



LEAN FARMING

Troy Rice, Farm Brigge

Implementing continuous improvement on the farm for sustainable & profitable growth.



TROY RICE

THOUGHT LEADER, FATHER, EDUCATOR



10+ Years In Finance & Strategy



7+ Years Lean Green Belt Coach



Entrepreneur & Creator



Thought Writer



Speaker & Educator



A MISSION ALIGNED WITH NATURE

Current challenges within local food supply chains



Farm Bankruptcies



11% in 5 years
19% in 2019



Food Travel



1,500 miles



Decreases nutrient



Increases pollutants



Childhood Obesity



4% a year in last 5
years
Current rate at
18.5%

WHAT DO YOU KNOW ABOUT LEAN APPLIED IN FARMING?



I am an expert in Lean Farming.



I practice Lean a little on the farm today.



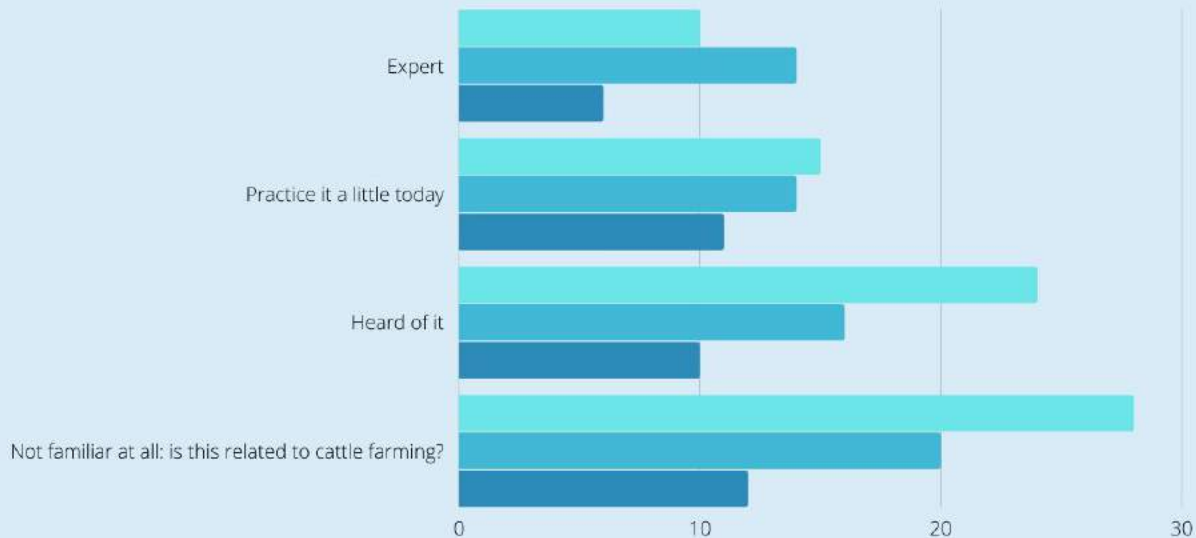
I have heard of Lean in farming before.



Not familiar at all: is this related to cattle farming?

Lean Awareness Poll

Participant Results





What is Lean?

Lean is a customer-focused approach to improve:

- quality
- cost
- delivery
- Staff satisfaction

Lean Involves:

- the elimination of waste while improving process flow
- a philosophy and method of continuous improvement
- a commitment to a journey

Lean is not:

- "silver bullet" approach
- a one-time initiative



THE OPTIMIST

Why is this glass half full?



THE PESSIMIST

Why is this glass half empty?



THE LEAN THINKER

Why is this glass twice as big as it should be?



LEAN
THINKERS



Lean Principles

Specify **VALUE** as seen by
the customer

IDENTIFY and create
value stream maps

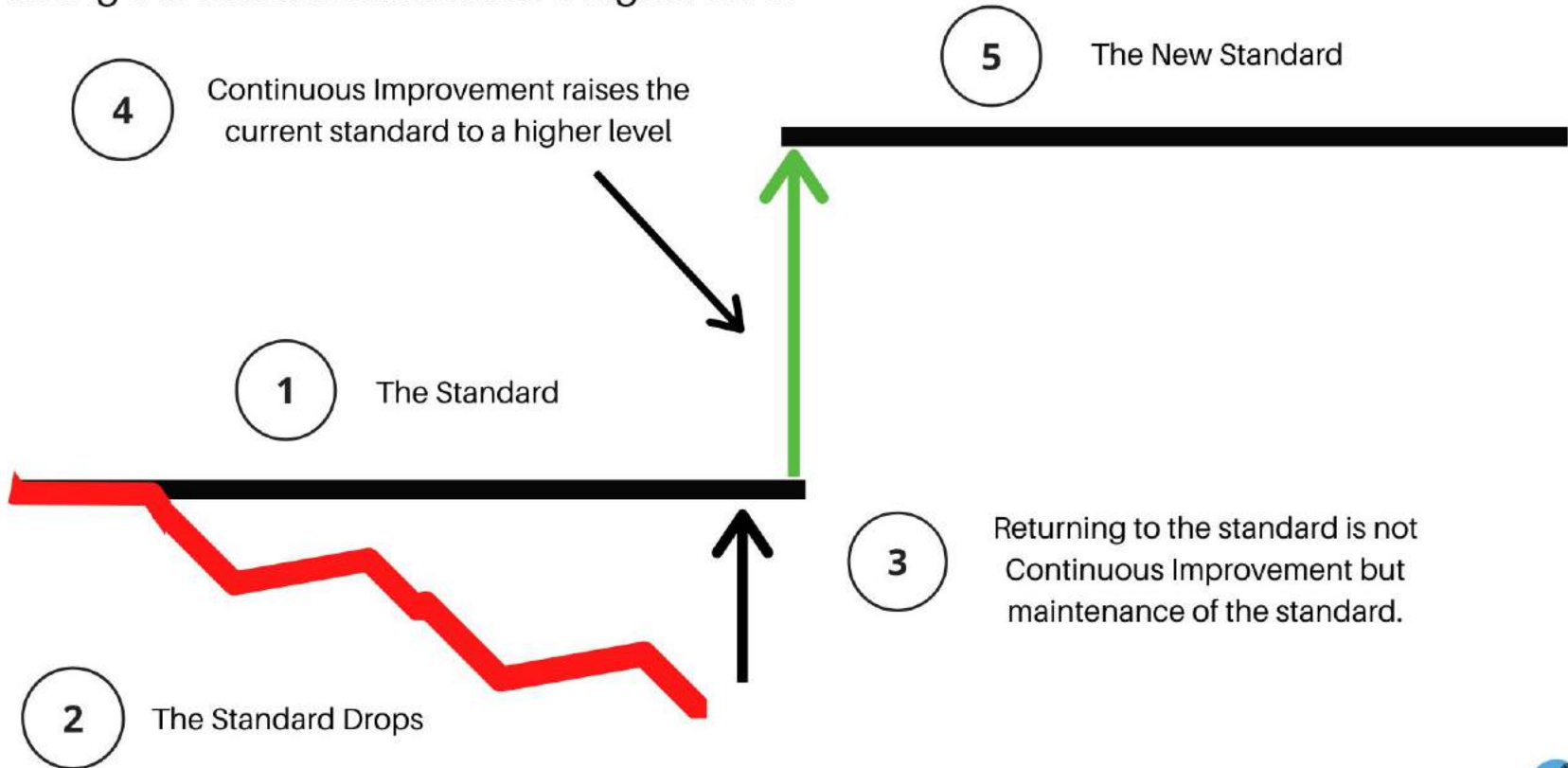
Make value creating steps
FLOW

Production based on
PULL not push

Strive for **PERFECTION**

CONTINUOUS IMPROVEMENT

Raising the current standard to a higher level





SMART Goals

- S** Specific
- M** Measurable
- A** Achievable
- R** Realistic
- T** Timely

Basic Lean Tools

Concerns & Expectations

- Improvement & Goal Planning

5s (Process Management)

- Organized Work Environment

Process Thinking

- Identify Customer Needs

PDCA (Plan, Do, Check, Act)

- Structured Problem Solving

CONCERNS

How can the farm be profitable in today's market conditions?

EXPECTATIONS

Highly profitable farm with over \$75k in sales in year 1 and \$100k in sales in year 2.



CONCERNS &
EXPECTATIONS



5s

SORT

identify unnecessary things

STRAIGHTEN

Removal of things

SHINE

Clean environment

STANDARDIZE

a consistent approach

SUSTAIN

implement and monitor



Process Thinking

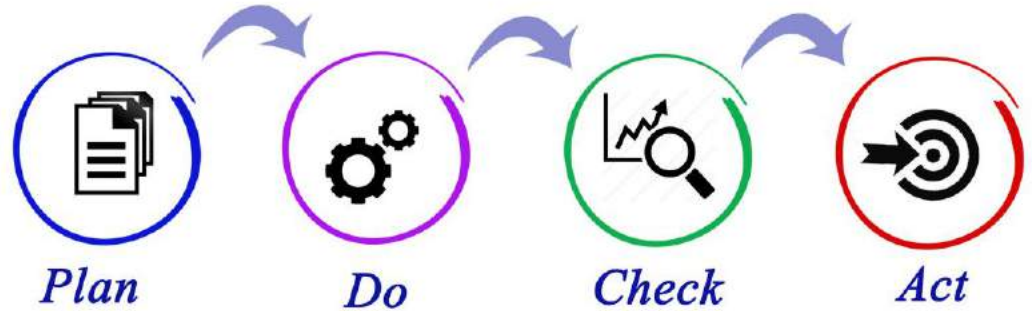
The flow of process steps during production leading to an output for the customer.

The process starts with the end in mind: who needs what by when and the level of quality (Voice of the Customer).

Helpful tool: SIPOC

- Supplier, Input, Process, Output, Customer

PDCA



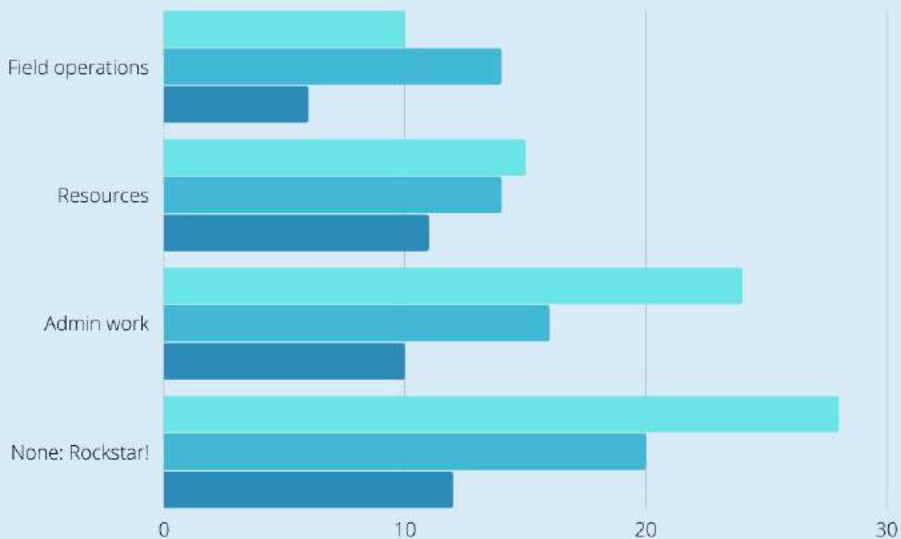
Structured problem solving to implement solutions that resolve the root causes of issues not the symptoms. Then, test the solutions for effectiveness and continuous improvement.

AREAS THAT NEED IMPROVEMENT MOST ON THE FARM INCLUDE:

- 1 Field operations (planting, growing, weeding, harvesting, etc.).
- 2 Resources (labor, capital, equipment, etc.).
- 3 Admin work (I wear too many hats).
- 4 None: I am a rockstar

Improvement Awareness Poll

Participant Results



PHASES OF LEAN



Scope



Diagnose



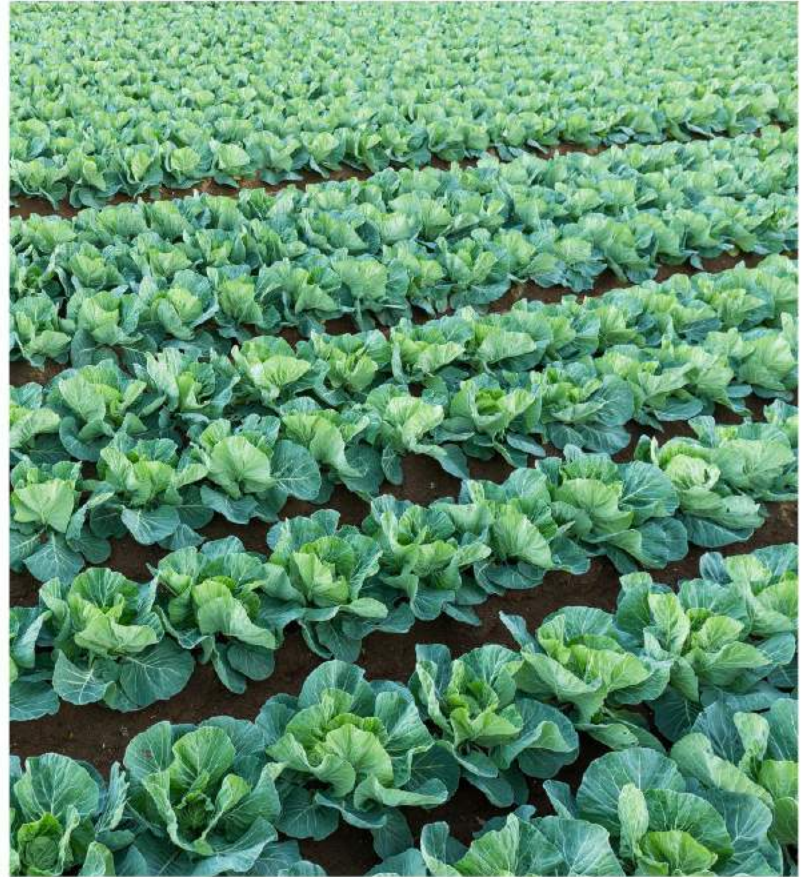
Design



Implement



Manage & Sustain



Scope

Tools for identifying problems using the SMART method, collecting customer requirements and capturing baseline data.



Voice of the Customer (VoC)



Baseline Data



SIPOC



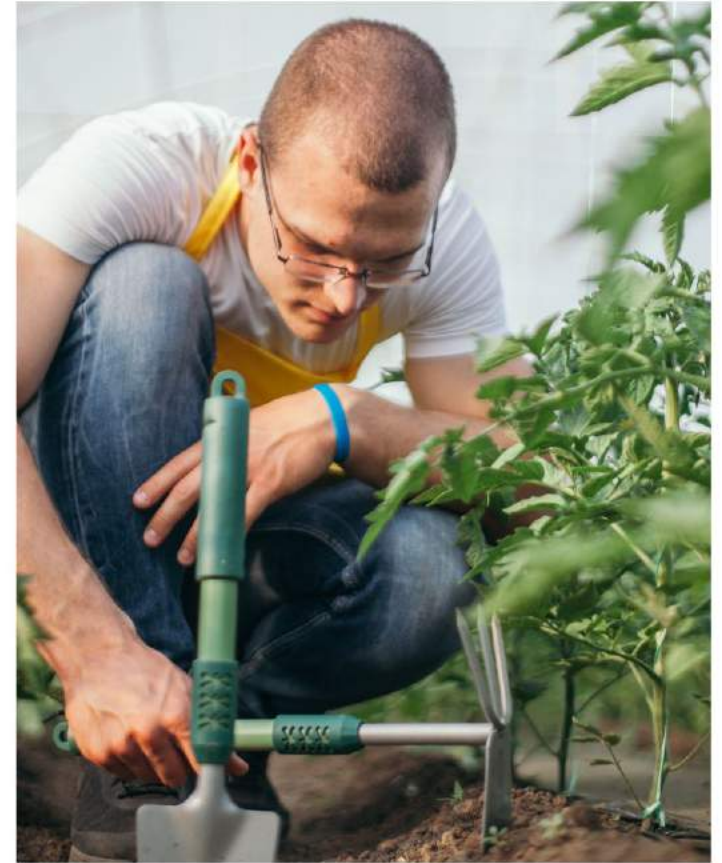
Problem & Goal Statements



Project Charters



Data Tracking



How do customers define & prioritize their needs and expectations?

A customer's needs and their perceptions of products and services.

A tool for prioritizing work based on customer requirements.



Baseline Data



Needing to make a change in your process for harvesting herbs to make it more profitable?

Baseline Data tools can be used for:

- Gathering basic information at the start of an improvement project.
- Collecting data to identify pain points that are supported by measurable information.
- Providing a comparison for assessing the impact through implementing changes.



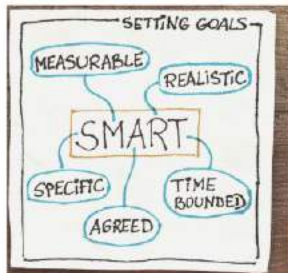
DESCRIBE CURRENT ISSUE

Identifying impacts to the farm using captured baseline data.



USE AS A GUIDE

Helpful as a guide for small improvement projects on the farm.



APPLYING S.M.A.R.T PRINCIPLES

Concise problems defined using **S**mart, **M**easurable, **A**greed, **R**ealistic and **T**imebound principles.



PROBLEM STATEMENT

Goal Statement



Problem Statement

In 3 months, our farm wasted 240 rotten peaches and spent approximately 7 hours of rework disposing them. Resulting in increased costs of \$244 in 3 months.

Goal Statement

To reduce the amount of wasted peaches by 50% during the next 90 days. Resulting in cost savings of \$122.

Defining goals you want to achieve, and by when, without stating possible solutions.

Goal measures are developed through Voice of the Customer (VoC) or based on existing continuous improvement projects.

The goal statement should be aligned in an 'apples to apples' format to your defined problem statement.

PROJECT CHARTER



Farm Owner	
Project Team	
Start Date (mm/dd/yy)	
End Date (mm/dd/yy)	

Project Schedule			
	Start (mm/dd/yy)	Finish (mm/dd/yy)	Comment
Prep Calls	[Enter Date]	[Enter Date]	
Field Work	[Enter Date]	[Enter Date]	
Tracking Progress	[Enter Date]	[Enter Date]	
Manage & Sustain	[Enter Date]	[Enter Date]	

Business Case (Purpose)
<p>The business case should address these questions:</p> <ul style="list-style-type: none"> - What is the main driver behind the project? - Does this project align with other business initiatives? - What benefits will be derived from this project? - Benefits specific to this project? - Has the value of the benefits been quantified? - What is the focus for the project team? - What impacts will this project have on other business units and employees?

Opportunity Statement (Pain)
<p>The opportunity statement should address these questions:</p> <ul style="list-style-type: none"> - What pain are we experiencing? - Where is it happening? - Over what time period? - What is the impact "pain" on our customers? - What is the impact "pain" on our business? - What is the impact "pain" on our employees? - How extensive is the problem? - What is wrong or not working? - Does it make strategic sense to address this problem? - What is the current performance compared to the target? - What is the cost of doing nothing?

Scope	
In	Out
<p>The project scope should address these questions:</p> <ul style="list-style-type: none"> - What processes are we addressing? - What areas of the business are included? - What areas of the business are not included? - What, if anything, is outside the project boundaries? - What constraints must the team work under? - What is not in scope? 	<p>The project scope should address these questions:</p> <ul style="list-style-type: none"> - What processes are we addressing? - What areas of the business are included? - What areas of the business are not included? - What, if anything, is outside the project boundaries? - What constraints must the team work under? - What is not in scope?

Goal Statement (Targeted Gain)
<p>The goal statement should address these questions:</p> <ul style="list-style-type: none"> - What are our improvements objectives and targets? - What does the team expect to accomplish and how will it be measured? - What is the primary metric that needs to be improved? - What is the secondary metric that needs to be improved? - What will be the tangible, "hard" deliverables/results? What will be the intangible, "soft" deliverables/results? - What will be the timetable for delivery of results? - How will the team prove the improvements?

DATA TRACKING

Voice of the Customer (VoC)

After identifying baselines and targets, track improvements through capturing actual data and comparing against baseline measurements.

Metric	Baseline Data	Target	Target Change (% or % Pt)	Actual			Actual Change (% or % Pt)		
				Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Waste									
Rework									
Labor Cost									
Product Cost									

$$\% \text{ Change} = \left[\left(\frac{\text{new}}{\text{old}} \right) - 1 \right] \times 100$$

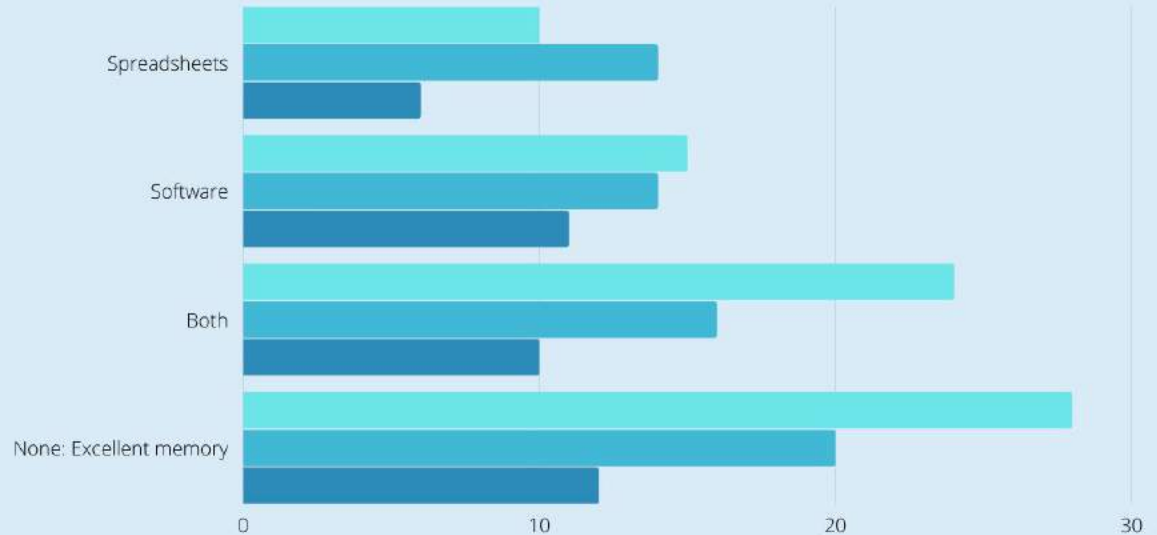
$$\text{Percentage point Change} = \text{New} - \text{Old} \quad (\% \text{ pt})$$

WHAT TOOLS DO YOU USE TODAY TO TRACK AND MEASURE OPERATIONAL RESULTS?

- 1 Spreadsheets
- 2 Software program
- 3 Combination of both spreadsheets and software
- 4 None: All in my head

Improvement Awareness Poll

Participant Results



Diagnose

Tools for assessing current processes and opportunities, identifying root causes for issues and methods for addressing and analyzing root causes that result in waste.



Value Stream Mapping



Value Add & Non Value Add



Categories of Waste



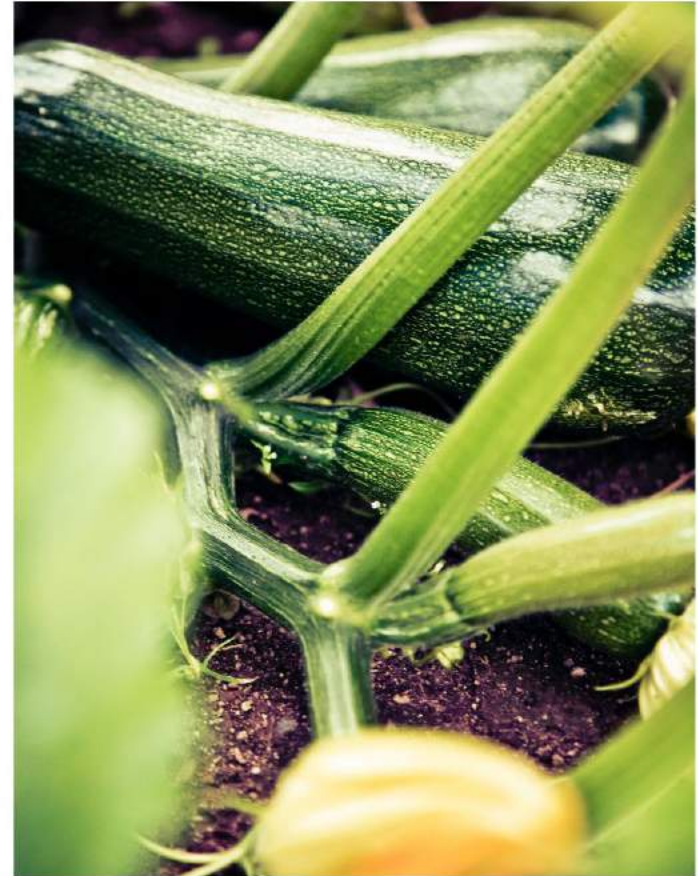
Root Cause Analysis Techniques



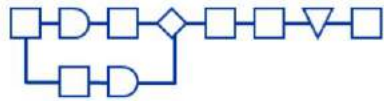
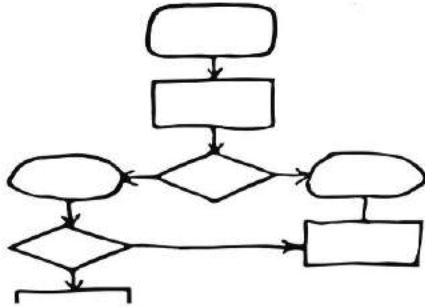
Data Collection



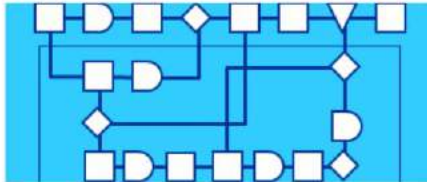
Analysis Tools



Value Stream Maps



What we think it is
(Perception)



What it is
(Actual)



What it should be
(Desired)



Tool to help:

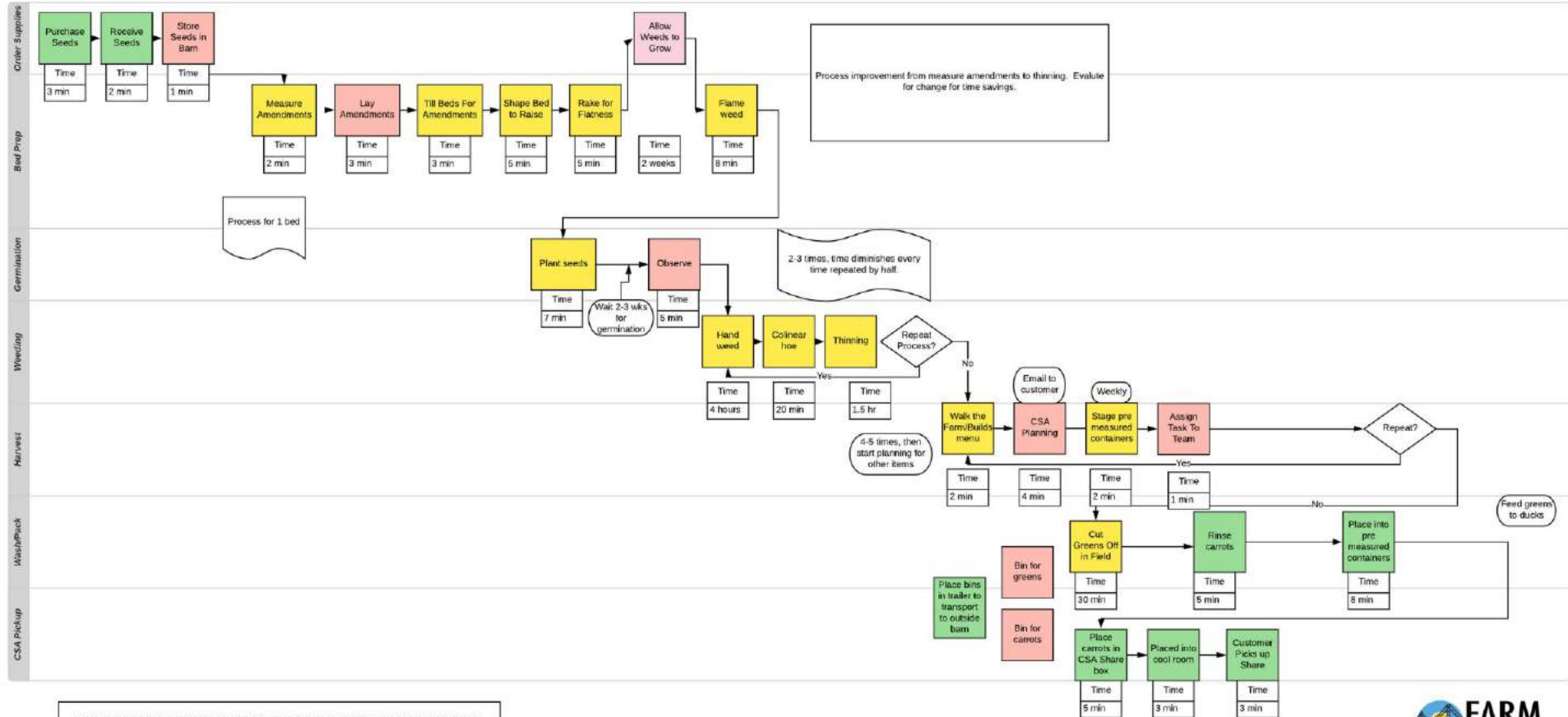
- create a visual of a current process, beginning to end
- with an in depth view of SIPOC
- measure the effectiveness on meeting customer requirements
- identify hand-offs, bottlenecks and process variances



Michigan Farm - Value Stream Map

Farm Brigade

- Non-value added
- Customer value added
- Business value added
- Waste / Rework



Value Add Analysis

Assigning value from the perspective of the customer to each step in the process.



CUSTOMER VALUE ADD (CVA)

NON VALUE ADD (NVA)

REQUIRED NON VALUE ADD (RNVA)

CVA ACTIVITIES

- Transforms or shapes material or information
- Customer cares about it and is willing to pay for it
- Must be done right the first time

NVA ACTIVITIES

- Consumes resources but does not meet Customer Value Add criteria

RNVA ACTIVITIES

- Adds no value but is required by farm, regulatory entities or other stakeholders
- Necessary because of risk tolerance

8 Types of Waste



Transportation

Excessive movement of products physically or electronically.



Inventory

Holding more than required inventory (material or information).



Motion (unnecessary)

Movement of people which does not add value.



Waiting

Waiting on workers, customers or products.



Overproduction

Producing more than required.



Overprocessing

Adding more than needed to the product.



Defects (Rework/Rejects/Repairs)

Making mistakes, process errors or additional work not needed.



Hidden Talent

Loss of time, ideas or improvements by not engaging your workers.

Examples of Waste on the Farm

Transportation

Transporting produce between the field and wash station, repeatedly, when the wash station is on the complete opposite side of the farm.

Overproduction

Overproducing a particular crop exceeding consumer demands.

Inventory

Cold storing of extra produce that is unsold, or seeds sitting on shelves in a barn waiting to be planted for long periods of time.

Overprocessing

Adding extra packaging and labeling for a product that is not needed. Use of soil amendments past what is actually needed.

Motion (unnecessary)

Traveling of workers across the farm to grab needed tools. Sending multiple workers to a farmers market when one or none would be more effective.

Defects (Rework/Rejects/Repairs)

Harvesting a crop too soon. Flame weeding the soil at the wrong time. Inadvertently damaging produce when in transport for sale.

Waiting

Setting long pickup times for farm shares and waiting for customer to show up, or waiting for product to harvest to begin work.

Hidden Talent

Failing to train a worker on proper techniques. Providing the right tools and environment for workers to share ideas. Being open for change and accepting trial and error.



BRAINSTORMING

FOR AREAS OF IMPROVEMENT

- Setup a team meeting for 30-60 minutes
- Have pens & sticky notes available
- Establish expectations of a specific focus area for improving or keep general.
- Silent brainstorming for 5-15 minutes, having each team member write down problems on their sticky notes (one problem per sticky).
- Collect all sticky notes and organize for duplicates or similarities
- Discuss each problem as a team.

FOR ROOT CAUSES

- Setup a team meeting for 30-60 minutes
- Have pens & sticky notes available
- Establish expectations on a specific identified problem.
- Silent brainstorming for 5-15 minutes, having each team member write down root causes on their sticky notes (one root cause per sticky).
- Collect all sticky notes and organize for duplicates or similarities
- Discuss each root casue using the 5 Whys tool.

LOCAL FARM IN MICHIGAN, USA

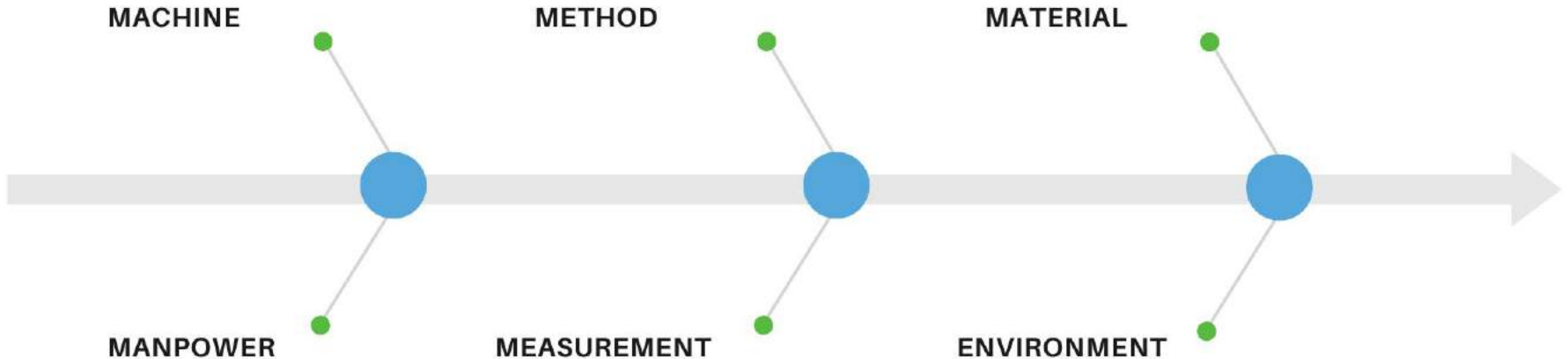


HARVESTING PROCESS

BRAINSTORMING ISSUES

FISHBONE DIAGRAM

A fishbone diagram helps in identifying potential factors that cause an overall affect, and how issues can impact multiple areas stemming from the same problem.



NOTE: Standard categories for operational processes are listed. A team can define their own categories that best suit their farm.

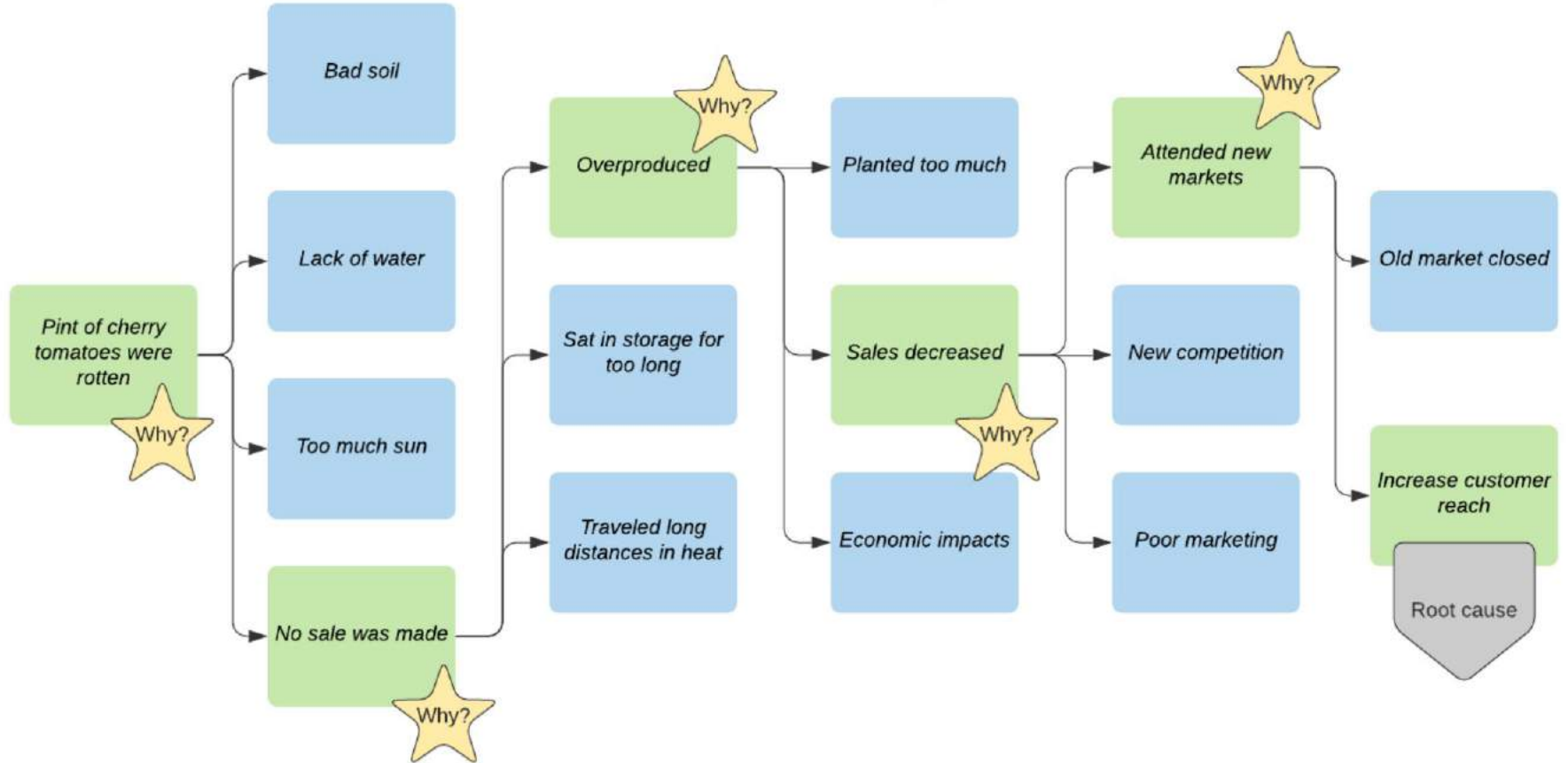


5 WHYS

Lean tool used to identify root causes of a problem.

- Avoid settling on the first solution as issues may resurface.
- The best approach is to ask 'why' five times when evaluating a problem.

5 WHYS Example



Data Collection Plan

TOOL FOR
CAPTURING DATA

Data collection plans to help understand, define and summarize the collection of data for measuring current state processes and future state processes after implementation of solutions.

Including:

- What will be measured
- What type of data
- Data source
- Related conditions

Farm Brigge Family Farms Data Collection Tool

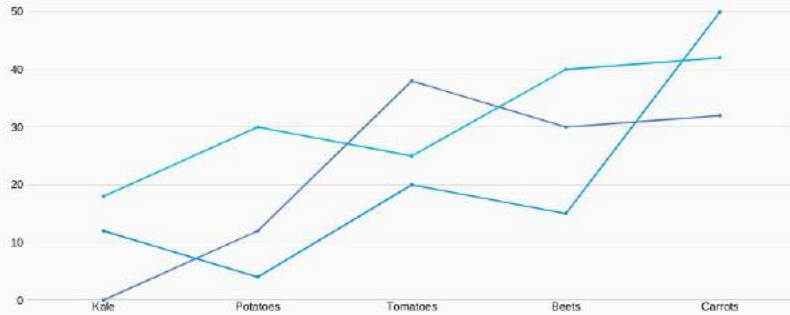
Process Step	Process	Who	Metrics			Comments
			Frequency	Day of Week	Process Time (General)	
<i>Definition</i>	<i>What is going to be measured?</i>	<i>Where you will pull the data from</i>	<i>How often will you report on the metric?</i>	<i>Which Day to pull?</i>	<i>Time of the Day the data should be pulled?</i>	<i>Who will be responsible - Go To Person?</i>
1	Planting peppers	Chris	Daily/Weekly/Monthly	Monday	1 hour	Goal to shorten process time.

Data gathering to measure current state inefficiencies and future state improvements!

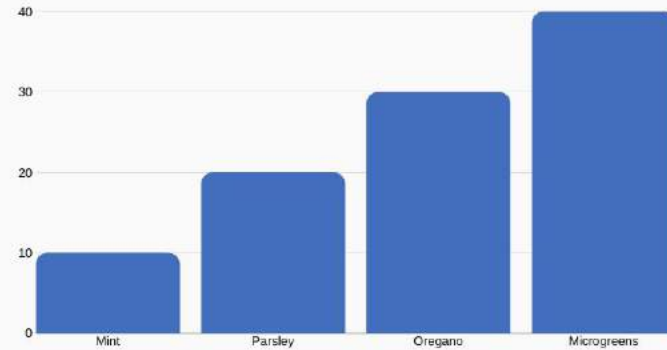


DATA ANALYSIS TOOLS

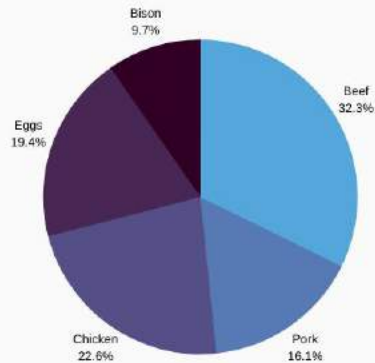
Line Graphs



Bar Charts



Pie Charts



Check Sheets/Tally Sheets

	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Totals
Harvest Kale	X		X	X		X	X		5
Harvest Spinach	X	X		X	X		X	X	6
Harvest Lettuce	X	X		X	X		X		5
Pull Beets	X	X	X	X	X	X			6
Pull Carrots	X	X	X	X					4

HOW OFTEN DO YOU HOLD
TEAM MEETINGS OR HUDDLES
ON THE FARM?

1 Daily

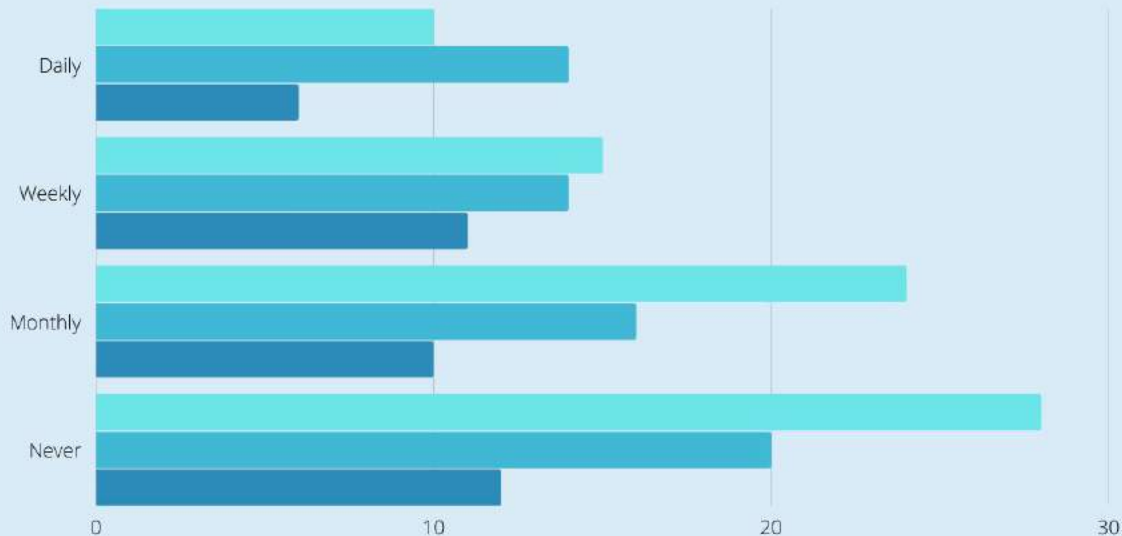
2 Weekly

3 Monthly

4 Never: Should I?

Improvement Awareness Poll

Participant Results



Design

Tools used for identification of solutions and future processes. Then, implementing solutions and setting goals for improving issues and root causes.



Solutioning



Impact / Effort Matrix



Sphere of Influence



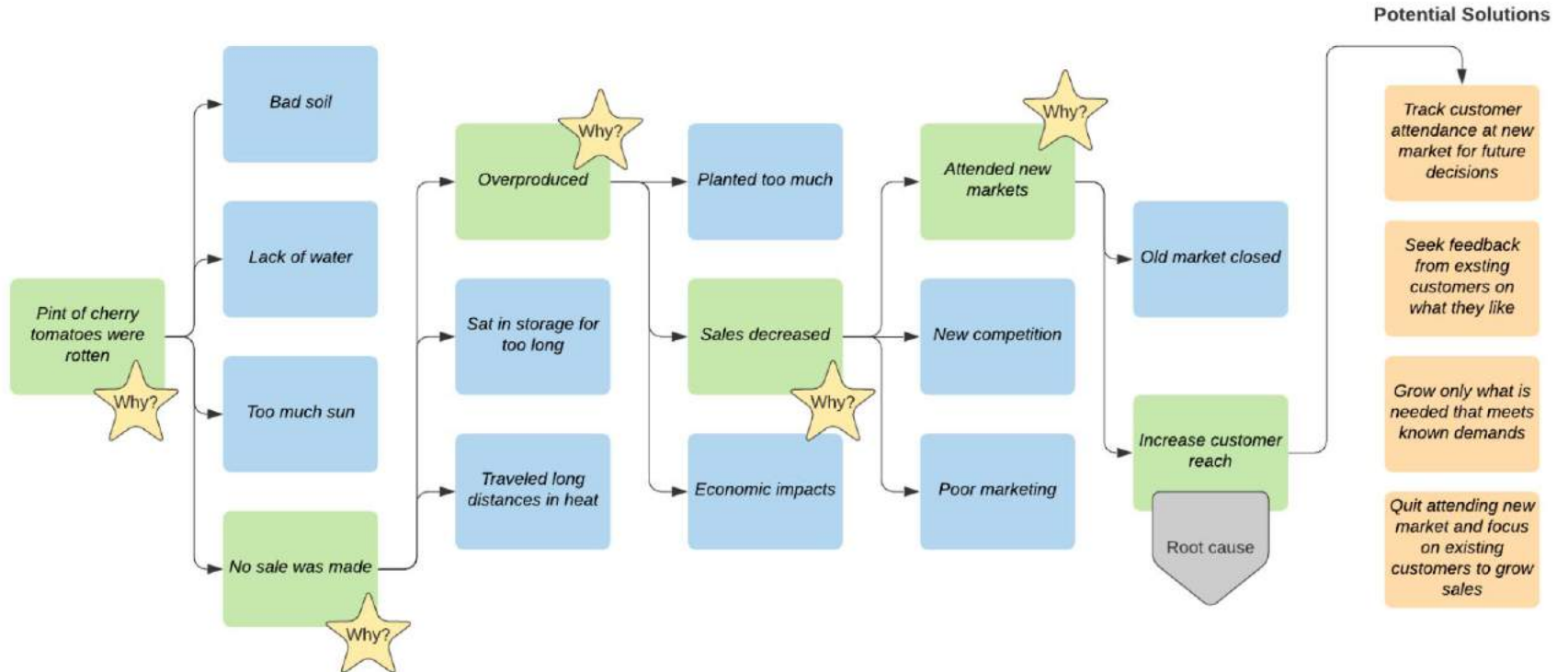
Action Plan



Future State Value Stream Maps



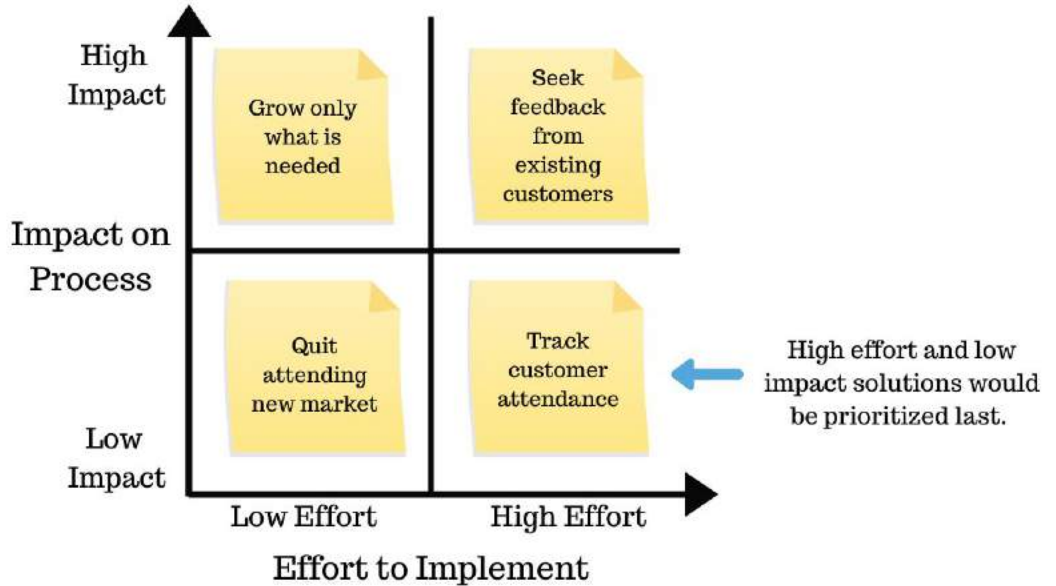
5 WHYS Example - Solutioning





EFFORT/IMPACT MATRIX

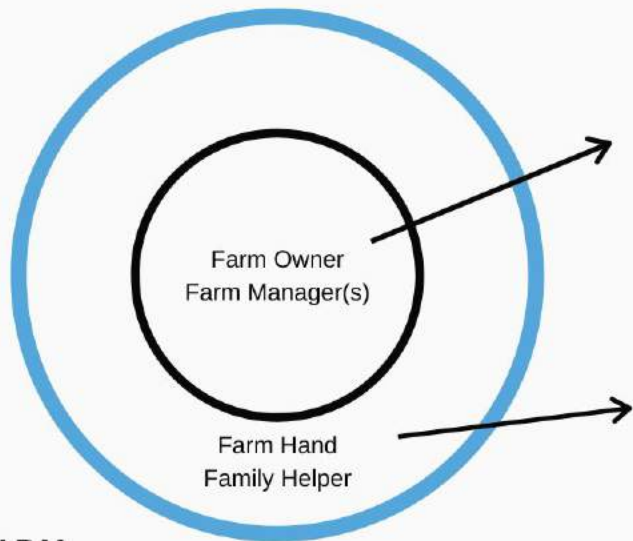
Farm Example



Sphere of Influence

Prioritization Method

Sphere of influence is a tool used to help the team consider what solutions can easily be implemented and what solutions require inputs and support from the top or outside the team. Influence and decisions vary by farm.



Has influence on the solution implementation

Minimal or no influence on solution implementation





Action Plan

An overview of all actions required to implement a solution, including:

- concrete actions
- ownership of task(s)
- timelines to completion

Action	Due Date	Who
Organize seeds and labelling stations in the barn.	6/30	John
Develop standard operating procedures for washing kale, packaging and labelling for CSA shares.	7/15	Garrett
Track time spent using new collinear hoe to analyze and measure efficiency.	7/1 – 8/1	Sue
Track the time it takes to harvest one bed of carrots for 4 weeks after implementing new processes.	8/1 – 8/31	Heather

Implement

Tools used for understanding when to adopt, adapt or abandon a solution.



Implementation Plan



PDCA



Implementation Plan

Run through your new process and track results.

Metric	Baseline Data	Target	Target Change (% or % Pt)	Actual			Actual Change (% or % Pt)		
				Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Waste Management (excess products)	45%	15%	67%	40%	35%	30%	11%	22%	33%
Rework (unnecessary steps)	10 hours	5 hours	50%	9 hours	6 hours	6 hours	10%	40%	40%
Additional Labor Cost	\$300/wk	\$100/wk	67%	\$310/wk	\$275/wk	\$250/wk	-3%	8%	17%
Product Cost (reduce inventory/supplies)	\$150/month	\$100/month	33%	\$130/month	\$125/month	\$120/month	13%	17%	20%



Solution Review & PDCA

Review implemented solutions with data collected and identify if the solution meets the goals established by the team.

Upon review, make the decision to:



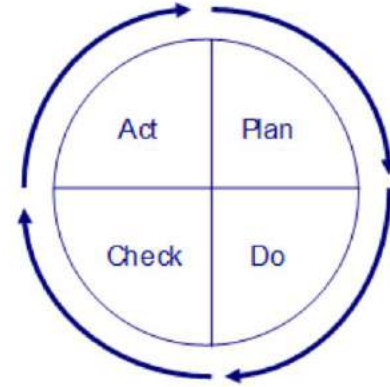
Adopt - Targeted desired state of the process achieved full expected results. Standardize the implemented solution and discuss utilizing as a best practice.



Adapt- Targeted desired state of the process achieved partial expected results with visible portions of improvement. Revisit solution for opportunities of improvement.



Abandon- Targeted desired state of the process resulted in no impact. Revisit root causes and develop new solutions or implement a separate solution.



What appears to work well in concept may not work in reality. Small scale testing is often needed for continuous improvement.

Discipline to review solution and collect data is critical for success.

Manage & Sustain

Tools and practices for continuous improvement after implementing solutions.



Continuous Improvement



Standard Work

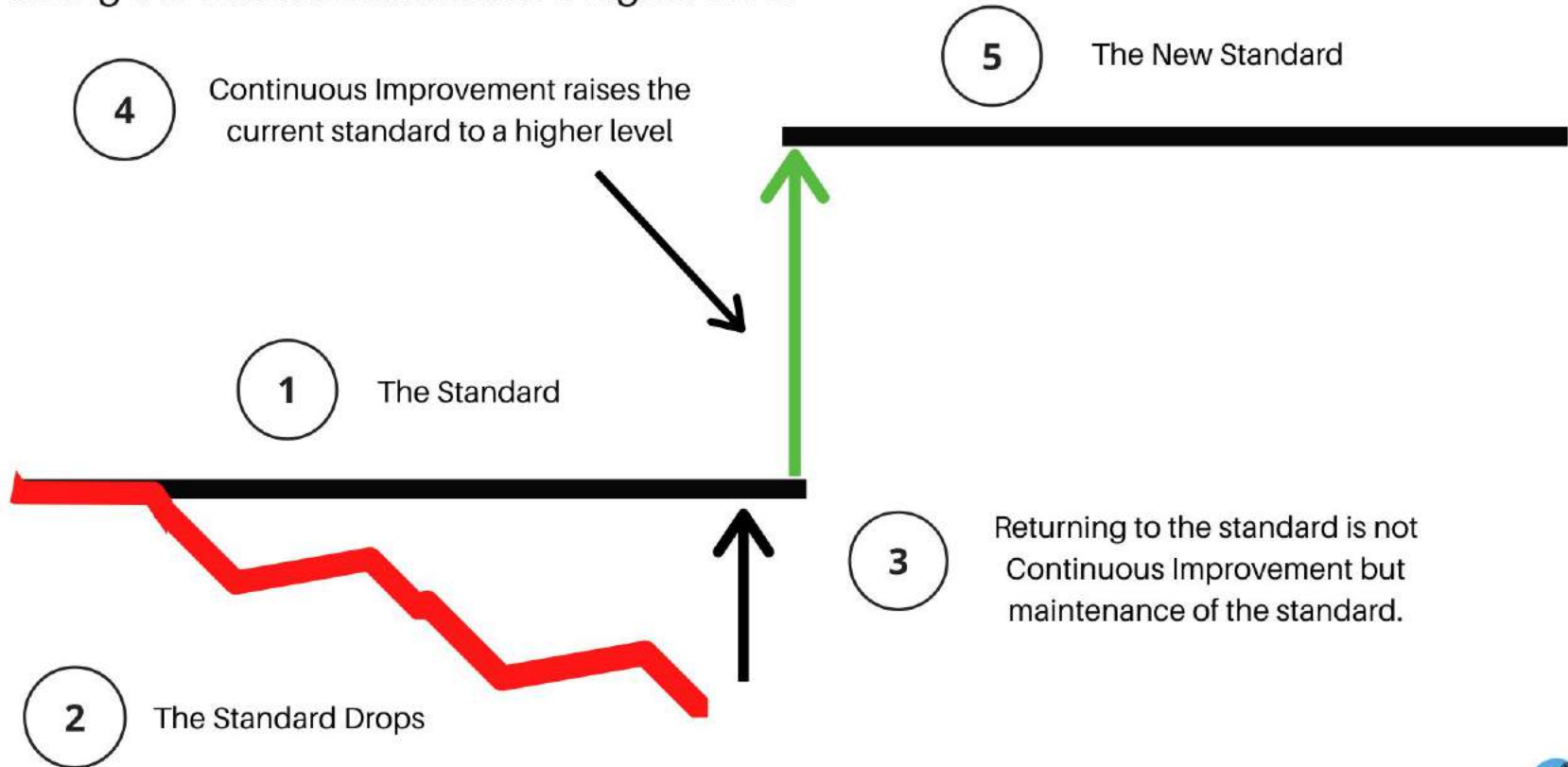


3C Document



CONTINUOUS IMPROVEMENT

Raising the current standard to a higher level



Standard Work



STANDARD WORK IS

- A document that describes a standardized way of executing tasks.
- Process designed based on business needs.
- A document defined or updated based on future state process design.
- A document with minimal rework and variations in the process.

BENEFITS

- A method to ensure all team members involved in the process execute tasks the same way.
- Assist with training team members, new and existing.
- Can be used as a reference guide for work process flows.



Harvesting Greens - Visual Aid (SOP)



1. Check with field manager for bundle count and field location

2. Grab harvesting tools (scissors and rubber bands)

3. Grab harvest bin and fill with 1-2 inches of water

4. Start at the end of the row, with your harvest bin and tools, and harvest one side towards the main walkway

5. See harvest bundling details below (holes are OK, no brown spots)

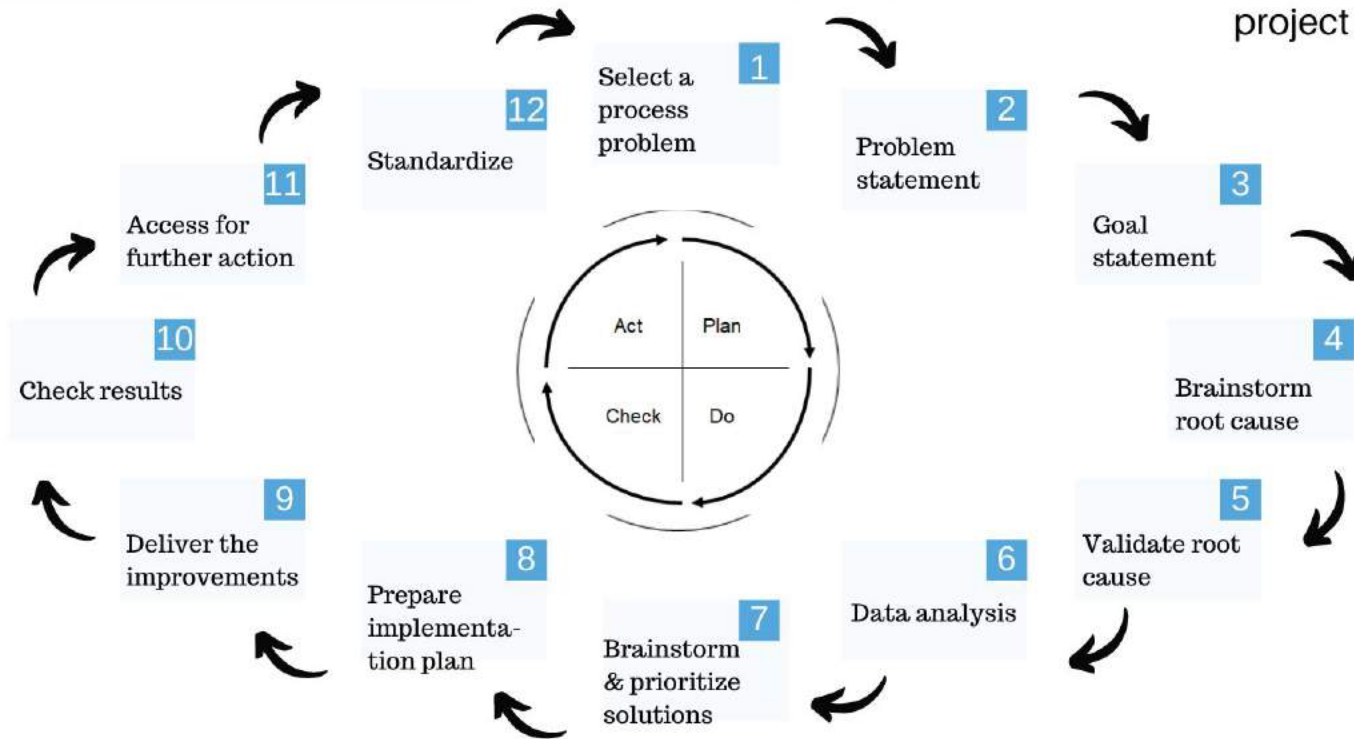
6. Place bin full of harvested kale bundles at the edge of the main walkway for transport

Note: A trailer may be used throughout harvest to transport bins of harvested kale up to the cool room during high temperature days to maintain freshness of kale.

Harvest Details

Leaf count for bundles can vary across types of greens. See visuals (left) to help with bundle size.

PROJECT CYCLE 12 STEPS (PDCA)



Lean Farm Coach is available to help throughout the project cycle.

THANK YOU!



Q&A

LEAN FARMING

