**UK** **COOPERATIVE EXTENSION SERVICE**
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

# Estimating Soybean Yield

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Estimating soybean yield while the crop is still standing in the field can be a challenging procedure. Proceed with caution since variability in yield components such as plant population, seeds per pod, and seed size can all drastically affect the final yield. Yield estimates may be inaccurate when conducted before seed fill is complete, and assumptions of final pod number, seeds per pod, and seed size may not accurately reflect those values at maturity. The best estimate can be achieved at reproductive growth stage R6 (green pods with seeds that fill the pod cavity) or later.

Estimates of yield components should be made in five to ten random locations across the field to get a better field average yield. Each of the locations should be typical of the surrounding areas. Sampling from multiple locations in the field will improve the overall yield estimate.

Soybean yield is estimated by completing the terms in the following equation:

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**Soybean Yield Estimate Equation:**

(plants per acre) x (pods per plant) x (seeds per pod) ÷ (seeds per pound) ÷ (pound per bushel) = (bushels per acre)

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## Step 1. Estimate plants per acre.

The number of plants per acre must be determined at each location in the field. Use the data in Table 1 to quickly convert stand counts into plants per acre. Count the number of plants in 10 feet of one row and divide that number by 10 to determine plants per foot for row widths of 30, 20, and 15 inches. For row widths of 7.5 and 7 inches, count the number of plants in 40 feet of one row (or 10 feet of four separate rows) to determine plants per acre.

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**Example:**
In 15-inch rows, you count an average of 3.5 plants per foot of row.

According to Table 1, 3.5 plants per foot in 15-inch rows equal 121,968 plants per acre.

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If you would prefer to count plants in 1/1,000th acre, you can use Table 2 to determine the row lengths needed. When using this method, count the number of plants within 1/1,000th acre, and multiply that number by 1,000 to estimate plants per acre for each location.

**Table 1.** Estimated soybean plants per acre. For 30, 20, and 15-inch rows, determine plants per foot of row by counting the number of plants within 10 feet of a row and divide the number of plants by 10. For 7.5 and 7.0-inch rows, determine the number of plants in 40 feet of row by counting plants in 10 feet of four separate rows.

| Soybean Plants Per Foot of Row | Row Width (inches) | | | Soybean Plants in 40 Feet of Row | Row Width (inches) | |
|---|---|---|---|---|---|---|
| | 30 | 20 | 15 | | 7.5 | 7 |
| | Estimated Plants / Acre | | | | Estimated Plants / Acre | |
| 0.5 | 8,712 | 13,068 | 17,424 | 5 | 8,712 | 9,340 |
| 1.0 | 17,424 | 26,136 | 34,848 | 10 | 17,424 | 18,679 |
| 1.5 | 26,136 | 39,204 | 52,272 | 15 | 26,136 | 28,019 |
| 2.0 | 34,848 | 52,272 | 69,696 | 20 | 34,848 | 37,358 |
| 2.5 | 43,560 | 65,340 | 87,120 | 25 | 43,560 | 46,698 |
| 3.0 | 52,272 | 78,408 | 104,544 | 30 | 52,272 | 56,037 |
| 3.5 | 60,984 | 91,476 | 121,968 | 35 | 60,984 | 65,377 |
| 4.0 | 69,696 | 104,544 | 139,392 | 40 | 69,696 | 74,716 |
| 4.5 | 78,408 | 117,612 | 156,816 | 45 | 78,408 | 84,056 |
| 5.0 | 87,120 | 130,680 | 174,240 | 50 | 87,120 | 93,395 |
| 5.5 | 95,832 | 143,748 | 191,664 | 55 | 95,832 | 102,735 |
| 6.0 | 104,544 | 156,816 | 209,088 | 60 | 104,544 | 112,074 |
| 6.5 | 113,256 | 169,884 | 226,512 | 65 | 113,256 | 121,414 |
| 7.0 | 121,968 | 182,952 | 243,936 | 70 | 121,968 | 130,753 |
| 7.5 | 130,680 | 196,020 | 261,360 | 75 | 130,680 | 140,093 |
| 8.0 | 139,392 | 209,088 | 278,784 | 80 | 139,392 | 149,432 |
| 8.5 | 148,104 | 222,156 | 296,208 | 85 | 148,104 | 158,772 |
| 9.0 | 156,816 | 235,224 | 313,632 | 90 | 156,816 | 168,111 |
| 9.5 | 165,528 | 248,292 | 331,056 | 95 | 165,528 | 177,451 |
| 10.0 | 174,240 | 261,360 | 348,480 | 100 | 174,240 | 186,790 |
| 10.5 | 182,952 | 274,428 | 365,904 | 105 | 182,952 | 196,130 |
| 11.0 | 191,664 | 287,496 | 383,328 | 110 | 191,664 | 205,469 |
| 11.5 | 200,376 | 300,564 | 400,752 | 115 | 200,376 | 214,809 |
| 12.0 | 209,088 | 313,632 | 418,176 | 120 | 209,088 | 224,148 |

**Table 2.** Row width and length of row needed to equal 1/1000th acre.

| Row Width (inches) | Length of Row Needed to Equal 1/1000th Acre |
|---|---|
| 6 | 87 feet 1 inch |
| 7 | 74 feet 8 inches |
| 7.5 | 69 feet 8 inches |
| 15 | 34 feet 10 inches |
| 30 | 17 feet 5 inches |

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## Step 2. Estimate pods per plant.

Count the pods on each plant for 10 consecutive plants in one row, regardless of plant size. Determine the average number of pods per plant.

> **Example:**
> At one location, 220 pods were counted on a total of 10 consecutive plants.
>
> The total number of pods (220) is divided by 10, and the average number of pods per plant is determined to be 22.

## Step 3. Estimate seeds per pod.

Healthy soybean plants will average about 2.5 seeds per pod. For healthy soybeans, multiply pods per acre from Step 2 by 2.5 seeds per pod to estimate seeds per acre. For soybeans under stress, the seeds per pod could drop to 2, 1.5, or even less under high stress situations. You can count the seeds per pod from the same soybean plants used in Step 2.

> **Example:**
> The majority of pods appear to have three seeds while some have two seeds. The overall estimate of seeds per pod is 2.5.

## Step 4. Estimate seeds per pound (seed size).

Seeds per pound may be the most difficult estimate to make. Research in Kentucky indicates that 2,500 seeds per pound is an average seed weight estimate, but seeds per pound can be as high as 3,400. If the soybean plant experienced stress, the seed size may be smaller, meaning that a larger seeds-per-pound number should be used for the estimate. The original seed size from the seed bag may provide a reasonable indication of soybean seed size. When the seed tag is not available, use 2,500 seeds per pound. You may want to adjust the seed size if the final yield estimate seems unusually high or low.

> **Example:**
> Without knowing the actual seeds per pound, you estimate 2,500 seeds per pound.

## Step 5. Estimate bushels/acre.

One bushel of soybeans weighs 60 pounds.

> **Example:**
> Using the numbers obtained and the yield calculation formula, the following yield estimate is determined:
>
> (plants per acre) x (pods per plant) x (seeds per pod) ÷ (seeds per pound) ÷ (pound per bushel) = (bushels per acre)
>
> 121,968 x 22 x 2.5 ÷ 2,500 ÷ 60 = 44.72 or 45 bushels per acre

## Step 6. Repeat yield estimate at other locations.

The yield estimate should be repeated five to ten times across the field. Use Table 3 as a worksheet to record the values estimated for each yield component. If the first five yield estimates are relatively close to each other, additional yield estimates at more locations may not be necessary. If the first five yield estimates vary widely, additional yield estimates at more locations are necessary.

## Keep the Yield Estimate in Perspective

Remember that the yield estimate is only as good as the numbers put into the equation. Yield estimates made closer to harvest are typically more reliable than yield estimates made earlier in growth and development of the soybean plant. If you have additional questions regarding soybean yield estimates, contact your county Cooperative Extension agent.

**Table 3.** Worksheet for yield estimates. Use this table to fill in the yield components for each location in a field. Average the yields of each location together for a yield estimate of the entire field. Use the following equation to calculate yield at each location in the field.
(plants per acre) x (pods per plant) x (seeds per pod) ÷ (seeds per pound) ÷ (pound per bushel) = (bushels per acre)

| Location | Plants per Acre | x | Pods per Plant | x | Seeds per Pod | ÷ | Seeds per Pound | ÷ | Pound per Bushel | = | Bushels per Acre |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | x | | x | | / | | / | 60 | = | |
| 2 | | x | | x | | / | | / | 60 | = | |
| 3 | | x | | x | | / | | / | 60 | = | |
| 4 | | x | | x | | / | | / | 60 | = | |
| 5 | | x | | x | | / | | / | 60 | = | |
| 6 | | x | | x | | / | | / | 60 | = | |
| 7 | | x | | x | | / | | / | 60 | = | |
| 8 | | x | | x | | / | | / | 60 | = | |
| 9 | | x | | x | | / | | / | 60 | = | |
| 10 | | x | | x | | / | | / | 60 | = | |
| **Average** | | | | | | | | | | = | |