

# ECONOMICS OF COMPOST IN SOIL FERTILITY MANAGEMENT

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# Compost

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- ❑ Green wastes, crop residues, animal manures, and other organic waste materials transformed by microbial decomposition
- ❑ Can be used as a primary source of N at high rates
- ❑ Improves soil tilth
- ❑ Rate, timing, and technique of application varies
- ❑ Quality varies, nutrient content uncertain

## *OFPA Regulations:*

# *Organic Production and Handling Requirements*

## General

Production practices must maintain or improve the natural resources of the operation, including soil and water quality.

## *OFPA Regulations:*

### *Organic Production and Handling Requirements*

#### Soil fertility and crop nutrient practice standards

The producer **must**:

- 1) Implement tillage and cultivation practices that maintain or improve the physical, chemical, and biological condition of the soil and minimize soil erosion.
- 2) Manage crop nutrients and soil fertility through rotations, cover crops, and the application of plant and animal materials.
- 3) Manage plant and animal materials to maintain or improve soil organic matter content without contaminating crops, soil, or water.

# Animal Manure – NOP Restrictions

Used less in vegetable production than in grain production

- Animal manure must be composted *unless*:
  - ▣ Applied for a crop not for human consumption (e.g. cotton)
  - ▣ Incorporated more than 120 days before harvest if edible portion **has** contact with the soil
  - ▣ Incorporated more than 90 days before harvest if edible portion **does not have** contact with the soil

# Compost Example - Almonds

Operation	Month	Tractor	Implement	Material
Foliar spray	October	66 HP 2WD	Air blast sprayer	Boron and zinc
Apply compost	October	Custom		10 tons compost

Operation	Labor	Material	Fuel, lube, and repairs/custom	Total
Foliar spray	6	10	5	21
Apply compost		270	12	282
TOTAL	\$9	\$280	\$22	\$311

Source: Holtz, et al. Sample costs to produce organic almonds. 2007. <http://coststudies.ucdavis.edu>

# Compost Example - Almonds

Material	Method	Month	Application Rate Per Acre	Cost per Unit	Cost per Acre *
Green waste compost	Spreader	October	10 tons	\$27	\$270
Custom application			1 acre	\$12	\$12
TOTAL					\$282

Source: Holtz, et al. Sample costs to produce organic almonds. 2007. <http://coststudies.ucdavis.edu>

# Compost Example - Walnuts

Operation	Month	Tractor	Implement	Material
Fertilize	January	60 HP	Spreader	Chicken Pellets
Fertilize	January	60 HP	Spreader	Compost (grape pumice) with gypsum (50/50)

Operation	Labor	Material	Fuel, lube, & repairs	Forklift rental	Total (\$/Acre)
Chicken Pellets	\$2	\$63	\$1	\$9	\$75
Compost	\$2	\$105	\$1	\$9	\$117

Source: Elkins, et al. Sample costs to produce organic walnuts. 2007. <http://coststudies.ucdavis.edu>

# Compost Example - Walnuts

Material	Hours/Acre	Application Rate Per Acre	Cost per Unit	Cost per Acre *
Chicken manure pellets	.10	.5 tons	\$126	\$63
Compost with gypsum	.10	3 tons	\$35	\$105
Forklift rental	.06		\$145/day	\$18

Source: Elkins, et al. Sample costs to produce organic walnuts. 2007. <http://coststudies.ucdavis.edu>

# SAFS Compost Use

Year	Material	Rate/Acre	% N
2004	Poultry Compost	4 tons	1.8%
2005	Poultry Compost	4 tons	1.8%
2006	Poultry Compost	4 tons	1.4%
2007	Poultry Compost	4 tons	3%

# Compost Example - Processing Tomato

Operation	Units/Acre	\$/Unit	Total/Acre
Chicken Compost	4 tons	\$22	\$87
Custom Hauling	4 tons	\$13.55	\$54
Custom Spreading	4 tons	\$7.50	\$30
TOTAL			\$171

Operation	Material	Custom Application	Total (\$/Acre)
Apply compost	\$87	\$84	\$171

Source: Elkins, et al. Sample costs to produce organic walnuts. 2007. <http://coststudies.ucdavis.edu>

# Compost Example - Corn

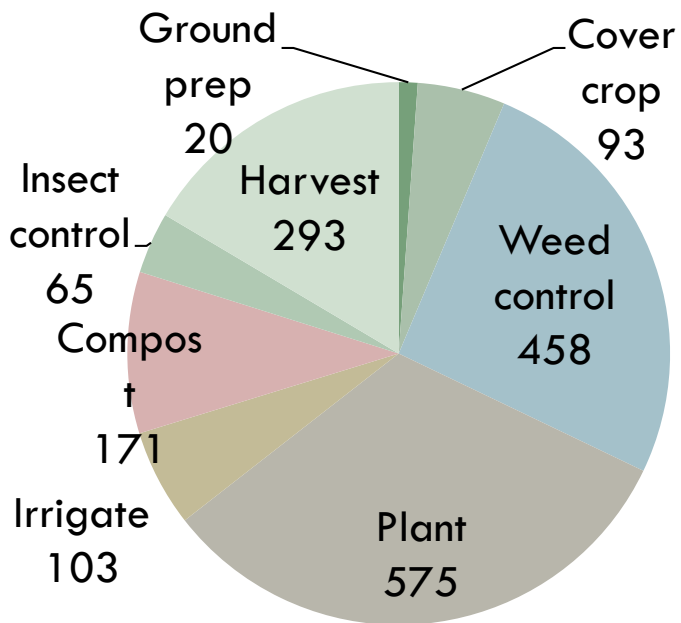
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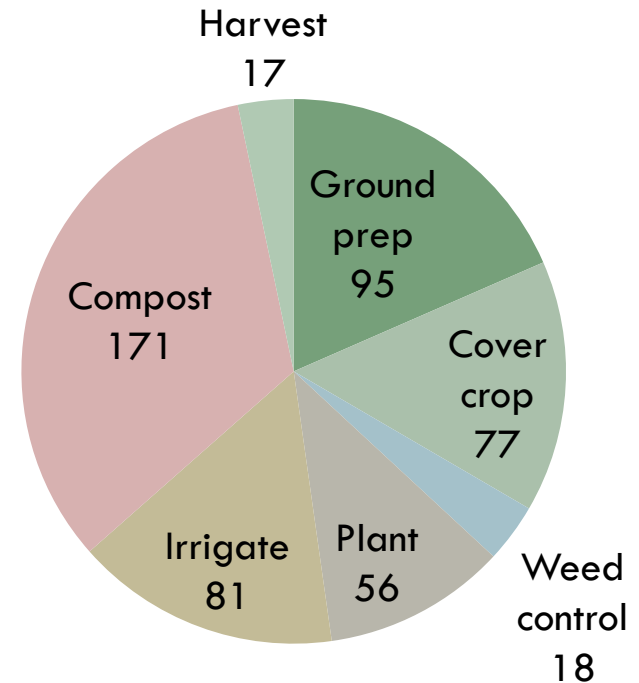
Source: Elkins, et al. Sample costs to produce organic walnuts. 2007. <http://coststudies.ucdavis.edu>

# Compost as a Share of Total Costs

Processing tomato, \$1,829/Acre



Corn, \$532 /Acre



# Compost Example - Alfalfa

Material	Month	Application Rate Per Acre	Cost per Unit	Cost per Acre *
Compost - chicken	Establishment year only	4 tons	\$22	\$88
Custom hauling		4 tons	\$13	52
Custom application		4 tons	\$7.50	\$30
TOTAL				\$170

Source: Costs to Establish and Produce Organic Alfalfa Hay 2007. <http://coststudies.ucdavis.edu>

# Compost and Commercial Fertilizer Example

## Leaf Lettuce

Material	Method	Month	Application Rate Per Acre	Cost per Unit	Cost per Acre *
Green waste compost	Custom	October	2.50 tons	\$40	\$100
Gypsum	Custom	October	.5 tons	\$38	\$19
Pelleted chicken manure	Custom	August	1,000 pounds	\$.10	\$100
Blood meal (13-0-0)	Sidedress	September	450 pounds	\$.45	\$210
Phytamin (7-0-0)	Drip	September	146 pounds	\$.35	\$51
TOTAL					\$480

\* For custom operations, application charge is included in the material cost.

Source: Tourte, et al. 2004. Sample costs to produce organic leaf lettuce – Central Coast region. UCCE. <http://coststudies.ucdavis.edu>. Prices updated to 2009.

# Local Compost Suppliers – Costs and Services

Material	\$/ton	Delivery	Spread \$/acre
Green waste compost*	\$8 -\$12	Arrange with trucking company	Not available
Green waste compost	\$18	None	Not available
Green waste compost	\$15 - \$18	Yes	\$8.50 - \$11.00

\* Green waste compost included yard trimmings, food scraps, and vegetable waste

# Compost Spreaders - PTO

Capacity	Tractor HP required	New Cost	Hourly ownership cost @ 7%	Lifetime repair costs	Hourly repair costs
144 cubic feet	30 – 40 HP	\$7,500	\$3.21	\$4,500	\$1.80
182 cubic feet	40 – 50 HP	\$8,000	\$3.42	\$4,800	\$1.92

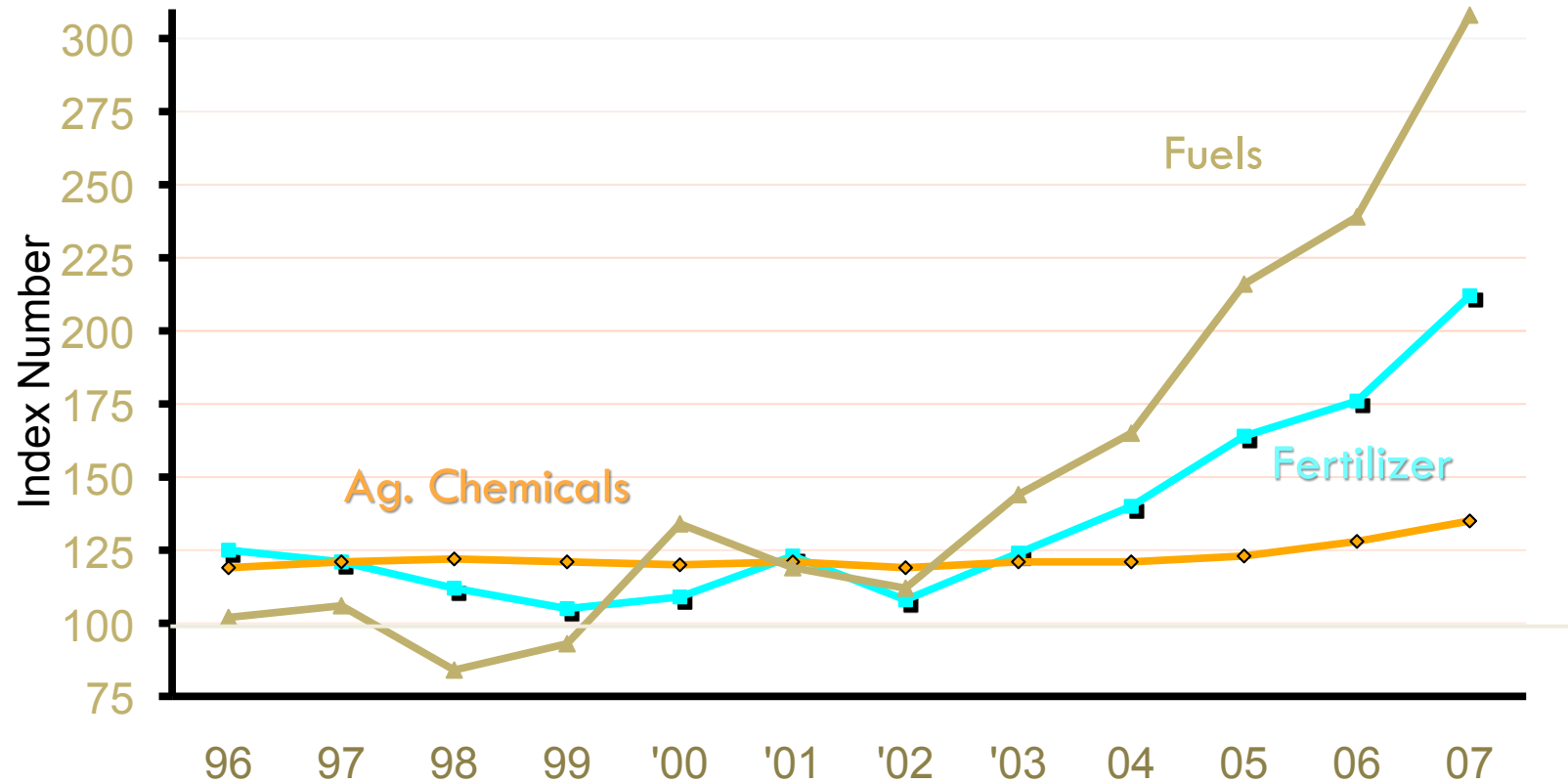
Estimated wear out life – 2,500 hours

# Compost - Factors Which Vary

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- Material used
- Timing and frequency of application
- Application method
  - Ground – custom
  - Ground – owner/operator

# Indexes of prices paid by US farmers 1990-1992 = 100



Source: National Agricultural Statistical Service, USDA.

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