

# Costs of Production for Diversified Vegetable Farms

Tanya Murray  
Oregon Tilth  
[tanya@tilth.org](mailto:tanya@tilth.org)



Agricultural  
Marketing  
Service



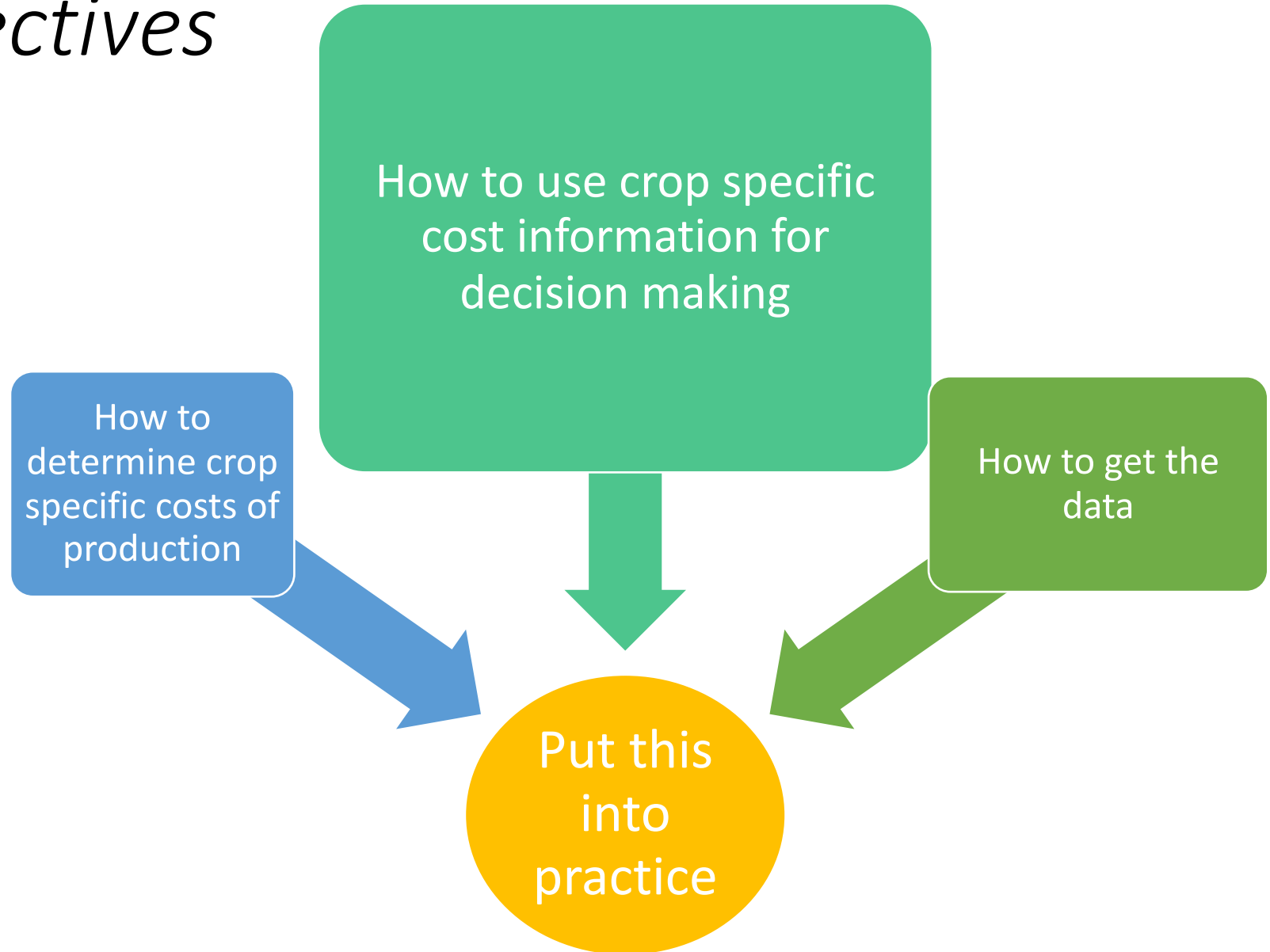
**Oregon State University**  
Center for Small Farms &  
Community Food Systems



# *Inspiration*



# *Workshop Objectives*



# *Basic Costing Concepts*

How to  
determine crop  
specific costs of  
production

Managerial Accounting → Internal Decision Making

Key Principle → Focus on relevant cost/benefits to the decision you're making.

## Relevant Costs

- ✓ Costs that differ between alternative courses of action
- ✓ Depend on decision and context/situation



How to  
determine crop  
specific costs of  
production

# *Single Product Farm Business Analysis*

Decision: Should I continue to grow this crop next season or discontinue crop (shut down)?

## Relevant Costs

➤ Costs that will be different if I grow the crop versus if I don't.

## Costs if I continue to grow the crop:

- ✓ Costs that will increase/decrease depending on how much I grow – variable costs
- ✓ Costs that will be constant regardless of how much I grow – fixed costs (cash /non-cash fixed costs + short-run/long-run)

## Costs if I discontinue crop (shut down)?

- ✓ No variable costs, because these vary with how much I grow.
- ✓ No fixed costs, because these are avoided if I discontinue crop (shut down).

Crop  
Market Channel  
Space Planted


A  
B  
C



Oregon State University  
Center for Small Farms &  
Community Food Systems



Created by Tanya Murray tanya@tilth.org

## LABOR COSTS

	Pre-Harvest Labor	notes
Bed Preparation		D
Direct Seeding		E
Transplanting		F
Weed Management		G
Irrigation		H
Covering		I
Plant Care		J
PRE-HARVEST LABOR MINUTES PER SPACE PLANTED	0	K sum D through J
PRE-HARVEST LABOR HOURS PER SPACE PLANTED	0.00	L divide K by 60 to convert to hours
Average Labor Cost per Hour (loaded)		M
PRE-HARVEST LABOR COSTS PER SPACE PLANTED	\$0.00	N multiply L by M
Harvested Yield per Space Planted		O
Crop Unit		P

	Harvest Labor	
Harvest Rate (Crop Units per Hour)		R
HARVEST LABOR HOURS PER SPACE PLANTED	#DIV/0!	S divide O by R
Average Labor Cost per Hour		T
HARVEST LABOR COSTS PER SPACE PLANTED	#DIV/0!	U multiply S by T

	Post Harvest Labor	
Post Harvest Rate (Crop Units per Hour)		V
POST HARVEST LABOR HOURS PER SPACE PLANTED	#DIV/0!	W divide O by V
Average Labor Cost per Hour		X
POST HARVEST LABOR COSTS PER SPACE PLANTED	#DIV/0!	Y multiply W by X

## NON-LABOR INPUT COSTS

Non-labor Input Costs		Z
-----------------------	--	---

TOTAL VARIABLE COSTS PER SPACE PLANTED	#DIV/0!	AA sum N+U+Y+Z
Marketable Yield per Space Planted		AB
VARIABLE COST PER CROP UNIT	#DIV/0!	AC divide AA by AB

Price per Crop Unit		AD
VARIABLE COST PER CROP UNIT	#DIV/0!	AE same as AC
CONTRIBUTION MARGIN PER CROP UNIT	#DIV/0!	AF difference between AD and AE

How to  
determine crop  
specific costs of  
production

# *Contribution Margin*

...aka Returns over Variable Costs

➤  $\text{Price per Unit} - \text{Variable Cost per Unit} = \text{Contribution Margin per Unit}$

➤  $\text{Crop Sales} - \text{Crop Variable Costs} = \text{Crop Contribution Margin}$

➤  $\text{Total Sales} - \text{Total Variable Costs} = \text{Total Contribution Margin}$

Contribution Margin is not the same as Profit

Contribution Margin has to cover fixed costs and then can contribute to profits.

# Decision Time

How to use crop  
specific cost  
information for  
decision making

Continue to grow this crop next season or discontinue/shut down?

Compare net benefits between alternatives.

Revenues – Variable Costs = Contribution Margin – Fixed Costs = Net Benefit

## Continue to Grow

Contribution Margin per Unit = **-\$-.79** per lb

Crop Contribution Margin = TCM

100 x **-\$-.79** = **-\$79**

1000 x **-\$-.79** = **-\$7,900**

1,000,000 x **-\$-.79** = **-\$79,000,000**

Fixed (Cash) Costs = \$10,000

## Discontinue/Shutdown

Contribution Margin per Unit = \$0

Crop Contribution Margin = TCM

0 x \$0 = \$0

Fixed Costs = \$0

# *Decision Rule – Part 1*

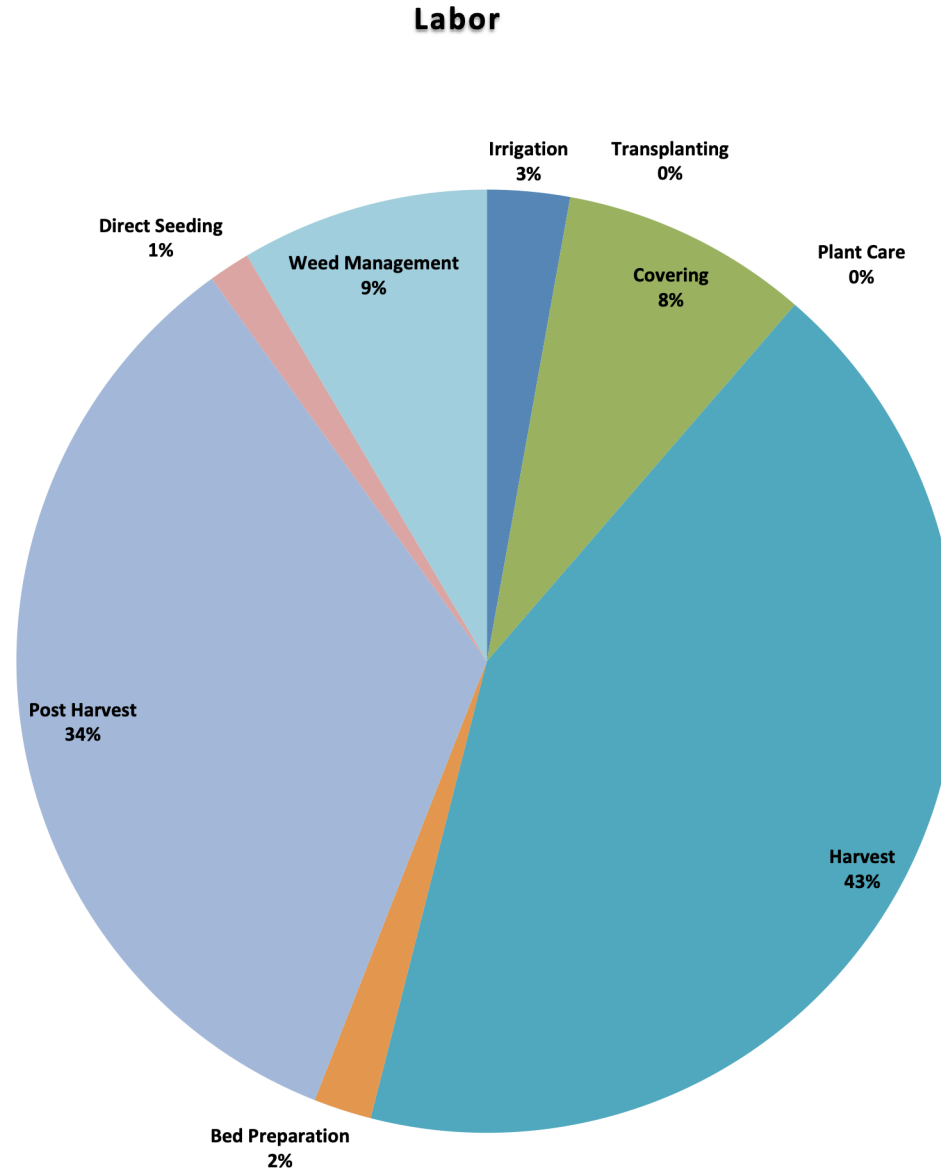
If price per unit < variable cost per unit,  
*unless you can improve the contribution margin...*  
discontinue/shut down.

How to use crop  
specific cost  
information for  
decision making

# *Can you increase contribution margin?*

How to use crop  
specific cost  
information for  
decision making

- Increase Price
- Increase Yield
- Reduce Variable Costs
  - Timing
  - Technique
  - Training
  - Tools





Crop  
Market Channel  
Space Planted


A  
B  
C



Oregon State University  
Center for Small Farms &  
Community Food Systems



Created by Tanya Murray tanya@tilth.org

## LABOR COSTS

	Pre-Harvest Labor	notes
Bed Preparation		D
Direct Seeding		E
Transplanting		F
Weed Management		G
Irrigation		H
Covering		I
Plant Care		J
PRE-HARVEST LABOR MINUTES PER SPACE PLANTED	0	K sum D through J
PRE-HARVEST LABOR HOURS PER SPACE PLANTED	0.00	L divide K by 60 to convert to hours
Average Labor Cost per Hour (loaded)		M
PRE-HARVEST LABOR COSTS PER SPACE PLANTED	\$0.00	N multiply L by M
Harvested Yield per Space Planted		O
Crop Unit		P

	Harvest Labor	
Harvest Rate (Crop Units per Hour)		R
HARVEST LABOR HOURS PER SPACE PLANTED	#DIV/0!	S divide O by R
Average Labor Cost per Hour		T
HARVEST LABOR COSTS PER SPACE PLANTED	#DIV/0!	U multiply S by T

	Post Harvest Labor	
Post Harvest Rate (Crop Units per Hour)		V
POST HARVEST LABOR HOURS PER SPACE PLANTED	#DIV/0!	W divide O by V
Average Labor Cost per Hour		X
POST HARVEST LABOR COSTS PER SPACE PLANTED	#DIV/0!	Y multiply W by X

## NON-LABOR INPUT COSTS

Non-labor Input Costs		Z
-----------------------	--	---

TOTAL VARIABLE COSTS PER SPACE PLANTED	#DIV/0!	AA sum N+U+Y+Z
Marketable Yield per Space Planted		AB
VARIABLE COST PER CROP UNIT	#DIV/0!	AC divide AA by AB

Price per Crop Unit		AD
VARIABLE COST PER CROP UNIT	#DIV/0!	AE same as AC
CONTRIBUTION MARGIN PER CROP UNIT	#DIV/0!	AF difference between AD and AE

How to use crop  
specific cost  
information for  
decision making

## *Decision Rule - Part 2*

If price per unit  $>$  variable cost per unit, aka contribution margin is positive, evaluate if crop contribution margin  $>$  fixed costs

(Consider non-cash costs too?)

If crop contribution margin  $>$  fixed costs, keep growing, if not...

*Can you change fixed costs?*

If not...discontinue/shut down.

## *Example*

Contribution Margin (CM) is \$.25 per lbs.

55 lbs per bed = \$13.67 CM per bed = \$1102 CM per acre  $(43560/540)*\$13.67$

\$10,000      \$1102 CM per acre = ~ 9 acres

What If you only have 5 acres?

Need \$2000 CM per acre

Need \$892 more/CM per acre

55lbs per bed = 4,436 lbs per acre  $(43560/540)*55\text{lbs}$

Need \$.45 more CM per lbs = \$5.20 per lb

# *Multi-Product Farm Business Analysis*

Decision: Should I continue to grow this crop next season or discontinue crop (shut down)?

## Relevant Costs

➤ Costs that will be different if I grow the crop versus if I don't.

### Costs if I continue to grow the crop:

- ✓ Costs that will increase/decrease depending on how much I grow – variable costs
- ✓ Costs that will be constant regardless of how much I grow – fixed costs but only **avoidable direct** fixed costs
- **INDIRECT (NON-CROP SPECIFIC) COST WILL BE THE SAME EITHER WAY – NOT RELEVANT**

### Costs if I discontinue crop (shut down)?

- ✓ No variable costs, because these vary with how much I grow.
- ✓ **No avoidable direct** fixed costs
- **INDIRECT (NON-CROP SPECIFIC) COST WILL BE THE SAME EITHER WAY – NOT RELEVANT**

How to  
determine crop  
specific costs of  
production

# *Decision Rule*

How to use crop  
specific cost  
information for  
decision making

If price per unit < variable cost per unit, drop the crop  
*(unless you can improve the contribution margin)*

If price per unit > variable cost per unit, aka contribution margin is positive, evaluate if crop contribution margin > **avoidable direct** fixed costs

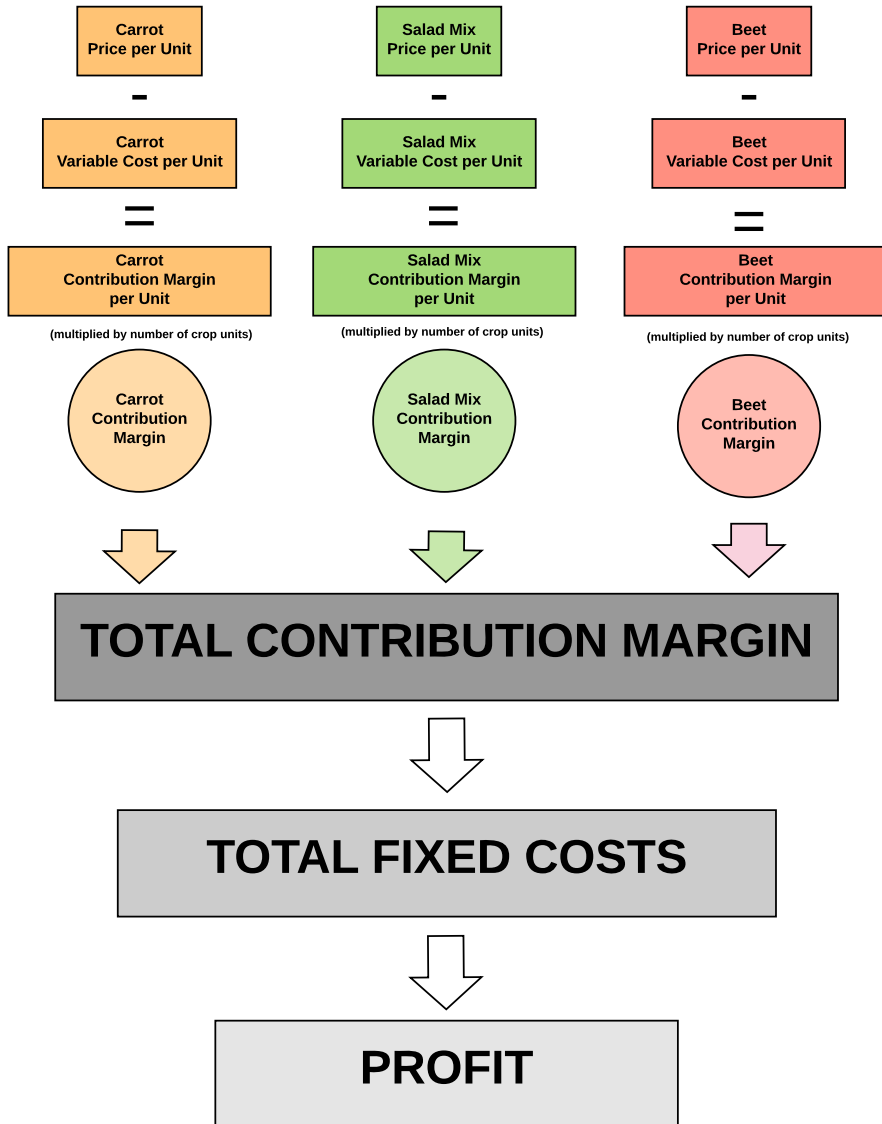
*(Consider non-cash costs too?)*

If crop contribution margin > **avoidable direct** fixed costs, keep growing, if not...

*Can you change fixed costs?*

If not...discontinue/shut down.

# Multi-Product Farm Business



How to  
determine crop  
specific costs of  
production



# *Crop Mix Decisions*

How to use crop  
specific cost  
information for  
decision making

Decision: Which crops should I emphasize/de-emphasize in crop mix?

Rank crops based on contribution margin per unit of constraint.

- Contribution Margin per Bed

- Contribution Margin per Labor Hour

Identify minimum amount per crop you have to produce. Plan on this.

Identify maximum you can produce.

Use available capacity (after required minimums) to grow maximum amount of highest ranking crops, then next highest, then next, etc. until capacity is used up.

# *Your Turn...*

- Choose a crop
- Choose a channel
- Identify pre-harvest steps
- Estimate time per step (use rate and extrapolate to space)
- Estimate field yield
- Estimate harvest rate
- Estimate post harvest rate
- Estimate non-labor input costs for inputs that vary with amount of crop produced

How to  
determine crop  
specific costs of  
production

# *What Data?*

- Labor Inputs
- Non-Labor Inputs
- Yield
  - Harvested Yield
  - Marketable Yield
  - Quantity Sold
- Fixed Costs

How to get the  
data

# *Time Studies*

How to get the  
data



# Time Study Worksheet

Production Activities	Minutes	Field Units/Transplant Production Units	Minutes/Unit
rototill			
spread amendment			
bed up			
direct seed			
irrigate			
cover			
weed			
cover			
Harvest	Hours	Crop Units	Units/Hour
Crop 1: Carrots			
Crop 2: Beets			
Crop 3: Radish			
Post Harvest	Hours	Crop Units	Units/Hour
Crop 1: Carrots			
Crop 2: Beets			
Crop 3: Radish			

# How to get the data: Recordkeeping Systems



How to get the  
data

## Time Studies

\* Required

Farm ID \*

Your answer

Labor Activity Type \*

- ☐ Field Labor
- ☐ Transplant Production Labor
- ☐ Harvest Labor
- ☐ Post Harvest Labor

NEXT

Never submit passwords through Google Forms.

[google form](https://forms.google.com)



# *Make it a Habit*

## How have you been successful at getting into a positive habit?

- ✓ Accountability
- ✓ Make it easy, convenient
  - Get set up
  - What to record (activities & units)
  - Who
  - When
  - How
- ✓ Create triggers
- ✓ Involve your crew/team
- ✓ Start small

How to get the  
data

# KNOW YOUR COSTS TO GROW



*Are you looking for ways to make your farm more profitable?*

**Know Your Costs To Grow** is a year-long program designed to help diversified vegetable farmers like you determine crop specific costs of production. Knowing your costs of production can provide important insights into changes you can make to your production systems, pricing and crop mix that will increase your overall profits.

- Join a facilitator-led cohort of farmers to determine crop specific costs of production.
- Access online modules to guide you on tracking, calculating and analyzing production costs throughout the growing season.
- Attend two in-person meetings (Winter 2020 & Winter 2021) to share ideas and best practices for profitability and viability.



**TRACK,  
CALCULATE,  
& ANALYZE**



**MEET &  
SHARE  
IDEAS**



**RECORDKEEPING  
SUPPORT &  
ACCOUNTABILITY**



**INFORMED  
DECISION  
MAKING**

**[Click here to preview the Introductory Module to learn more about the Know Your Costs to Grow Program.](#)**

For more information about the program contact [Tanya@tilth.org](mailto:Tanya@tilth.org).

Put this  
into  
practice



**Oregon State University**  
Center for Small Farms &  
Community Food Systems



This program was developed in partnership with Oregon State University's Center for Small Farms and Community Food Systems and Oregon Tilth, through funding from the USDA's National Institute for Food and Agriculture's (NIFA) Beginning Farmer and Rancher Program.

The Know Your Costs To Grow program is being offered by 13 partner organizations in 6 states in 2020. Sign up with a facilitator in your region to participate. Please note that in 2020, Know Your Costs To Grow is being offered as a pilot program. Fees to access the online modules are being waived, however, organizations that are hosting the pilot program may charge a facilitation fee.