional yield from replanting. It is important that you estimate as accurately as possible the following costs.

Seed cost: Determine cost of seed by multiplying unit cost by the seeding rate. In many instances, seed companies reduce seed prices if their products were initially used in the sparse stands.

Fuel, machinery and labor costs: Include all fuel and machinery costs associated with replanting. Obviously, reduced tillage or no-till methods will reduce these costs. Custom charges for planting or chemical application can be used but will probably overstate the cost of replanting if you use your own equipment.

Pesticide costs: Usually additional preemergence herbicide will not be necessary unless tillage is performed. If you do not use tillage to remove the existing stand, a burndown herbicide application is necessary. Include only those costs that would not be incurred from already-planned herbicide applications. If the sparse stand resulted from disease or insect damage, additional fungicide or insecticide may be needed.

Other costs: These costs would include interest on loans associated with replanting, increased dryer costs for late maturing corn, and labor costs not already covered.

For purposes of this analysis, none of the other costs of production are important. Fertilizer, chemical and other costs already incurred in production are considered sunk costs that do not affect the decision to replant. These costs affect profitability but the replant decision addresses only the question of whether the increased revenue from replanting exceeds the increased cost associated with replanting.

Likely yield and income from replanted field

Delayed planting will usually decrease yield potential but the amount of decrease is difficult to predict. Use Tables 3 and 4 to estimate the effect of planting date on yield from replanted fields.

Once yield is predicted, determine income by multiplying yield by the predicted market price. Use the same predicted market price that you used in estimating expected gross revenue. Estimate net income by subtracting the cost of replanting from expected income.

Making the decision

To determine whether replanting is appropriate, compare the net income from replanting with the income from a sparse stand. Even if this comparison is positive you still may not wish to replant. Other demands on your time and competing crop manage-

Table 3. Effect of planting date on corn and soybean yield in central and north Missouri.

Corn planting date	Yield as % of normal	Soybean planting date	Yield as % of normal
May 11	100	May 10	100
May 16	99	May 20	100
May 21	97	May 30	94
May 26	94	June 10	88
May 31	90	June 20	78
June 5	85	June 30	70
June 10	80	July 10	NR*
June 15	75		

* not recommended north of Interstate 70

Table 4. Effect of planting date on corn and soybean yield in southeast and southwest Missouri.

Corn planting date	Yield as % of normal	Soybean planting date	Yield as % of normal
April 1	100	May 10	100
April 10	99	May 20	100
April 30	92	May 30	97
May 10	87	June 10	90
May 20	83	June 20	78
May 30	79	June 30	72
June 10	72	July 10	67
June 20	59		

ment issues are important considerations.

The worksheets below can help in organizing the important information and arriving at an objective decision. An EXCEL® spreadsheet program is available on the Agricultural Electronic Bulletin Board to help you analyze your situation. You can access AgEBB by modem at (573)882-8289 or on the World Wide Web at www.ext.missouri.edu/agebb/. For voice assistance call (573)882-4827. Download the file named **replant.exe.**

A Web-based version of the worksheet accompanies this publication at the Xplor (Extension Publications Library on Request) Web site at the following address: muextension.missouri.edu/xplor/.

Corn/Soybean Replant Worksheet	
A. Estimated stand density of sparse stand	plants/acre
B. "Normal" yield in bushels/acre	bu/acre
C. Effect of sparse stand on yield potential from Table 2	%
D. Estimated yield from sparse stand; multiply line "B" by line "C"/100	bu/acre
E. Estimated market value of crop	$/bushel
F. Estimated income from sparse stand; multiply line "E" by line "D"	$/acre
G. Extra herbicide needed due to sparse stand	$/acre
H. Expected net income from sparse stand. (F - G)	$/acre
I. Estimated cost to replant; total of lines 1 + 2 + 3 + 4 1. Seed _____ 2. Fuel, machinery, labor _____ 3. Pesticides _____ 4. Other costs _____	$/acre
J. Effect of planting date on yield from Table 3 or Table 4	%
K. Estimated yield from replanted stand; multiply line "B" by line "J"/100	bu/acre
L. Estimated income from replanted stand; multiply line "E" by line "K"	$/acre
M. Net income from replanted stand; subtract line "I" from line "L"	$/acre
N. Profit or loss from replanting; subtract line "F" from line "M"	$/acre

NOTE: Sparse stands may also result in some added expenses. Defoliated plants and sparse stands may require an additional herbicide application.

EXAMPLE Corn/Soybean Replant Worksheet	
A. Estimated stand density of sparse stand	10,000 plants/acre
B. "Normal" yield in bushels/acre	120 bu/acre
C. Effect of sparse stand on yield potential from Table 2	5 %
D. Estimated yield from sparse stand; multiply line "B" by line "C"/100	90 bu/acre
E. Estimated market value of crop	$2.50 /bushel
F. Estimated income from sparse stand; multiply line "E" by line "D"	$292.50 /acre
G. Extra herbicide needed due to sparse stand	0 $/acre
H. Expected net income from sparse stand. (F - G)	$292.50 /acre
I. Estimated cost to replant; total of lines 1 + 2 + 3 + 4 1. Seed ___$15.00_____ 2. Fuel, machinery, labor ___$10.00_____ 3. Pesticides _____ 4. Other costs ___$2.00_____	$27.00 /acre
J. Effect of planting date on yield from Table 3 or Table 4	88 %
K. Estimated yield from replanted stand; multiply line "B" by line "J"/100	105.6 bu/acre
L. Estimated income from replanted stand; multiply line "E" by line "K"	$343.20 /acre
M. Net income from replanted stand; subtract line "I" from line "L"	$316.20 /acre
N. Profit or loss from replanting; subtract line "F" from line "M"	$23.70 /acre

NOTE: In this example, the grower would probably replant corn if this operation did not interfere with soybean planting or some other activity. However, if corn yield from a replanted stand was 100 and not 105.6 bu/acre, replanting would not be justified. This illustrates the importance of accurate estimates for price and yield.

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