

## Finance and Economics



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June 2017

Applied Economics/2017-03pr

# Northern Utah Peach Orchard Costs and Returns Comparison by Management Strategy, 20 Acres, 2015

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## Introduction

This publication outlines the costs and returns associated with eleven separate peach orchard treatments based upon research conducted at Utah State University, Kaysville Research Farm, from 2012-2014. This publication is intended to be a guide used to make production decisions, determine potential returns, and prepare business and marketing plans. The practices described are not the recommendations of Utah State University. The Baseline Peach Orchard Budgets used in this publication are taken from costs and return studies published by Knudsen et al. (2016a) and Knudsen et al. (2016b). The establishment and operating costs are meant to be “representative” of a Utah peach orchard, but should be adjusted where necessary to reflect individual situations. Site selection, peach variety, pest management, and other practices will affect the total net returns to peach orchard production.

## Treatments

The eleven separate orchard treatments are described below. Production inputs used and management practices are given for each treatment. Each treatment is associated with an organic orchard or a conventional/integrated orchard production system.

### *Organic Orchard Treatments:*

- 1) Organic Tillage: compost, feathermeal, trace element spray, pesticides, sulfur, tillage, alleyway mowing, pruning, thinning, seed
- 2) Organic Fabric Mulch: compost, feathermeal, trace element spray, pesticides, sulfur, alleyway mowing, stakes, grass seed, mulch fabric
- 3) Organic Legume Straw: compost, feathermeal, trace element spray, pesticides, sulfur, alleyway mowing, in-row mowing, straw, legume seed
- 4) Organic Legume Mowing: compost, feathermeal, trace element spray, pesticides, sulfur, alleyway mowing, in-row mowing, legume seed
- 5) Organic Grass Straw: compost, feathermeal, trace element spray, pesticides, sulfur, alleyway mowing, in-row mowing, straw, grass seed
- 6) Organic Grass Mowing: compost, feathermeal, trace element spray, pesticides, sulfur, alleyway mowing, in-row mowing, grass seed

### *Conventional/Integrated Orchard Treatments:*

- 1) Conventional: 16-16-16 fertilizer, urea, herbicide, pesticides, sulfur, alleyway mowing, grass seed

- 2) Conventional Transitioned to Organic: 16-16-16 fertilizer, urea, compost, feathermeal, trace element spray, pesticides, sulfur, alleyway mowing, in row mowing, grass seed
- 3) Integrated Fertility: compost, feathermeal, trace element spray, herbicide, pesticides, sulfur, alleyway mowing, in row mowing, grass seed
- 4) Integrated Weed: 16-16-16 fertilizer, urea, herbicide, pesticides, sulfur, paper mulch, alleyway mowing, grass seed
- 5) Paper Mulch Compost: compost, feathermeal, trace element spray, pesticides, sulfur, paper mulch, alleyway mowing, in row mowing, grass seed

## Inputs

A brief description of the various applications used for each treatment and the associated partial budget with an approximate cost for inputs, applications, and any additional machinery is given below. It is assumed that the labor cost is \$15 per hour (Galinato et al., 2014) and that the orchard is 20 acres with a 20-year lifespan. All prices are on a per acre basis.

**Compost** - The price of compost is estimated at \$80 per ton, (Intermountain Farmers Association, Country Stores, personal communication, September 15, 2014) and the application rate is 5 tons per acre. The expense for the compost spreader (used for compost, feathermeal, and straw) is \$125 per acre (Chapman, 2014). Labor for spreading compost is 3.5 hours at \$15 per hour.

**Feathermeal** - The cost of feathermeal is estimated at \$38.50 for 50 lbs. (or \$.077/lb.). The application rate varies depending on the treatment from 1,390 pounds per acre to 2,250 pounds per acre (Seven Springs Farm, n.d.).

**Trace Element Spray** - Metalosate Multimineral foliar sprays were used for trace mineral application in both the organic and conventional treatments. The conventional multimineral spray costs \$36 per gallon and is applied at a rate of 1 gallon per acre (Intermountain Farmers Association, 2014). The organic treatment costs \$12.50 per pound and is

applied at a rate of 1.3 pounds per acre (Earthwise Organics, 2014).

**Pesticide** - Pesticides used for the organic orchard include Dipel DF Pro and Isomate BTP for Twig Borer, at a cost of \$20 per pound and \$80 per gallon respectively, each applied at 1 pound or gallon per acre (Arbico Organics, 2014; Intermountain Farmers Association, 2014). Stylet Oil is used for Green Peach Aphids, at a cost of \$20 per gallon and applied at 2 gallons per acre (JMS Stylet-Oil, n.d.). The conventional orchard uses Captan 50 WP for Twig Borer, at a cost of \$10.65 per pound and applied at 4 pounds per acre. A dormant oil spray is used for Green Peach Aphids, at a cost of \$8.50 per gallon and is applied at 3 gallons per acre (Intermountain Farmers Association, 2014).

**Sulfur** - To control powdery mildew, sulphur granules are applied to each orchard. For organic treatments, the sulphur granules cost \$0.90 per pound and are applied at a rate of 100 lbs. per acre (Arbico Organics, 2014). The conventional treatments use sulphur granules that cost \$0.40 per pound and are applied at a rate of 200 pounds per acre (Intermountain Farmers Association, 2014).

**Tillage** - Added labor for tilling is assumed at \$15 per hour and requires 5 hours per acre. The tiller expense is \$47.10 per acre (\$9,000 purchase price and a 10-year useful life (Painter, 2011)).

**Mowing** - Alleyway mowing assumes 1.5 hours of labor at \$15 per hour and in-row mowing assumes 5 hours of labor at the same rate. Alleyway mower (flail mower) expense is \$15.70 per acre (\$3,000 purchase price, \$300 salvage value, and a 10-year useful life (Painter, 2011) and in-row mowing expense (Weed Badger, 2014) is \$26.25 per acre (\$8,800 purchase price and a 20 year useful life (Weed Badger, 2014)).

**Mulch Fabric** - Weed fabric costs \$0.20 per square foot and has a life of 20 years; fabric stakes cost \$0.08 each, and assumes 500 stakes per acre to secure the fabric (Intermountain Farmers Association, 2015).

**Straw** - Straw costs \$250 per ton (Intermountain Farmers Association, 2014) and is applied at 1.5

tons per acre. Labor for straw application is 3.5 hours per acre at \$15 per hour.

**Grass Seed** - A rye grass and red fescue mixture is used, planted at rates of 50 and 20 pounds per acre, respectively. The cost of grass seed is estimated at \$158 per acre (Intermountain Farmers Association, 2015). Custom planting for grass is \$17.50 per acre (Drollette, 2010).

**Legume Seed** - Birdsfoot trefoil is used as a legume and is planted at a rate of 12 pounds per acre. The cost of birdsfoot trefoil is \$156 per acre (Hancock Seed Company, 2015). Custom planting for birdsfoot trefoil is assumed at \$17.50 per acre (Drollette, 2010).

**16-16-16 Fertilizer** - A balanced fertilizer costs \$0.68 per pound and is applied at a rate of 300 pounds per acre (Intermountain Farmers Association, 2015).

**Urea** - Urea costs \$0.67 per pound and is applied at a rate of 150 pounds per acre (Intermountain Farmers Association, 2014).

**Herbicide** - Roundup costs \$12.50 per gallon and is applied at a rate of .5 gallon per acre (Intermountain Farmers Association, 2014) and custom spraying rates are \$7.67 per acre (Drollette, 2010).

**Paper Mulch** - Paper mulch is estimated at \$0.33 per pound and is applied at a rate of 1573 lbs. per acre. (Turbo Turf, 2013) Labor is assumed at 13.5 hours per acre at a rate of \$15 per hour. The hydroseeder expense is \$46.60 per acre (\$8,900 used purchase price and 10-year useful life (Surplus Equipment Exchange, n.d.)).

### Yields

Yields and packout rates per treatment are based upon averages from the Utah State University research farm during the 2013 and 2014 seasons (Table 1).

**Table 1: Annual Peach Orchard Yields**

Treatment	Yield (lbs/acre)			Packout Rate	
	2013	2014	Average		
Organic Treatments	Organic Baseline Budget	15,015	15,015	15,015	80%
	Tillage	26,866	21,534	24,200	88%
	Fabric Mulch	19,669	20,804	20,237	86%
	Legume Straw	29,048	19,828	24,438	80%
	Legume Mowing	26,596	21,613	24,105	83%
	Grass Straw	21,344	20,153	20,749	85%
	Grass Mowing	19,654	19,408	19,531	87%
Conventional/ Integrated Treatments	Conventional Baseline Budget	19,250	19,250	19,250	80%
	Conventional	33,014	10,731	21,873	94%
	Conventional Transistion	22,236	12,483	17,360	89%
	Integrated Fertility	25,972	12,219	19,096	92%
	Integrated Weed	33,457	10,678	22,068	85%
	Organic Paper Mulch	16,074	10,685	13,380	86%

Note: Yields and packout rates used in the partial budgets assume full orchard production (which starts in year 6 of orchard establishment) and do not consider the possibility of a partial or total crop loss.

## Market Prices

Revenues for both organic and conventional orchards are calculated by using the prices in Table 2. “Wholesale” prices reflect prices paid by retail locations such as Associated Foods during 2014. “Direct Market” prices reflect prices received by producers at various farmers’ markets in Northern Utah and Colorado during the 2014 market season. Also shown in Table 2 is the percentage of peaches sold in each market. Wholesale markets mainly consist of grocery stores, and direct markets include farmers markets, CSA programs, and roadside stands.

**Table 2: Peach Prices and Market Allocation**

Market Type	Price Per Pound		Percentage Sold
	Organic	Conventional	
Wholesale	\$2.08	\$1.06	20%
Direct Market	\$3.87	\$2.23	80%

## Baseline Peach Orchard Budgets

The “Organic Baseline Budget” and the “Conventional Baseline Budget” are taken from the peach orchard cost and returns studies published by USU Extension (Knudsen et al., 2016a; Knudsen et al., 2016b). These will be used as the baseline budget when comparing the costs and returns of the various treatments (Table 3). “Fixed Costs” are costs that are assumed to remain constant across all orchards within the organic and conventional treatments such as irrigation costs, tree pruning, land, etc. In Tables 3, 4, and 5, the “fertility” category includes the cost of compost, feathermeal, trace elements spray, ammonium sulfate, and 16-16-16 fertilizer used in each treatment, the expense of the spreader (where applicable), and labor for the application of each. The “cover crop” category includes the grass and/or legume seed, plus the labor expense for planting. The “weed control” category includes the herbicide and/or the straw used in the treatment, and labor to apply each. The remaining categories include the expenses listed in the descriptions above.

**Table 3: Baseline Peach Orchard Budgets (Annual \$/Acre)**

	Organic Budget	Conventional Budget
<i>Packout Rate</i>	80%	80%
<b>Revenues</b>		
Revenues	\$ 42,186	\$ 30,738
<b>Costs</b>		
<b>Fixed Costs</b>	\$ 15,313	\$ 15,947
<b>Variable Costs</b>		
Fertility	\$ 819	\$ 349
Sulphur	\$ 90	\$ 80
Pest Control	\$ 140	\$ 68
Weed Control	\$ 375	\$ 21
Tilling	\$ 122	\$ -
Mowing	\$ 101	\$ 101
Cover Crop	\$ -	\$ -
Mulch Fabric	\$ -	\$ -
Paper Mulch	\$ -	\$ -
<b>Total Variable Costs</b>	<b>\$ 1,647</b>	<b>\$ 620</b>
<b>Total Revenues</b>	\$ 42,186	\$ 30,738
<b>Total Costs</b>	\$ 16,960	\$ 16,566
<b>Net Returns per Acre</b>	<b>\$ 25,226</b>	<b>\$ 14,172</b>

## Partial Budget Comparisons

Table 4 shows the change in costs and revenues for the organic orchard treatments in comparison to the USU baseline organic peach orchard budget. The difference in total net returns for each treatment over the baseline budget is given at bottom. Table 5 shows the change in costs and revenues of the conventional/integrated orchard treatments in comparison to the USU baseline conventional peach orchard budget. The difference in total net returns for each treatment over the baseline budget is given at bottom.

**Table 2: Organic Treatment Partial Budgets (Annual \$/Acre)**

	<b>Organic Baseline</b>	<b>Organic Tillage</b>	<b>Fabric Mulch</b>	<b>Legume Straw</b>	<b>Legume Mowing</b>	<b>Grass Straw</b>	<b>Grass Mowing</b>
<b>Packout Rate</b>	<b>80%</b>	<b>88%</b>	<b>86%</b>	<b>80%</b>	<b>83%</b>	<b>85%</b>	<b>87%</b>
<b>Revenues</b>							
Additional Revenues	\$ -	\$ 32,605	\$ 18,935	\$ 26,475	\$ 28,078	\$ 19,752	\$ 17,490
<b>Additional Costs</b>							
Fertility	\$ -	\$ 685	\$ 528	\$ 581	\$ 528	\$ 712	\$ 869
Sulphur	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pest Control	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Weed Control	\$ -	\$ (375)	\$ (375)	\$ (198)	\$ (375)	\$ (198)	\$ (375)
Tilling	\$ -	\$ -	\$ (122)	\$ (122)	\$ (122)	\$ (122)	\$ (122)
Mowing	\$ -	\$ (63)	\$ (63)	\$ 38	\$ 38	\$ 38	\$ 38
Cover Crop	\$ -	\$ 68	\$ 68	\$ 156	\$ 156	\$ 68	\$ 68
Mulch Fabric	\$ -	\$ -	\$ 272	\$ -	\$ -	\$ -	\$ -
Paper Mulch	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Additional Costs</b>	<b>\$ -</b>	<b>\$ 315</b>	<b>\$ 307</b>	<b>\$ 455</b>	<b>\$ 225</b>	<b>\$ 498</b>	<b>\$ 477</b>
<b>Resulting Change in Net Returns</b>							
Difference in Revenue	\$ -	\$ 32,605	\$ 18,935	\$ 26,475	\$ 28,078	\$ 19,752	\$ 17,490
Difference in Costs	\$ -	\$ 315	\$ 307	\$ 455	\$ 225	\$ 498	\$ 477
<b>Total Net Return Difference</b>	<b>\$ -</b>	<b>\$ 32,290</b>	<b>\$ 18,627</b>	<b>\$ 26,020</b>	<b>\$ 27,853</b>	<b>\$ 19,255</b>	<b>\$ 17,012</b>

**Table 3: Conventional/Integrated Treatment Partial Budgets (Annual \$/Acre)**

	Conventional Baseline	Conventional	Organic Transition	Integrated Fertility	Integrated Weed	Paper Mulch Compost
Packout Rate	80%	94%	89%	92%	85%	86%
<b>Revenues</b>						
Additional Revenues	\$ -	\$ 10,300	\$ 100	\$ 4,327	\$ 6,701	\$ (7,772)
<b>Additional Costs</b>						
Fertility	\$ -	\$ (15)	\$ 1,976	\$ 1,411	\$ 8	\$ 1,332
Sulphur	\$ -	\$ -	\$ (80)	\$ -	\$ -	\$ -
Pest Control	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Weed Control	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (21)
Tilling	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Mowing	\$ -	\$ (63)	\$ 38	\$ 38	\$ (63)	\$ 38
Cover Crop	\$ -	\$ 68	\$ 68	\$ 68	\$ 68	\$ 68
Mulch Fabric	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Paper Mulch	\$ -	\$ -	\$ -	\$ -	\$ 633	\$ 633
<b>Total Additional Costs</b>	<b>\$ -</b>	<b>\$ (11)</b>	<b>\$ 2,002</b>	<b>\$ 1,516</b>	<b>\$ 645</b>	<b>\$ 2,050</b>
<b>Resulting Change in Net Returns</b>						
Difference in Revenue	\$ -	\$ 10,300	\$ 100	\$ 4,327	\$ 6,701	\$ (7,772)
Difference in Costs	\$ -	\$ (11)	\$ 2,002	\$ 1,516	\$ 645	\$ 2,050
<b>Total Net Return Difference</b>	<b>\$ -</b>	<b>\$ 10,311</b>	<b>\$ (1,902)</b>	<b>\$ 2,811</b>	<b>\$ 6,056</b>	<b>\$ (9,821)</b>

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This publication is issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Ken White, Vice President for Extension and Agriculture, Utah State University.