

Costs and Benefits – Will Higher Density Make More \$: *An AgBiz Logic Case Study*



Clark Seavert

Professor, Department of Applied Economics

Executive Director, NW Agribusiness Executive Seminar

Oregon State University

Key Trends - *Industry and Others*

- **\$13.50 per hour minimum wage rates are a reality**
- **Immigration Reform**
- **Climate Change/Weather Variability:**
 - ✓ irrigation water shortages
 - ✓ condensed harvest season
- **Orchard Renewal:**
 - ✓ Acres planted
 - ✓ increased per acre yields (*40-50 to 80-100+ BPA!*)
 - ✓ increased per acre revenues (*as high as \$30k to \$80k, depending on variety and training system!*)

Key Trends - *Industry and Others*

▪ **Orchard Renewal** (continued):

✓ **New varieties**

✓ **Costs to establish** (*\$25-\$30k to \$45-\$60k per acre!*)

✓ **Margins are slim**

▪ **Technologies**

✓ **Drones/UAV's**

✓ **Mechanical-assist harvesters w/platform to perform other orchard tasks**

✓ **Fully automated harvesters on the horizon!**

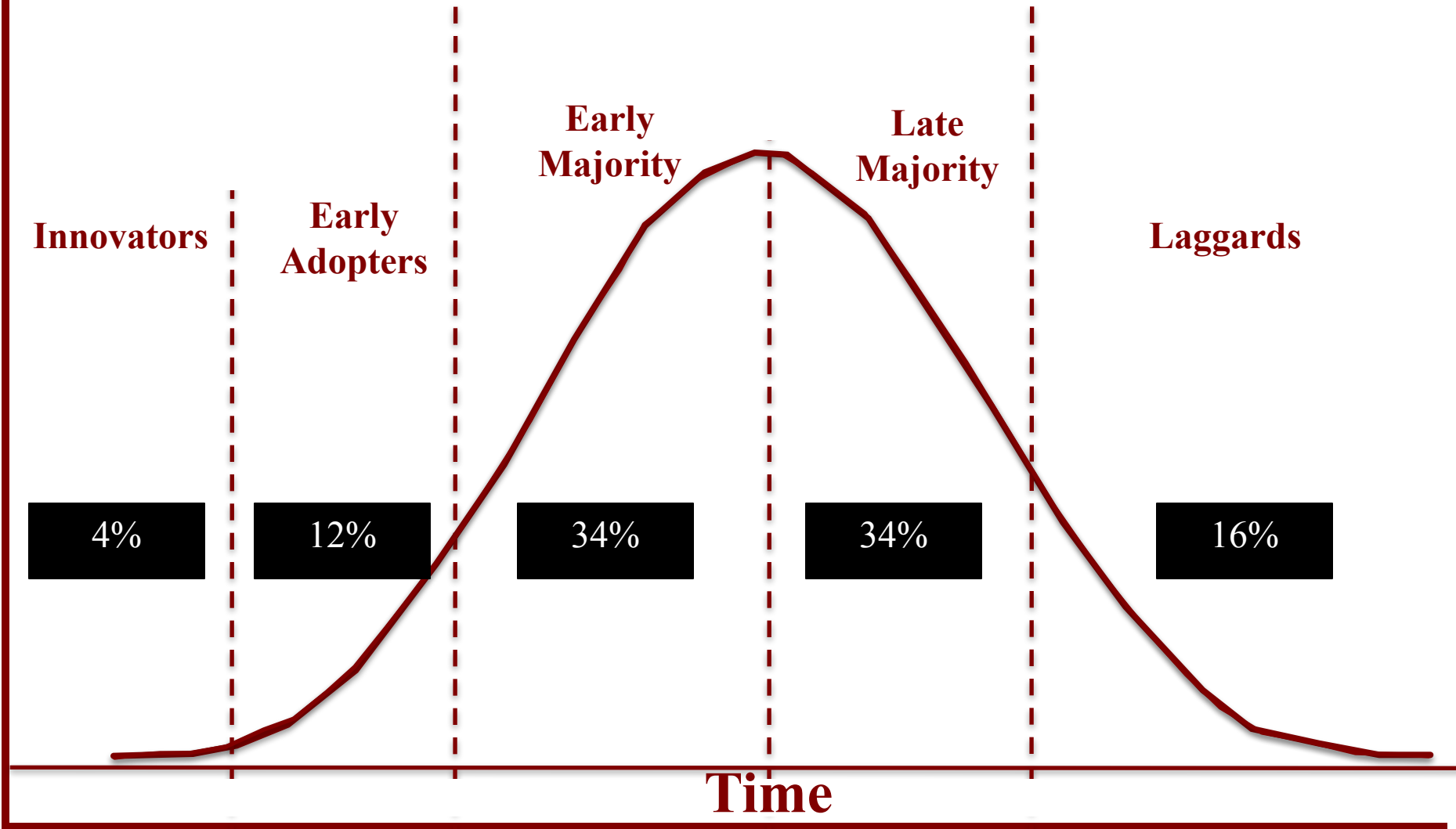
- *Cost of a machine*

- *Number of machines required*

- *Purchase vs. custom hire*

Innovation Adoption Curve

Diffusion of Innovations: Everett Rogers



Orchard Renewal Decisions should be based on Capital Investment Analysis

Capital investment analysis is a budgeting procedure to assess the potential profitability of a long-term investment. The goal is to pinpoint the the most likely profitable option, at a minimum, based on a discounted cash flow analysis – net present value and internal rate of return.

Orchard Renewal Decisions should be based on Capital Investment Analysis

Block-by-block accounting is essential!

85 percent of agricultural producers do not have adequate accounting data to complete an accurate, meaningful capital investment analysis!

Profitability

Can I Make Money Doing This?

- 1. Net Present Value**
- 2. Internal Rate of Return**



Feasibility

Can I Afford To Do This?

- 1. Cash Flow Analysis**
 - Year to cash flow
 - Payback period
 - Costs to implement



***THREE Key Factors to
Successful Orchard Renewal***

- 1. Price**
- 2. Yield (When & How Much)**
- 3. Costs – Production & Establishment**

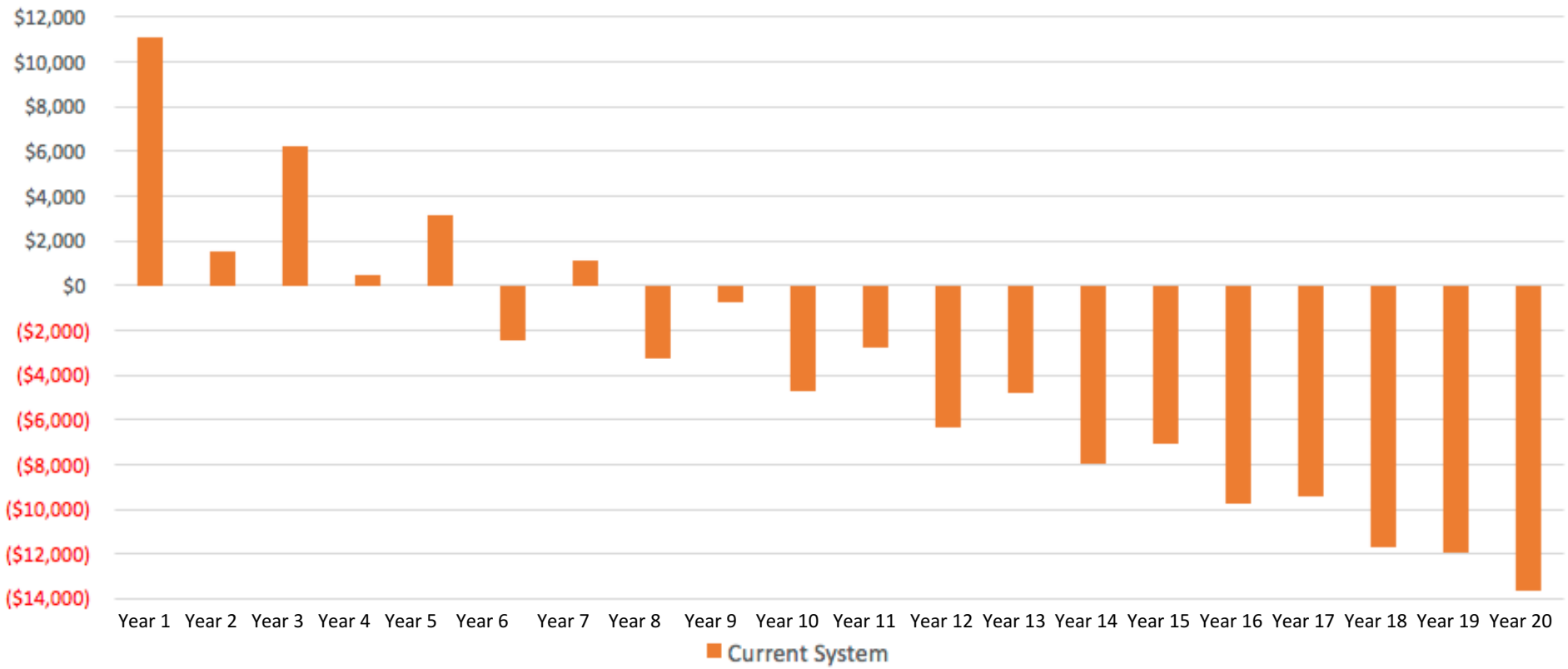
Labor Rates Assumed in *AgBiz Logic* Scenario

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------|---------|---------|---------|---------|---------|
| Minimum Wage Rate | \$9.47 | \$11.00 | \$11.50 | \$12.00 | \$13.50 |
| <i>% Increase</i> | | 16.16% | 4.55% | 4.35% | 12.50% |
| Labor Rates per Hour | \$13.80 | \$16.03 | \$16.76 | \$17.49 | \$19.67 |
| Labor Rates per Bin | \$24.93 | \$28.96 | \$30.27 | \$31.59 | \$35.54 |

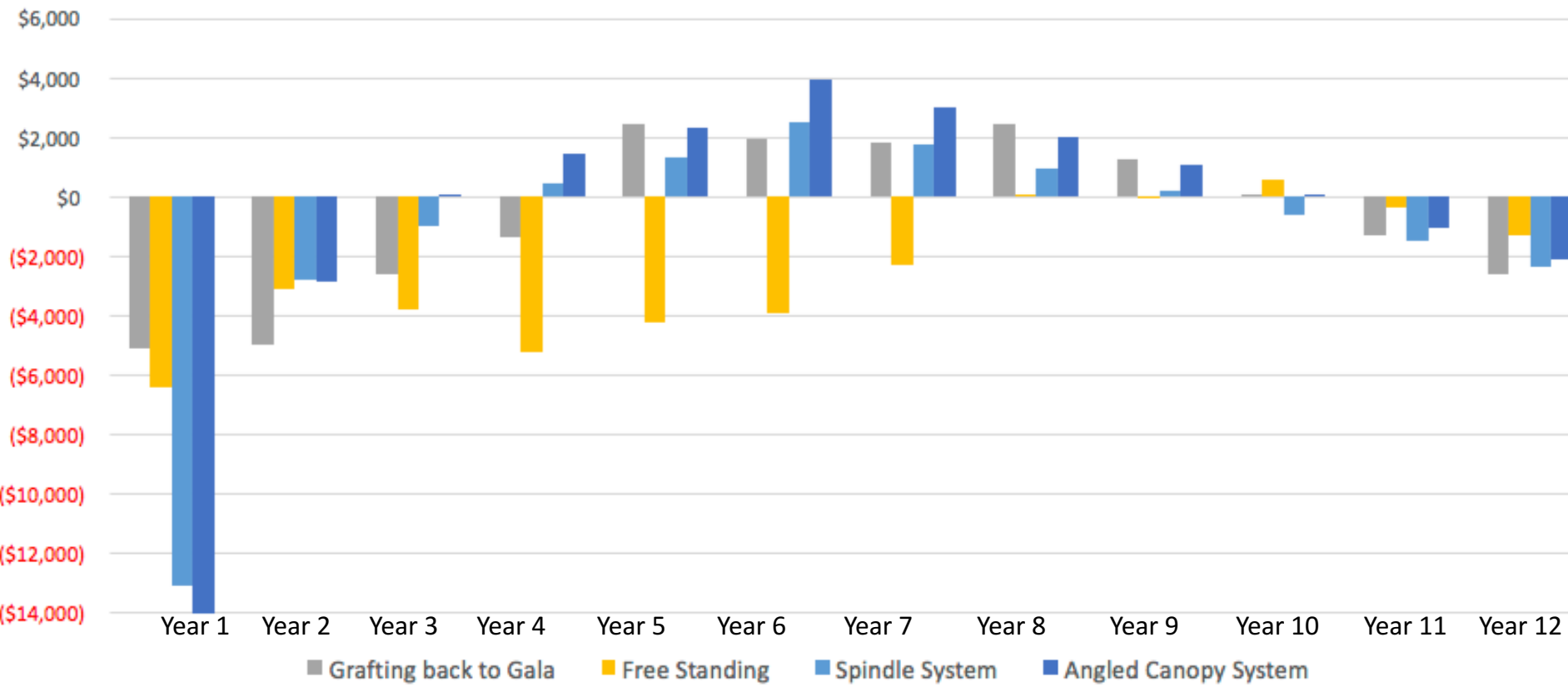
Gala Yields Assumed in *AgBiz Logic* Scenario

| | Year 1/2017 | Year 2/2018 | Year 3/2019 | Year 4/2020 | Year 5/2021 | Year 6/2022 | Year 7/2023 | Year 8/2024 | Year 9/2025 | Year 10/2026 |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Current Orchard | 60 | 40 | 60 | 40 | 60 | 40 | 60 | 40 | 60 | 40 |
| Grafting back to Gala | 0 | 0 | 15 | 20 | 50 | 60 | 60 | 60 | 60 | 60 |
| Free Standing | 0 | 0 | 0 | 0 | 10 | 15 | 25 | 40 | 50 | 60 |
| Spindle System | 0 | 0 | 16 | 30 | 50 | 70 | 80 | 80 | 80 | 80 |
| Angled Canopy System | 0 | 0 | 24 | 40 | 60 | 80 | 100 | 100 | 100 | 100 |

Net Returns to Establish Gala Apples (\$290/Bin) with Assumed Yields



Net Returns to Establish Gala Apples (\$290/Bin) with Assumed Yields



Net Present Value of Each Training System, Based on 6% Discount Rate and \$12,000 Beginning and Ending Investment Values, and Breakeven Price per Bin and Yields for NPV to Equal \$0

| Training System | Net Present Value, Before Adjustments | B-E Price for NPV to be equal to \$0 | B-E Yield for NPV to be equal to \$0 |
|-----------------------|---------------------------------------|--------------------------------------|--------------------------------------|
| Current Orchard | (27,627) | NA | NA |
| Grafting back to Gala | (42,482) | +12.8%/\$327 | +36.6% |
| Free Standing | (49,793) | +25.4%/\$364 | +76.0% |
| Spindle System | (40,758) | +10.2%/\$320 | +26.0% |
| Angled Canopy System | (38,782) | +8.8%/\$315 | +24.3% |

Gala Yields Assumed in AgBiz Logic Scenario, Adjusted for Net Present Value to Equal \$0

| | Yr 1/2017 | Yr 2/2018 | Yr 3/2019 | Yr 4/2020 | Yr 5/2021 | Yr 6/2022 | Yr 7/2023 | Yr 8/2024 | Yr 9/2025 | Yr 10/2026 |
|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|
| Grafting back to Gala | 0 | 0 | 15 | 20 | 50 | 60 | 60 | 60 | 60 | 60 |
| Adjusted Yields | 0 | 0 | 20 | 27 | 68 | 82 | 82 | 82 | 82 | 82 |
| Free Standing | 0 | 0 | 0 | 0 | 10 | 15 | 25 | 40 | 50 | 60 |
| Adjusted Yields | 0 | 0 | 0 | 0 | 18 | 26 | 44 | 70 | 88 | 106 |
| Spindle System | 0 | 0 | 16 | 30 | 50 | 70 | 80 | 80 | 80 | 80 |
| Adjusted Yields | 0 | 0 | 20 | 38 | 63 | 88 | 101 | 101 | 101 | 101 |
| Angled Canopy System | 0 | 0 | 24 | 40 | 60 | 80 | 100 | 100 | 100 | 100 |
| Adjusted Yields | 0 | 0 | 30 | 50 | 75 | 99 | 124 | 124 | 124 | 124 |

Develop a 5-Year Business Plan
*with Specific Goals and a Method to
Benchmark Your Progress*

- 1. Increase revenues in all blocks to a minimum of \$25,000 per acre, in the short run**
- 2. Increase net farm income by 5% annually**
- 3. Improve efficiencies and utilization of labor with new orchards and future technologies**
- 4. All orchard blocks will be designed to adequately acquire and retain labor.**

Developing a 5-Year Business Plan

Step 1: Assess your Current Operation

- 1. Orchard Blocks**
- 2. Labor Requirements Throughout the Season**
- 3. Financial Position**
- 4. Others, Depending on Your Unique Situation**

Developing a 5-Year Business Plan

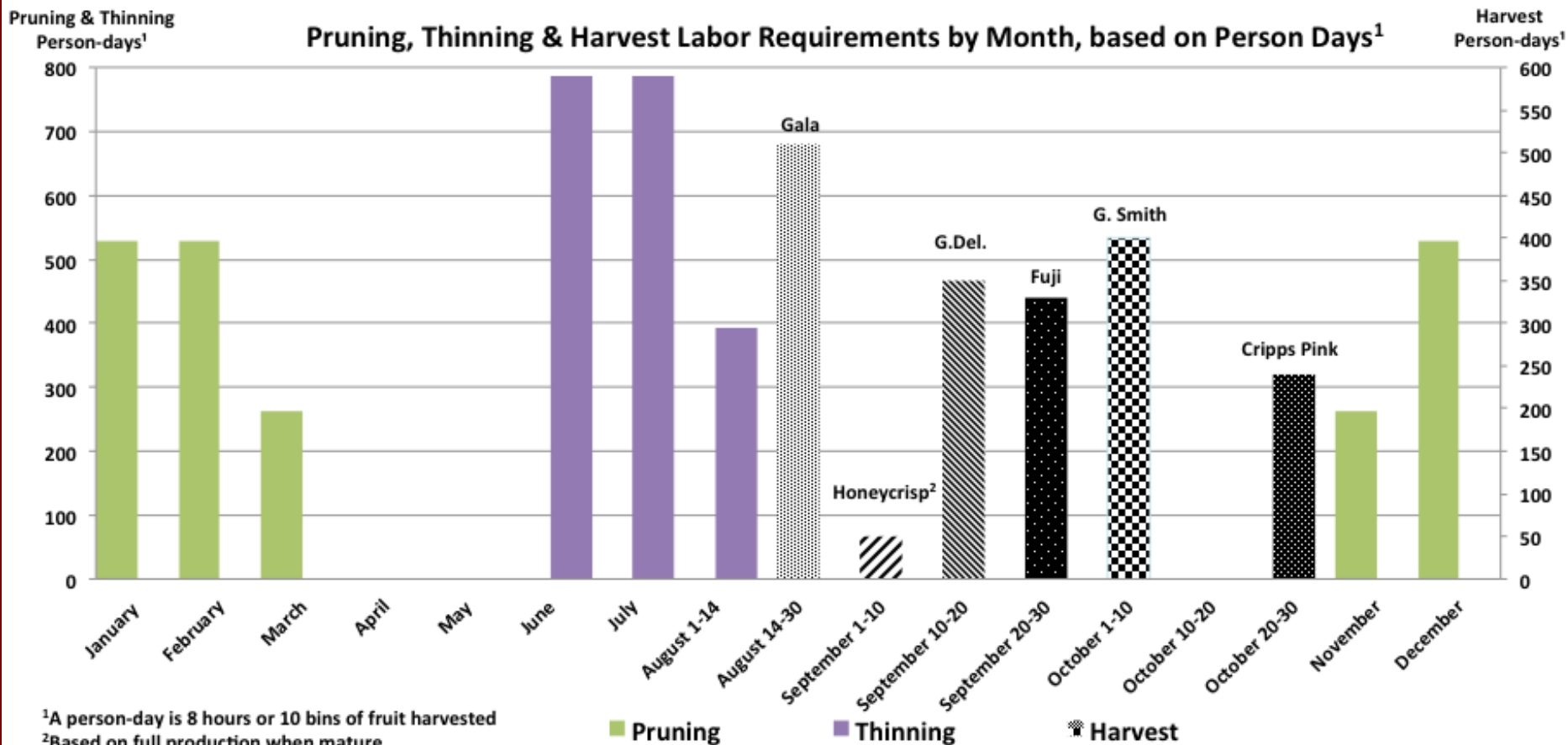
1. Orchard Blocks

Based on your goals:

- *Which blocks are grossing \$25k per acre?*
- *Which blocks are contributing to increasing net farm income?*
- *How does a block “fit” in your harvest season?*
- *Is this the type of block that workers will make money?*

Developing a 5-Year Business Plan

2. Harvest Labor



Developing a 5-Year Business Plan

Step 2: Execute, Execute, Execute

Options for Low Income Producing Blocks

1. Remove and replant

- Varieties with high grower returns*
- Harvest date to spread labor requirements*
- Single vs. multiple pick harvest*
- Training system for automated harvesting*

2. Rejuvenate

- Water management strategies*
- Horticultural skills to increase yields and packouts*

Developing a 5-Year Business Plan

Financial Position

FIVE Key Financial Ratios and Performance Measures

1. Current Ratio

Current Assets \div Current Liabilities (Current Assets - Current Liabilities)

2. Working Capital to Total Farm Expenses

Working Capital / Total Farm Expenses

3. Debt-to-Asset Ratio

Total Liabilities / Total Assets

4. Profit Margin

Net Farm Earnings \div Total Farm Revenues

5. Value of Farm Production to Liabilities

Total Farm Revenues / Total Farm Liabilities

Developing a 5-Year Business Plan


Financial Position

Tree Fruit Producers with Gross Revenues of > \$2m

| | <i>Current Ratio</i> | <i>Working Capital to Total Farm Expenses</i> | <i>Debt-to-Asset Ratio</i> | <i>Profit Margin</i> | <i>Value of Farm Production to Liabilities</i> |
|-----------------------|----------------------|---|----------------------------|----------------------|--|
| <i>Upper Quartile</i> | 6.21 | 1.31 | 47.0 | 30% | 1.61 |
| <i>Median</i> | 3.26 | 0.74 | 35.0 | 14% | 0.95 |
| <i>Lower Quartile</i> | 1.88 | 0.42 | 19.0 | 4% | 0.53 |

Information provided by *Northwest Farm Credit Services*, Craig Shindler, Branch Manager, Sunnyside, WA.



 AgBiz Logic™

Data is always in Season

Thank you for visiting the *AgBiz Logic™* web site. This site is an economic, financial and environmental accounting decision tool to assist agribusinesses that grow, harvest, package, add-value, and sell agricultural products.

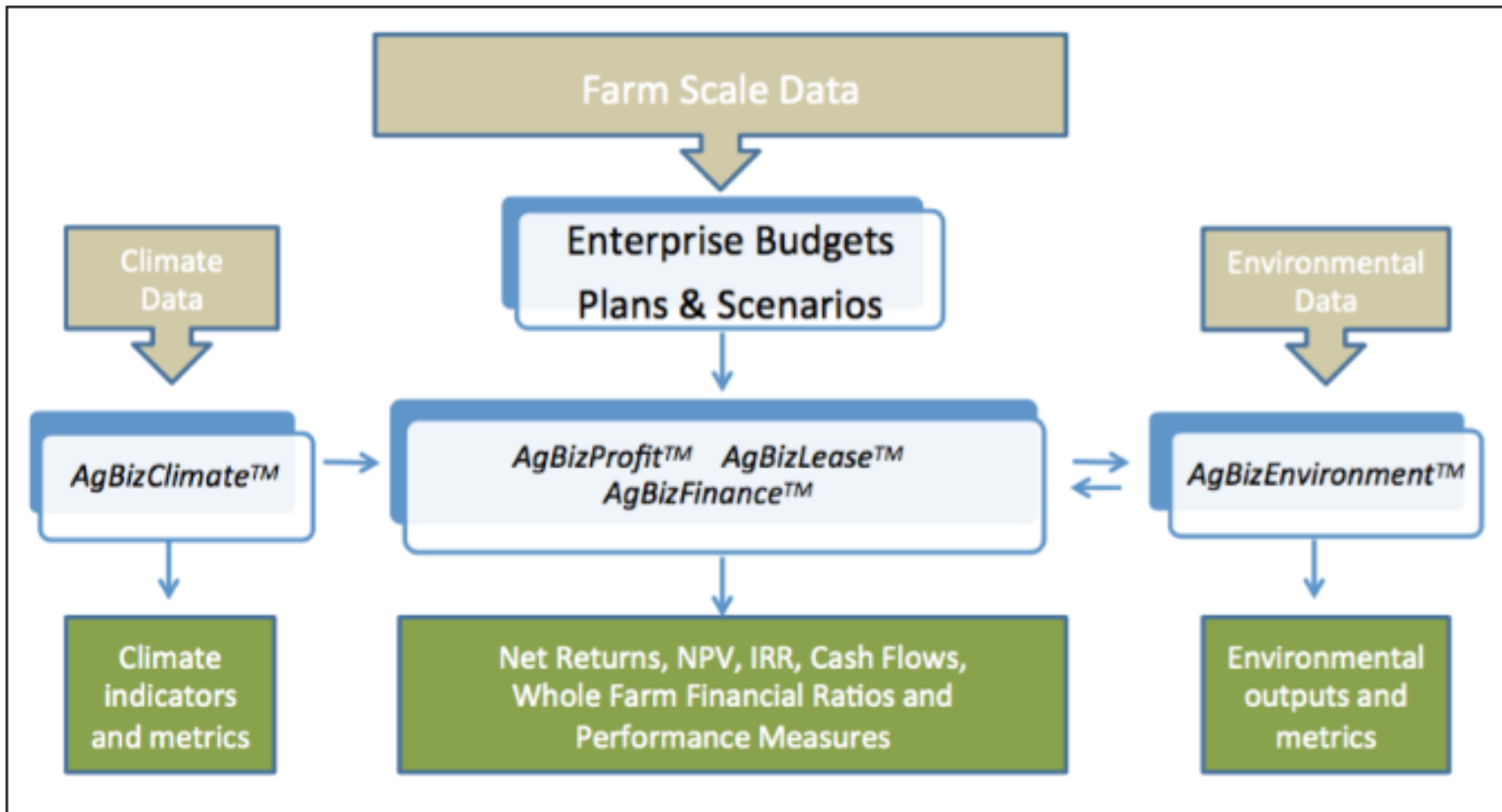
[Sign Up Free](#)

www.agbizlogic.com

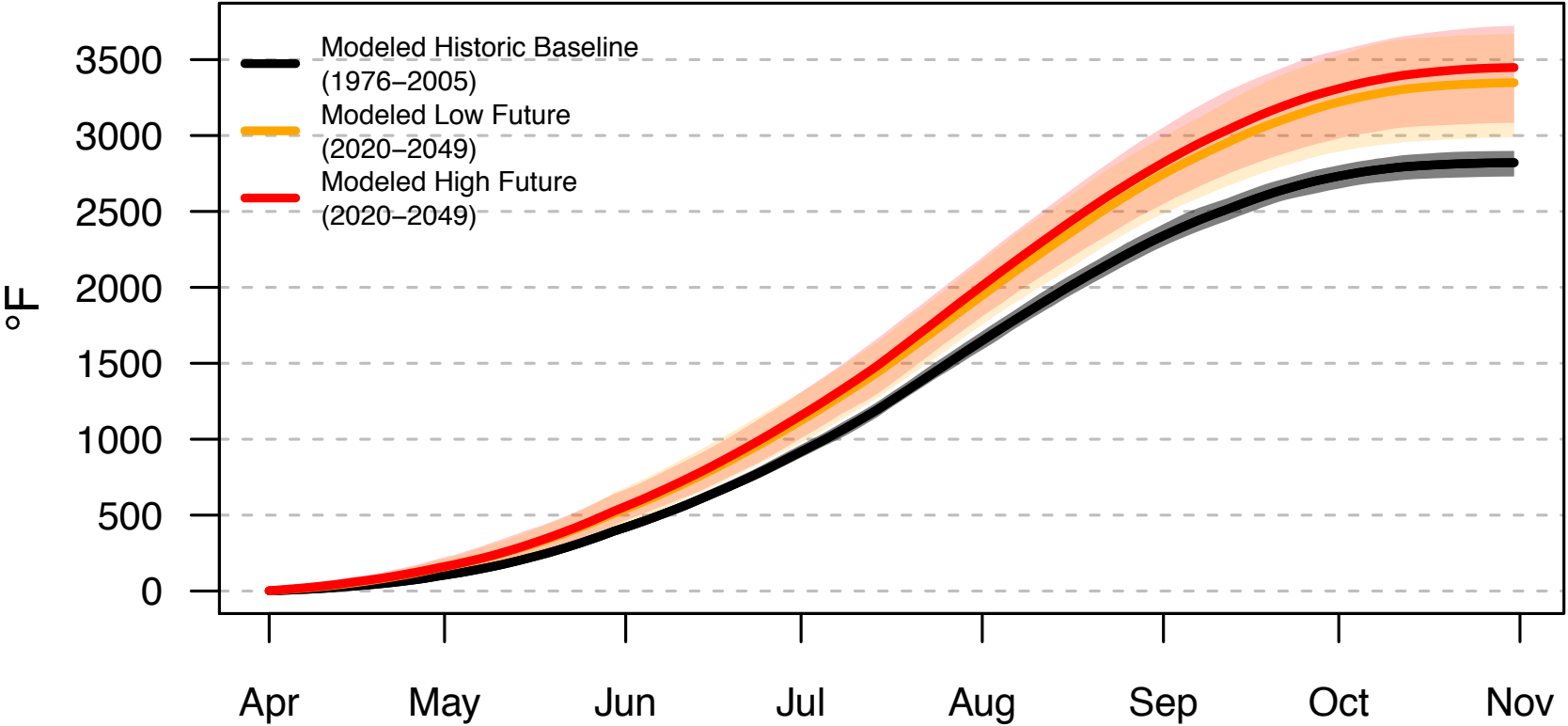
What is *AgBiz Logic*?

AgBiz Logic (ABL) is a suite of economic, financial, environmental and climate change decision-support tools that enable producers to increase or assess profitability while assessing environmental trade-offs.

AgBiz Logic Platform



Accumulated Growing Degree Days (Base 50°F) Wenatchee



By the 2030s, accumulated growing degree days from April 1 to October 31 is expected to increase by 527 degree-hours for the low emissions future and by 627 degree-hours for the high emissions future compared with the historical baseline.

Farm-level Data is “King” in *AgBiz Logic*

- Cost and return (enterprise) budgets are the foundation of *ABL*
- Three methods of data collection within *ABL*:
 - ✓ Schedule F (Form 1040) Federal tax returns
 - ✓ Import data from accounting system via .csv/.exe files
 - ✓ University & industry enterprise budgets

Transfer your business data to AgBiz Logic

The first step toward utilizing AgBiz Logic decision tools is to populate AgBiz Logic with income and expense data generated from your business. Once this information is entered, you'll be able to allocate income and expenses to create enterprise budgets for personalized scenarios.

We provide three methods for collecting your business data. Select one from the list below, and proceed through the steps provided.

- Enter information from your Schedule F/Form 1040
- Import data from your accounting system or spreadsheet
- Select existing University Budget(s) (if you don't have your own data)

Business Allocation

Income

| Category | Total | Crop ? | Livestock ? | Whole Farm ? | \$ or % ? |
|--|-------------|--------------|-------------|--------------|-----------|
| Sales of livestock, produce, grains and other products | \$3,800,000 | \$ 3,000,000 | \$ 800,000 | \$0 | % |
| Cooperative distributions received | \$3,000 | \$ 0 | \$ 0 | \$3,000 | % |
| Agricultural program payments | \$60,000 | \$ 60,000 | \$ 0 | \$0 | % |
| Commodity Credit Corporation | \$0 | \$ 0 | \$ 0 | \$0 | % |
| Crop insurance proceeds and federal crop disaster payments | \$200,000 | 100 % | 0 % | \$0 | \$ |
| Specified custom hire (machine work) income | \$150,000 | \$ 0 | \$ 0 | \$150,000 | % |
| Other income | \$12,500 | \$ 0 | \$ 0 | \$12,500 | % |

Enterprise Allocation



Allocate your enterprise information

Follow the prompts to specify your enterprises, assigning attributes such as Type, Class, and Commodity. You can add as many types of enterprises as needed by using the "Add" button.

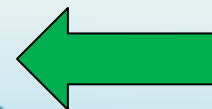
Choose your enterprise

Select an Enterprise

Enterprise Type

Market

- ✓ -Select-
- Berry Crops
- Cereal Grains
- Feed
- Legumes
- Nut Crops
- Oil
- Row Crops
- Seed
- Tree Fruit
- Vine Crops



Your enterprises so far:

| Enterprise | Enterprise Type |
|------------|-----------------|
|------------|-----------------|

Enterprise Allocation



Allocate your enterprise information

Follow the prompts to specify your enterprises, assigning attributes such as Type, Class, and Commodity. You can add as many types of enterprises as needed by using the "Add" button.

Choose your enterprise

Select an Enterprise

Enterprise Type

Commodity -Select-
Apples ←
Apricots
Avocado
Banana
Cherries
Coconut
Date
Fig
Grapefruit
Kiwi Fruit
Lemon
Lime
Mango
Nectarines

Market

Your enterprises so far:

| Enterprise | Enterprise Type |
|------------|-----------------|
| | |

Back

Data is Always in Season.™

Enterprise Allocation



Allocate your enterprise information

Follow the prompts to specify your enterprises, assigning attributes such as Type, Class, and Commodity. You can add as many types of enterprises as needed by using the "Add" button.

Choose your enterprise

Select an Enterprise

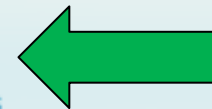
Enterprise Type

Commodity

Class/Variety

Market

- ✓ -Select-
- Ambrosia
- Braeburn
- Cameo
- Cortland
- Cripps Pink
- Elstar
- Empire
- Fuji
- Gala
- Golden Delicious
- Granny Smith
- Gravenstein
- Honeycrisp
- Idared
- Jazz



Your enterprises so far:

| Enterprise | Enterprise Type |
|------------|-----------------|
|------------|-----------------|

Back

Enterprise Allocation



Allocate your enterprise information

Follow the prompts to specify your enterprises, assigning attributes such as Type, Class, and Commodity. You can add as many types of enterprises as needed by using the "Add" button.

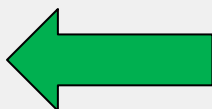
Choose your enterprise

Select an Enterprise

Enterprise Type

Commodity

Class/Variety

Market 

- ✓ -Select-
- Conventional
- GMO
- Local
- Natural
- Organic
- Other

Your enterprises so far:

| Enterprise | Enterprise Type | Production/Commod |
|------------|-----------------|-------------------|
|------------|-----------------|-------------------|

Back

Data is Always in Season.™

Enterprise Budget for Gala Apples, not for a particular block!



Allocate your enterprise information

Follow the prompts to specify your enterprises, assigning attributes such as Type, Class, and Commodity.

You can add as many types of enterprises as needed by using the "Add" button.

Choose your enterprise

Select an Enterprise

Select

Add

Your enterprises so far:

| Enterprise | Enterprise Type | Production/Commodity Type | Class | Market | Actions |
|------------|-----------------|---------------------------|-------|--------------|---------|
| Crop | Tree Fruit | Apples | Gala | Conventional | Delete |

| Enterprise Type | Production/Commodity Type | Class | Market |
|-----------------|---------------------------|-------|--------------|
| Tree Fruit | Apples | Gala | Conventional |

Enterprise Budget for Honeycrisp, can be at the block level!

Gross Income

| Gross Return | Unit Sold by/as | Quantity of Units Sold | Price per Unit Sold | Total Value per Acre |
|----------------------------|-----------------|------------------------|---------------------|----------------------|
| Honeycrisp Apples | Bin | 43.00 | \$650.00 | \$27,950.00 |
| Total Gross Returns | | | | \$27,950.00 |

Add New

General Cash Costs

| Name | Unit | Quantity | Price per Unit | Total Cost per Acre |
|---------------------------------------|------|----------|----------------|---------------------|
| Chemicals | Acre | 1.00 | \$1,200.00 | \$1,200.00 |
| Cost of Goods Sold | Acre | 1.00 | \$10,013.26 | \$10,013.26 |
| Fertilizers and lime | Acre | 1.00 | \$350.00 | \$350.00 |
| Freight and Trucking | Acre | 1.00 | \$480.00 | \$480.00 |
| Gasoline, fuel, and oil (1) | Acre | 1.00 | \$140.00 | \$140.00 |
| Interest on loans and mortgages | Acre | 1.00 | \$624.42 | \$624.42 |
| Labor hired (less employment credits) | Acre | 1.00 | \$3,210.00 | \$3,210.00 |
| Other Expenses | Acre | 1.00 | \$792.91 | \$792.91 |
| Repairs and maintenance (2) | Acre | 1.00 | \$220.00 | \$220.00 |
| Supplies | Acre | 1.00 | \$45.00 | \$45.00 |
| Utilities | Acre | 1.00 | \$200.00 | \$200.00 |
| Total General Costs | | | | \$17,275.59 |

Add General Cost

Totals

| | |
|----------------------------------|--------------------|
| Total Gross Returns | \$27,950.00 |
| Total Costs | \$17,275.59 |
| Net Returns (income minus costs) | \$10,674.41 |

Costs and Benefits – Will Higher Density Make More \$: *An AgBiz Logic Case Study*



Questions or Comments!