Replacing Labor with Capital:
An *AgBiz Logic* Case Study

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Key Trends - *Industry and Others*

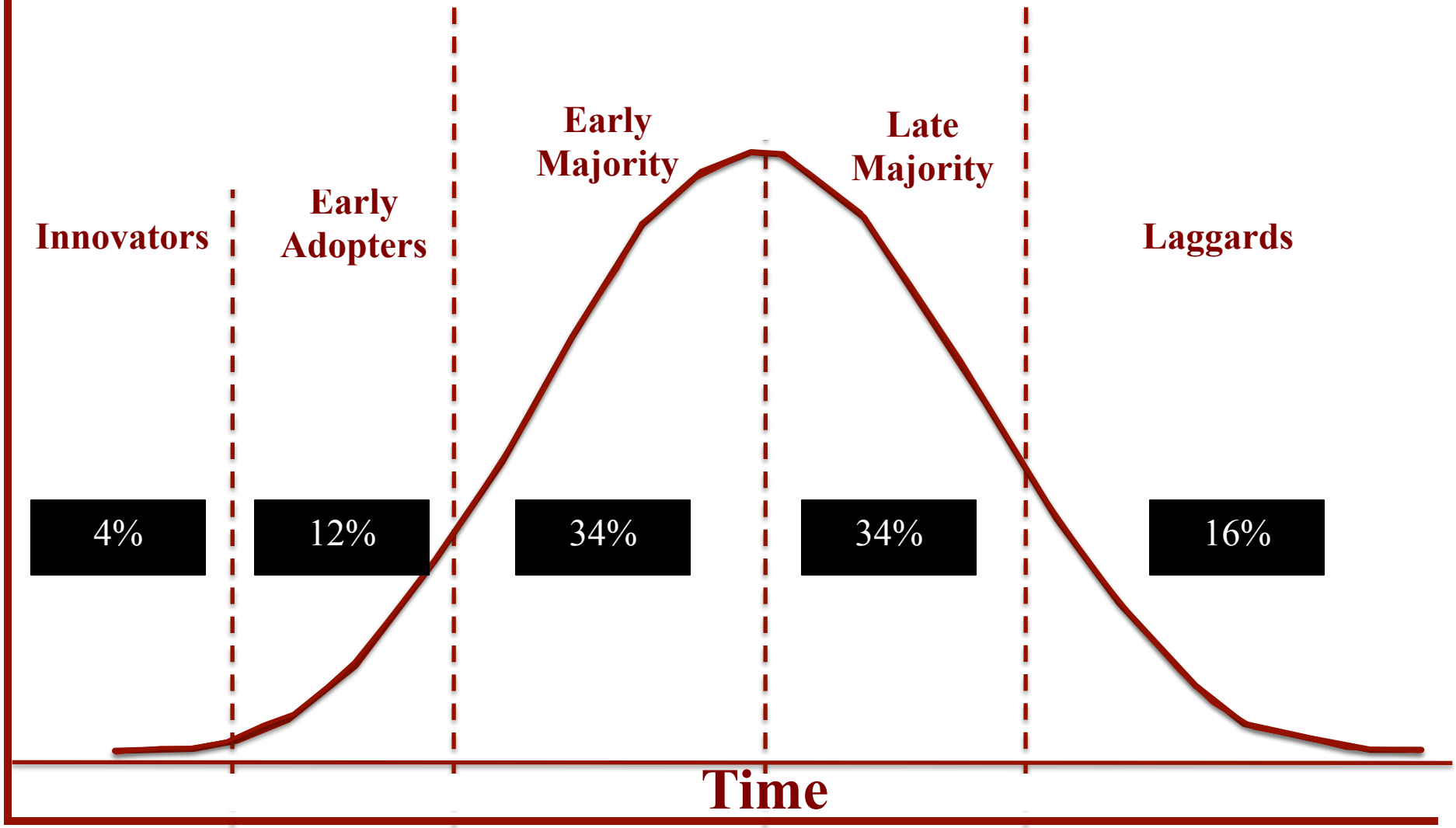
- **Proposed $15 per hour minimum wage rates**
- **Immigration Reform**
- **Climate Change/Weather Variability:**
  - ✓**irrigation water shortages**
  - ✓**condensed harvest season**
- **Orchard Renewal:**
  - ✓**Acres planted**
  - ✓**increased per acre yields (*40-50 to 80-100*+ BPA!)**
  - ✓**increased 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 (*$20-$25k to $42-$45k 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*

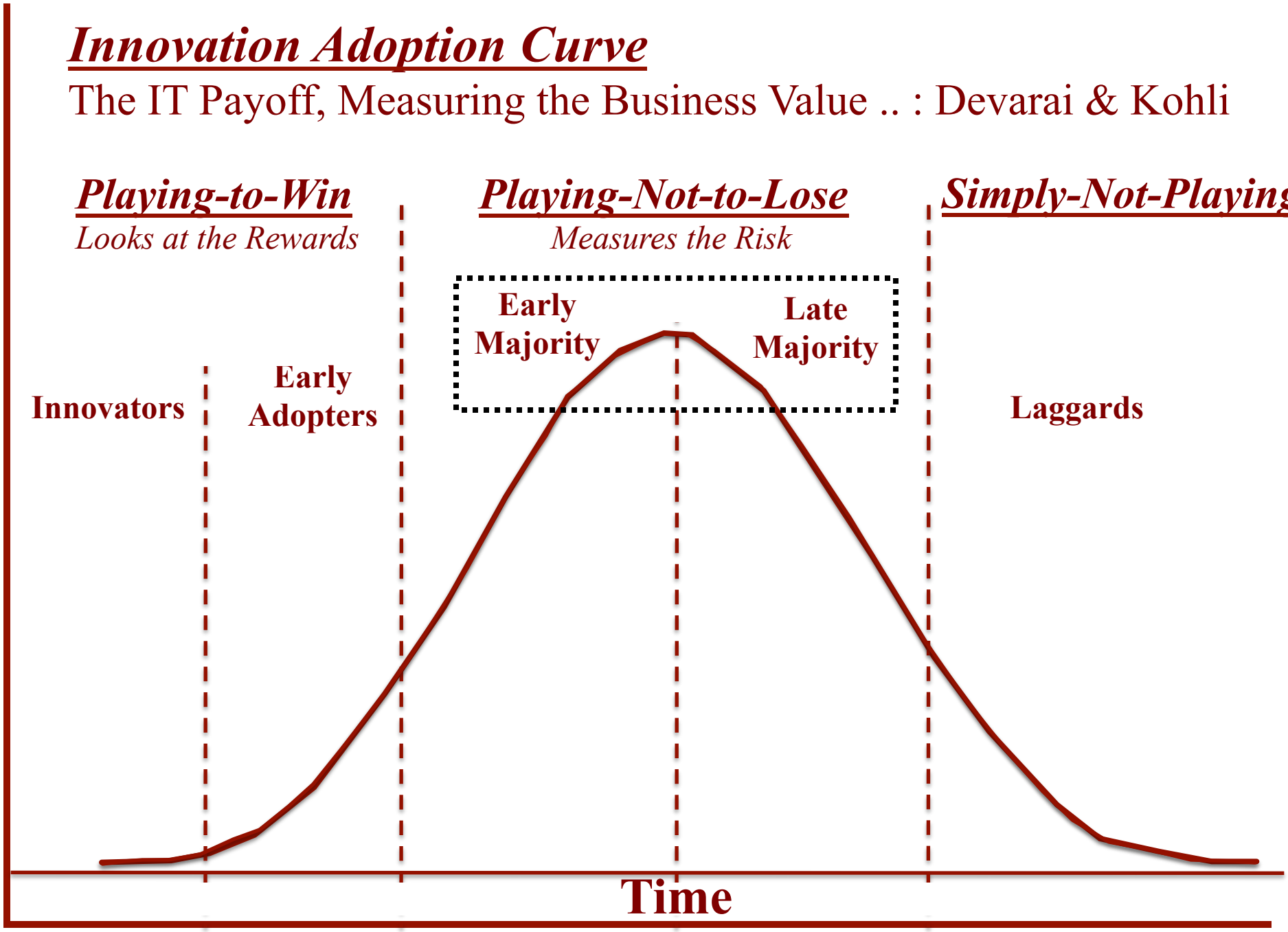
Innovation Adoption Curve

Diffusion of Innovations: Everett Rogers



Innovation Adoption Curve

The IT Payoff, Measuring the Business Value .. : Devarai & Kohli



Profit Maximization, always keep in mind:

THREE Key Factors to Successful Orchard Production/Renewal

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

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
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.

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

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

1. Orchard Blocks

Smith Apple Farms, Case Study, 2010

Block	Variety	Acres	Years of Age	System	Trees/ Acre
A	Gala	45	Mature >20	2- wire trellis	550
B	Gala	30	Mature 10	5- wire trellis	550
C	Gala	10	Mature 7	5- wire trellis	800
D[1]	Golden Delicious	50	Mature >30	Free Standing	200
E[2]	BC2 Fuji	55	Mature >30	3- wire trellis	200
F	Granny Smith	50	Mature >20	4-wire trellis	600
G	Cripps Pink	30	Mature 8	5- wire trellis	550
H	Cripps Pink	10	5	5- wire trellis	800
I	Honeycrisp	10	2	5- wire trellis	1,089
J	Idle Land	10	0	n/a	n/a

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

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E[2]	BC2 Fuji	55	Mature >30	3- wire trellis	200
F	Granny Smith	50	Mature >20	4-wire trellis	600
G	Cripps Pink	30	Mature 8	5- wire trellis	550
H	Cripps Pink	10	5	5- wire trellis	800
I	Honeycrisp	10	2	5- wire trellis	1,089
J	Idle Land	10	0	n/a	n/a

Smith Apple Farms, Case Study, 2015

Block	Variety	Acres	Years of Age	System	Trees/ Acre
A	Gala	45	Mature >25	2- wire trellis	550
B	Gala	30	Mature 15	5- wire trellis	550
C	Gala	10	Mature 12	5- wire trellis	800
D	Honeycrisp	30	4	5- wire trellis	1,452
D	Cripps Pink	20	4	5- wire trellis	1,452
E	Honeycrisp	10	3	5- wire trellis	1,452
E	Jazz	25	3	5- wire trellis	1,452
E	Envy	20	1	5- wire trellis	1,452
F	Granny Smith	50	Mature >20	4-wire trellis	600
G	Cripps Pink	30	Mature 12	5- wire trellis	550
H	Cripps Pink	10	Mature 10	5- wire trellis	800
I	Honeycrisp	10	Mature 7	5- wire trellis	1,089
J	Envy	10	5	5- wire trellis	1,452

Play-to-Win Strategy: *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?***

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

Smith Apple Farms, Case Study, 2015

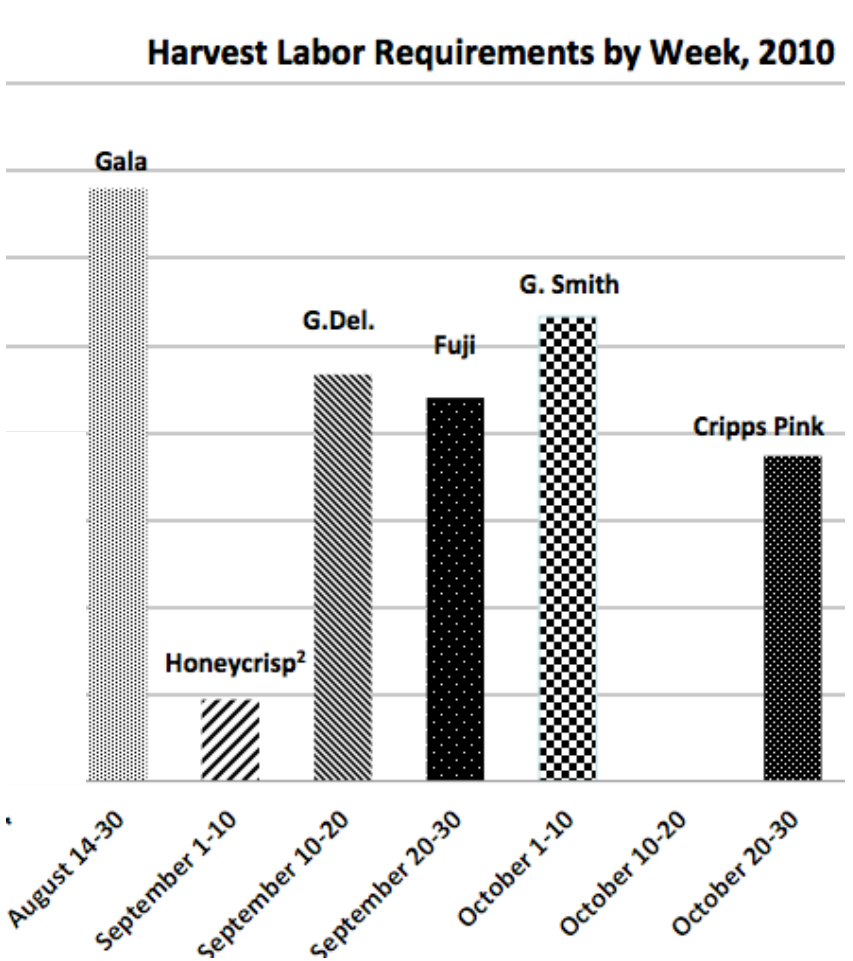
Acres	Block	Variety	Yields Harvested Bins/acre	Return To Grower/Bin Harvested	Total Revenues/Ac
85	A	Gala	60	$200	$12,000
	B	Gala	60	$209	$12,540
	C	Gala	60	$212	$12,720
	D	Honeycrisp (full prod)	70	$500	$35,000
	D	Cripps Pink (full prod)	70	$440	$30,800
	E	Honeycrisp	70	$500	$35,000
	E	Jazz (full prod)	70	$500	$35,000
	E	Envy (full prod)	80	$500	$40,000
50	F	Granny Smith	80	$275	$12,000
195	G	Cripps Pink	70	$440	$30,800
	H	Cripps Pink	70	$440	$30,800
	I	Honeycrisp	70	$500	$35,000
	J	Envy (full prod)	80	$500	$40,000

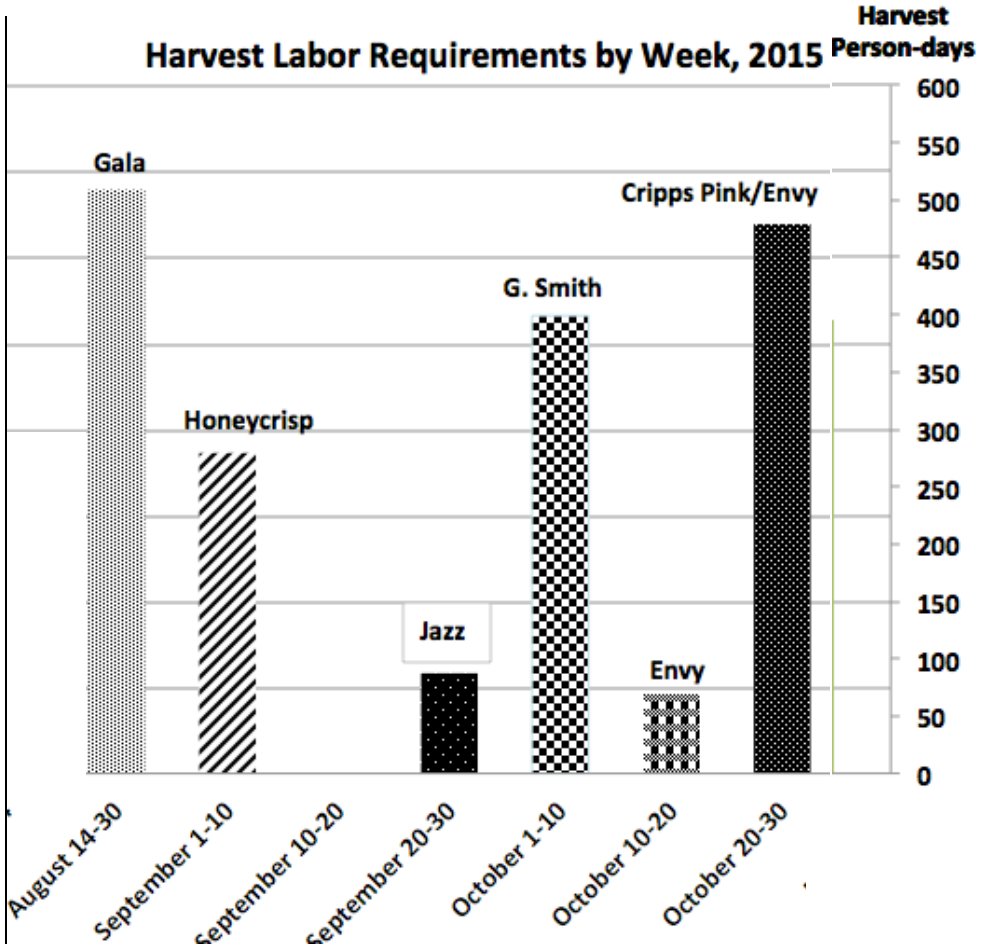
Gala and Granny Smith blocks are 45% of total acreage.

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

2. Harvest Labor

Smith Apple Farms, Case Study





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*

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

Financial Position: Income Statement

Smith Apple Farms, Case Study, 2015

Farm/Ranch Net Income

Year	Farm/Ranch Gross Income	Farm/Ranch Costs	Annual Net Income	Accumulated Net Income
1	$4,027,900	$2,507,152	$1,520,748	$1,520,748
2	$4,884,908	$4,139,293	$745,615	$2,266,362
3	$4,673,416	$2,277,025	$2,396,391	$4,662,753
4	$5,860,924	$3,530,942	$2,329,983	$6,992,736
5	$6,860,933	$2,533,324	$4,327,609	$11,320,345

Gala and Granny Smith blocks are 45% of total acreage. In this scenario,

1) **Remove Gala's in 2016 and replant in 2017**
2) **Remove Granny Smith in 2018 and replant in 2019**

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

Financial Position

FIVE Key Financial Ratios and Performance Measures

1. Current Ratio (Working Capital)

Current Assets ÷ Current Liabilities (Current Assets - Current Liabilities)

2. Debt-to-Asset Ratio

Total Liabilities / Total Assets

3. Return on Assets

Net farm income + Farm interest expense – Owner withdrawals
÷ Average total farm assets

4. Profit Margin

Net Farm Earnings ÷ Value of Farm Production

5. Term Debt to EBITDA

Long Term Loan Payments ÷ Earnings before Interest, Taxes, Depreciation and Amortization Expenses

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

Financial Position

Tree Fruit Producers with Gross Revenues of > $2m

	Current Ratio	*Debt-to-Asset Ratio*	*Return on Assets*	*Profit Margin*	*Term Debt to EBITDA*
Upper Quartile	5.19	45.0	> 6%	32.13%	> 350%
Median	3.20	27.0	2%-6%	18.67%	350 - 600%
Lower Quartile	1.98	22.0	< 1%	2.75%	> 600%

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

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

How much can you afford to pay for a fully-automated harvester?

Grower's Financial Indifference Value (gFIV)

A gFIV is the total net returns that the technology would replace.

If the gFIV were equal to the costs to acquire, repair, service, power, or train employees to operate the technology, increases and decreases to grower returns and input costs, and a return on investment for the risks associated with implementing the technology, then the grower would be indifferent to adopting the technology.

Smith Apple Farms, Hand Harvest Labor

Year	Farm/Ranch Gross Income	Farm/Ranch Costs	Annual Net Income	Accumulated Net Income
1	$4,027,900	$2,507,152	$1,520,748	$1,520,748
2	$4,884,908	$4,139,293	$745,615	$2,266,362
3	$4,673,416	$2,277,025	$2,396,391	$4,662,753
4	$5,860,924	$3,530,942	$2,329,983	$6,992,736
5	$6,860,933	$2,533,324	$4,327,609	$11,320,345

Smith Apple Farms, Fully Automated Harvest

Year	Farm/Ranch Gross Income	Farm/Ranch Costs	Annual Net Income	Accumulated Net Income
1	$4,027,900	$2,153,862	$1,874,038	$1,874,038
2	$4,884,908	$3,701,142	$1,183,766	$3,057,804
3	$4,673,416	$1,877,087	$2,796,329	$5,854,133
4	$5,860,924	$3,012,082	$2,848,842	$8,702,975
5	$6,860,933	$1,906,156	$4,954,777	$13,657,752
6	$2,125,442	$663,221	$1,462,220	$15,119,972

$3,799,621

Smith Apple Farms, Replace 75% of Harvest Labor

Year	Farm/Ranch Gross Income	Farm/Ranch Costs	Annual Net Income	Accumulated Net Income
1	$4,027,900	$2,278,405	$1,749,495	$1,749,495
2	$4,884,908	$3,857,003	$1,027,905	$2,777,401
3	$4,673,416	$2,024,785	$2,648,631	$5,426,032
4	$5,860,924	$3,233,992	$2,626,932	$8,052,964
5	$6,860,933	$2,217,032	$4,643,901	$12,696,865
6	$2,125,442	$866,210	$1,259,232	$13,956,097

$2,635,752

Play-to-Win Strategy: *Developing a 5-Year Business Plan*

How many harvest machines must I purchase?

Depends on:

1. Acres per Hour

2. Hours of operation in a day

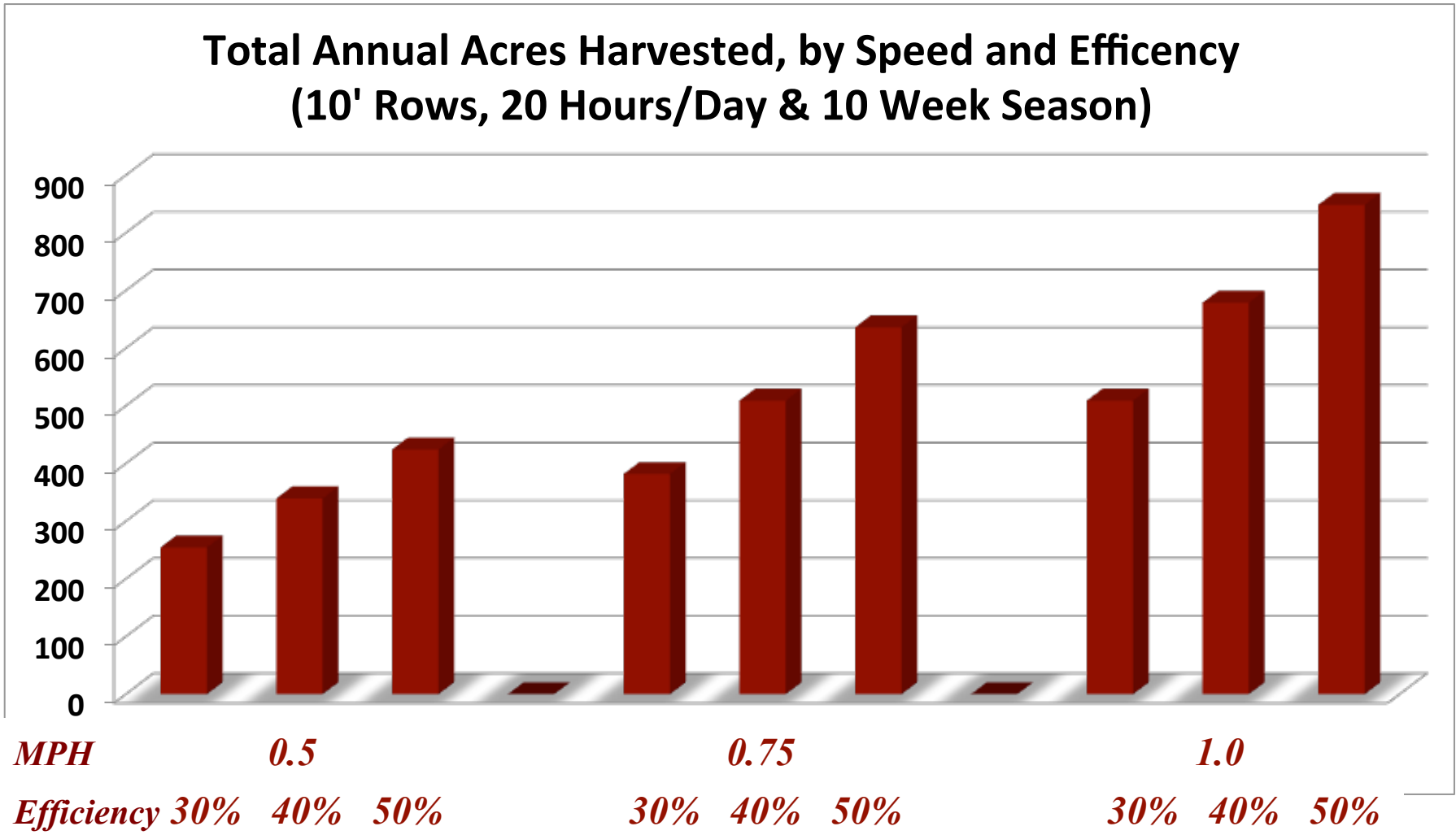
3. Days in your harvesting season

Acres per Hour

$$\frac{\text{Equipment Speed} \times \text{Width of Operation} \times \text{Field Efficiency}}{8.25}$$

(relationship of rods in a mile and square feet per acre)

Play-to-Win Strategy: *Developing a 5-Year Business Plan*



Replacing Labor with Capital: Summary

1. Focus on maximizing profits, not minimizing costs.
2. Develop a 5-year plan with a "Play to Win" strategy.
3. Establish a gross revenue per acre minimum and remove or rejuvinate those blocks that do not meet that criteria.

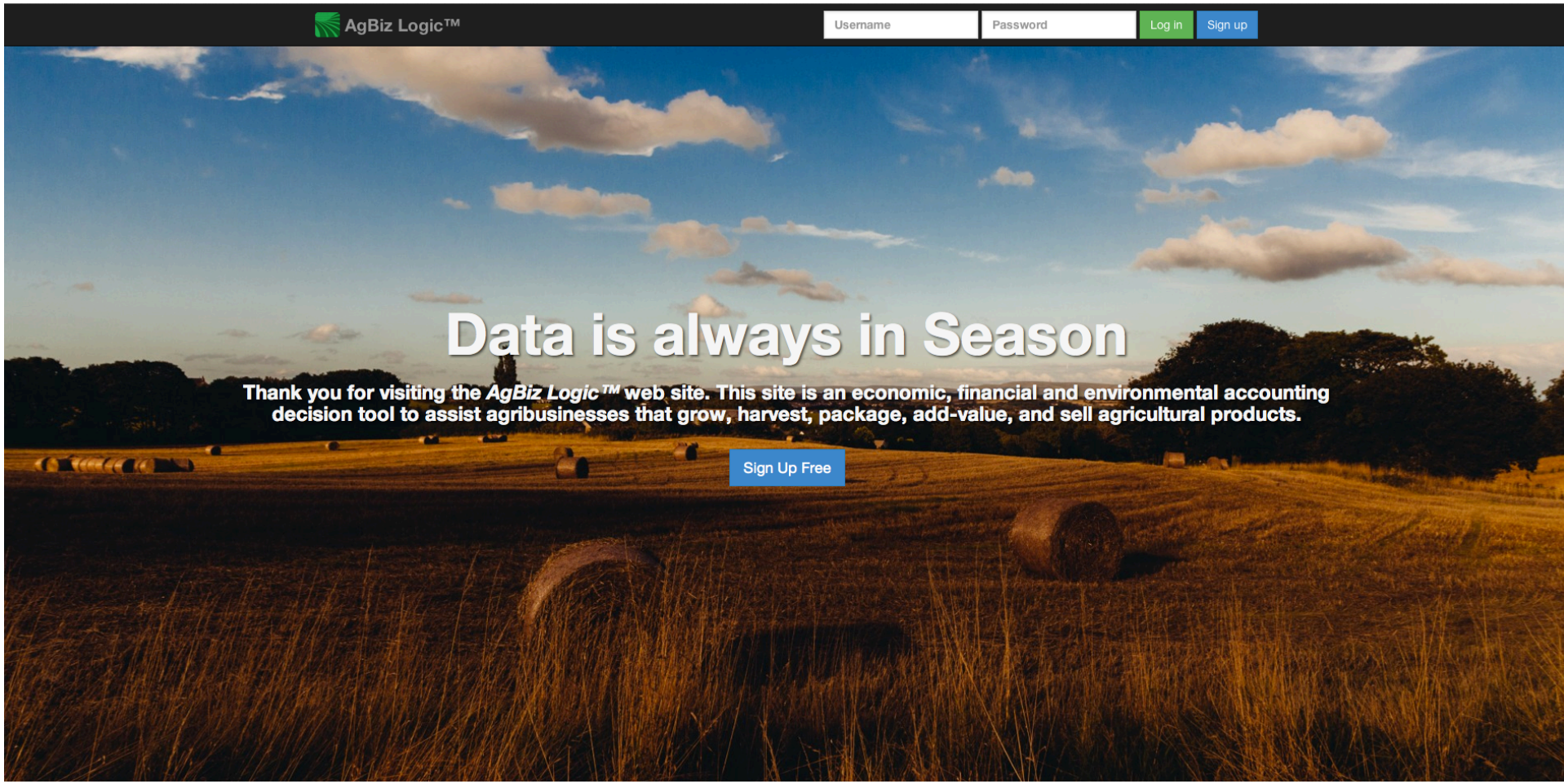
Replacing Labor with Capital: Summary

4. Use financing appropriately, don't short your working capital by financial orchard renewal with annual cash flows.
5. Plant varieties that "fit" within your harvest window, that produce consistent yields, packouts and/or high returns.

Replacing Labor with Capital: Summary

6. Setup your operation for fully-automated harvesting, its coming to an orchard near you in our life-time!
7. Be prepared to have an additional revenue stream in your budgets – DATA! In the future people will pay for your data, capitalize on it!

Integrating *AgTools™* Capabilities and MORE!



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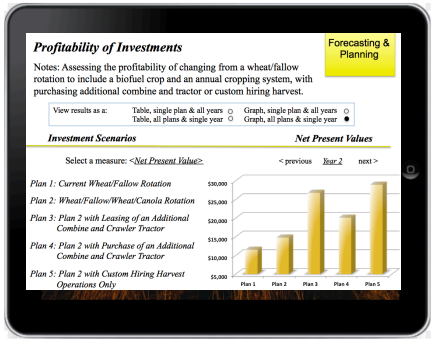
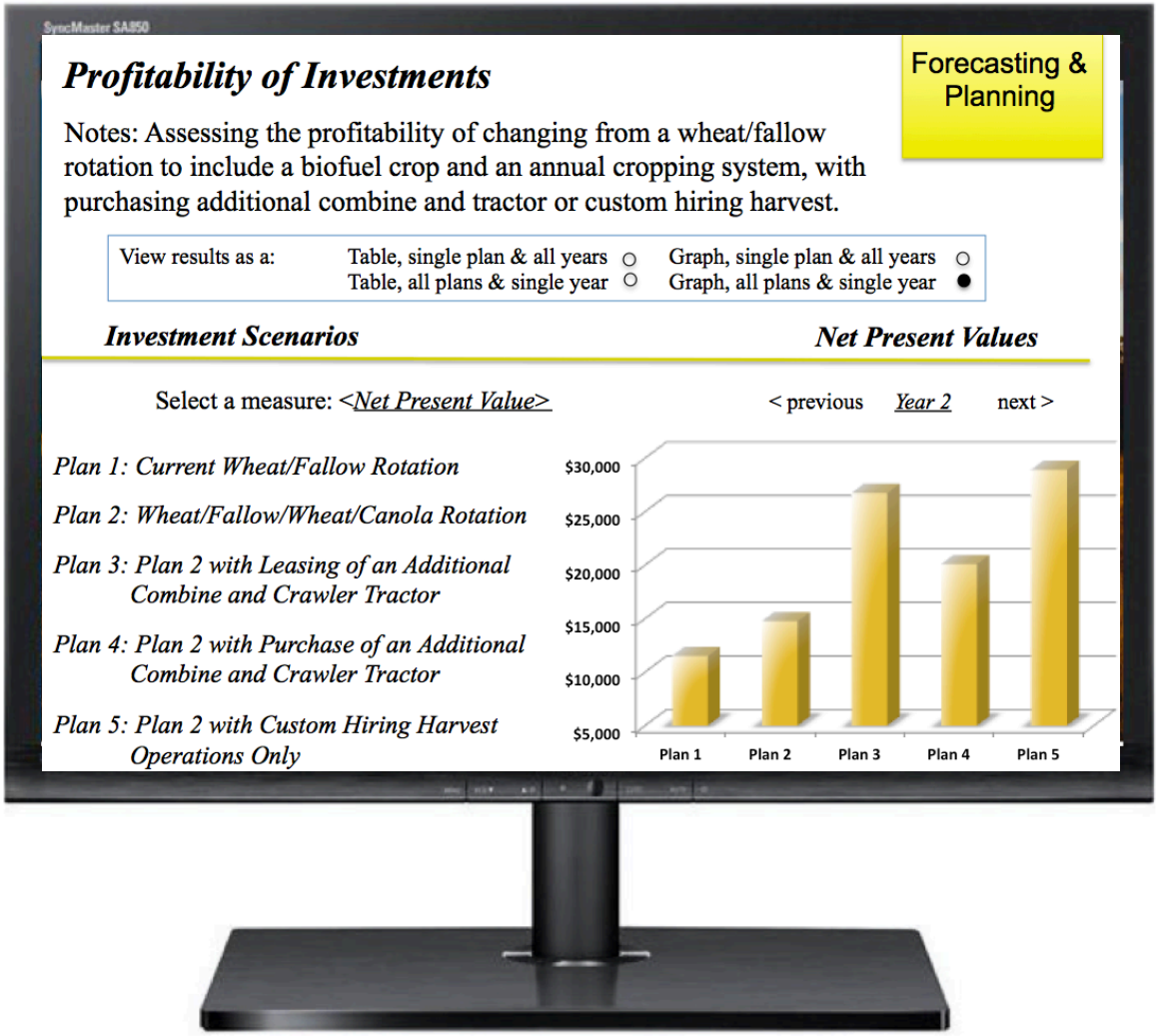

Profitability of Investments
Forecasting & Planning
Notes: Assessing the profitability of changing from a wheat/fallow rotation to include a biofuel crop and an annual cropping system, with purchasing additional combine and tractor or custom hiring harvest.
View results as a:
Table, single plan & all years
Graph, single plan & all years
Table, all plans & single year
Graph, all plans & single year
Investment Scenarios
Net Present Values
Select a measure: <Net Present Value>
< previous
Year 2
next >
Plan 1: Current Wheat/Fallow Rotation
Plan 2: Wheat/Fallow/Wheat/Canola Rotation
Plan 3: Plan 2 with Leasing of an Additional Combine and Crawler Tractor
Plan 4: Plan 2 with Purchase of an Additional Combine and Crawler Tractor
Plan 5: Plan 2 with Custom Hiring Harvest Operations Only
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
Plan 1
Plan 2
Plan 3
Plan 4
Plan 5


SyncMaster SA350
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Student-Engaged Business Assessment Program

SEBA

Student Engaged Business Assessment

The Student-Engaged Business Assessment (SEBA) program provides OSU students with an innovative and creative link to the world of agricultural business in the Pacific Northwest. The students are integrated with real-time situations as they conduct and collaborate on economic and financial analyses for owners of agribusinesses. SEBA is the recent development of the faculty in the Applied Economics Department.

For a fee, OSU undergraduate students who excelled in AEc 460 Capital Investment Analysis, will conduct various financial analyzes for growers under my supervision.

Student-Engaged Business Assessment Program

Current and Past Projects

Whole farm financial analysis to develop a succession plan or a strategic orchard renewal plan.

Establishing price points and market strategies for a new agricultural product.

Establishing equitable leases for cash rent annual payment, crop share, flexible case rent based on yield and price variations, or a 35-year cash rent with a share of the crop.

Industry cost of production budgets for cow-calf operations in southern Oregon,fresh and processed potatoes in southern Oregon, and strawberries in the Willamette Valley.

Conduct capital investment analyses to purchase new equipment and technologies, and compare crops, crop rotations, and production systems.

http://appliedecon.oregonstate.edu/SEBA