

Farm Level Food Loss

Quantifying · Purposing · Reducing

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Food loss:
One crop,
One farm



Quantifying

— Market Yield

- 3,000 land acres
- Planted 3x over a 154-day growing season
- Effectively, 9,000 acres planted
- Desired Marketable Yield: 130-140 bushels per planted acre (30 lbs/bushel)
- 35.1 million pounds – 37.8 million pounds marketable beans

Quantifying

– Market Value

- Production Cost: \$325–350 per acre
- Market Value: varies; roughly 14-15¢/pound (\$625-650/acre)
- Generally, growers allocate production and harvest costs across marketable yield only*
- Net dollar value: \$2.7 million (~ \$300/acre @ 140 bushels)

*This can complicate claiming tax benefits for donated crops

Quantifying

– Sources of Yield Reduction and Crop Loss

- 13% Loss due to Disease
- 12–52% Loss due to Moisture
 - Emergence to bloom: 12% yield reduction
 - Flowering & pod set: 52% yield reduction
 - Pod enlargement: 44% yield reduction
 - Pod maturity: 12% yield reduction
- 10% Loss due to planter issues, seed issues, soil condition

These losses reduce crop yield. There may be no product edible, either by humans or by animals, when yield loss/reduction is from these sources.

Farmers factor prior experience with these sources of crop loss into their planting and yield estimates.

Crop loss and **food loss**
are not the same thing.

Recognizing that
may be a significant change in thinking.

What is food
loss or food
waste?

Food loss or food waste
occurs when edible crop yields
go uneaten

Some causes of farm Level food loss

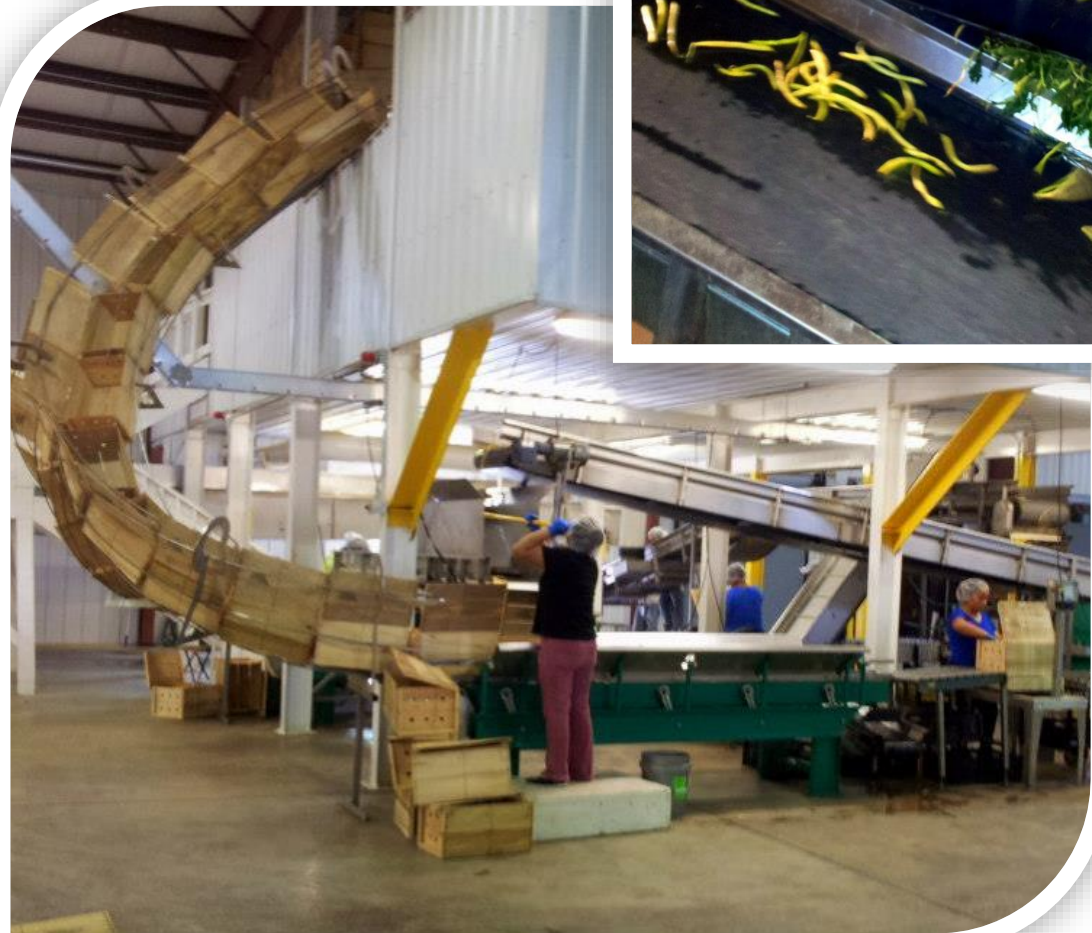
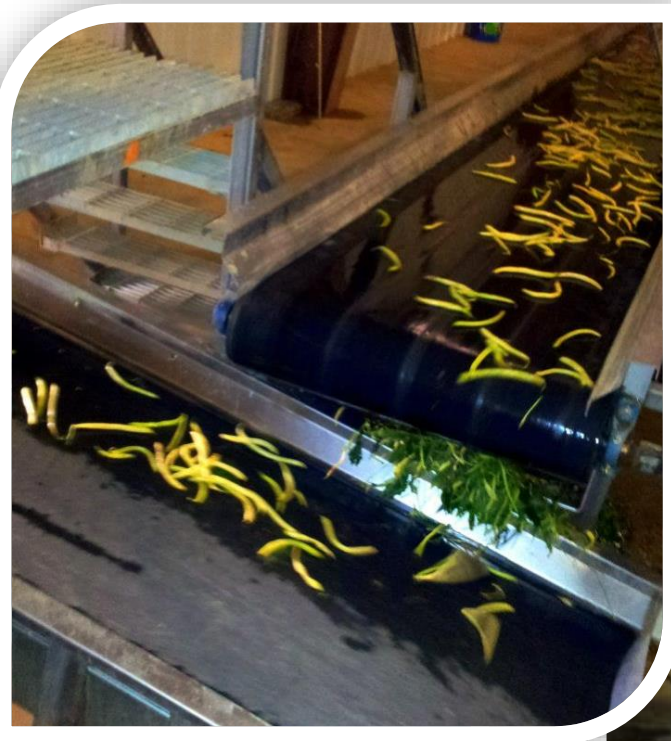
- Commodity pricing standards
- Sale contract requirements
- Sale contracts
- Market price
- Labor or equipment issues
- Harvest timing
- Harvest volume
- Weather issues
- Packaging issues
- Transportation issues
- Rejection at destination



Sale contract requirements

- Whole beans
- 3" to 5" long





Volume of food loss at the packing house

- 1,000 pounds of beans every 6 – 10 minutes during peak season
- 7 – 9 hours per day
- 6 days per week
- mid-June to mid-October

Point of Diversion



Purposing:

#1 Dump it
in a hole
in the
ground

#2 Feed
Animals



#3 Feed
People





Food Recovery Hierarchy

Most Preferred

Source Reduction

Reduce the volume of surplus food generated

Feed Hungry People

Donate extra food to food banks, soup kitchens and shelters

Feed Animals

Divert food scraps to animal feed

Industrial Uses

Provide waste oils for rendering and fuel conversion and food scraps for digestion to recover energy

Composting

Create a nutrient-rich soil amendment

Landfill/ Incineration

Last resort to disposal

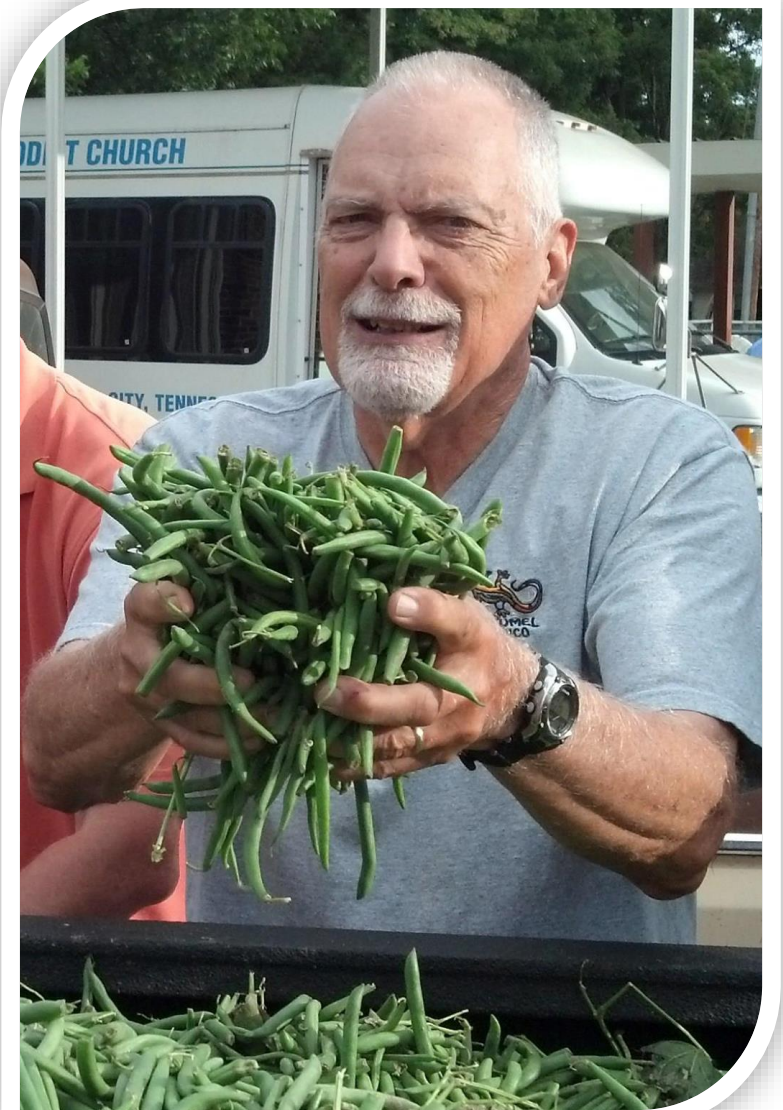
Least Preferred

Challenges to bean recovery

- Volume
- Field Heat
- Mode of Transport
- Cost of Transport
- Distance
- Distribution
- Speed
- Availability
- Weather
- Scheduling









Potential Recovery Volume

Large loads

@ 10,000 – 20,000 pounds
1-2 per week
14 weeks
140,000 – 560,000 pounds

Small loads

@ 500 – 1,500 pounds
8-12 per day
110 days
440,000 – 2,000,000 pounds

Reducing challenges by changing point and method of diversion

- Volume
- ~~Field Heat~~
- Mode of Transport
- Cost of Transport
- Distance
- Distribution
- ~~Speed~~
- Availability
- Weather
- Scheduling



Additional challenges new diversion method raises

- All those other challenges (except field heat)
- Shelf-life and distribution speed remain challenges
- Expense of installing new production line
- Staffing of new production line ('switch only' system)
- Inconvenience and expense of operation to grower
- Cost of RPCs, bins, and pallets
- Managing RPCs, bins, and pallets
- Maintaining proper temperature and humidity of product
- Number of steps / hands / operations before reaching consumer

Potential Recovery Volume—Processing Line

Large loads

@ 10,000 – 20,000 pounds

1-2 per day

14 weeks

980,000 – 3,920,000 pounds



Reality
falls short
of potential

Processing Line Recovery:

Year 1 — 160,000 lbs

Year 2 — 400,000 lbs

Year 3 — ?

Advance Projection:

Year 1 — 400,000 lbs

Year 2 — 1 million lbs

Year 3 — 2-3 million lbs

Fresh Recovery:

Year 1 — 40,000 lbs

Year 2 — 160,000 lbs

Year 3 — 185,000 lbs

Year 4 — 210,000 lbs

Year 5 — 140,000 lbs

Year 6 — 40,000 lbs

Year 7 — ?

Reality is that 400,000 lbs recovered via Processing Line in Year 2 maxed out network distribution capacity

We've been talking about one packing house in one small town.
But there are FIVE packing houses on the same road, with similar volumes of food loss.

Below: Georgia, 2009



Above: Adams County, PA 2016
Right: York County, PA 2016

**And other bean packing
houses in other places,
doing more of the same.**



Sources

- “Commercial Bush Snapbean Production,” UT Ag Extension Service (PB897-1M-10/95),
http://trace.tennessee.edu/cgi/viewcontent.cgi?article=1007&context=utk_agexcomhort
- <https://content.ces.ncsu.edu/postharvest-cooling-and-handling-of-green-beans-and-field-peas>
- “United States Standards for Grades of Snap Beans,”
https://www.ams.usda.gov/sites/default/files/media/Fresh_Snap_Beans_Standard%5B1%5D.pdf
- All photos belong to the Society of St. Andrew, except the center photo in Slide 26, which is courtesy of the Gleaning Project of South Central PA.



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