






# Lean Six Sigma

*A brief overview of this CI methodology*

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4 April 2012






## Why LSS works

- Customer focus
- Data and facts
- Project approach
- Methodology/tollgate
- Defined Roles and Responsibilities
- Many tools are easy to apply
- *DOES NOT REQUIRE A BUS LOAD OF STATISTICIANS*



## Not a matter of 'either or'

- Don't have to decide between Lean or Six Sigma
- Three main types of project
  - SOP/control plan projects
  - Eliminating waste using Lean tools
  - Variation reduction statistical tools
- Early projects are typically SOP = eliminate tribal knowledge



## DMAIC - Lean/Six Sigma

Five phase methodology

1. Define
2. Measure
3. Analyze
4. Improve
5. Control



## Define Phase

1. Charter
  1. Problem statement
  2. Objectives
  3. Scope
  4. \$
2. SIPOC
3. Customer CTS
4. Association matrix
5. Process performance measures
6. Tollgate review



## Measure Phase

1. Process capability and control
2. Process map = type of project
3. Cause and effect
4. Lean tools?
5. Process risk/controls - FMEA



## Analyze

1. What are the critical input variables
2. What is the final analysis of the current situation?
3. What does your business and the VC look like in the future?
4. Measure and manage change in your business and the chain



## Improve

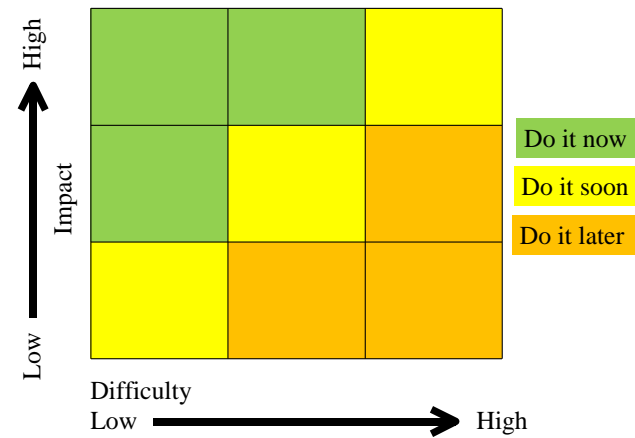
1. Design and implement the new process
2. Organizational change and communications



## Control

1. Documentation and control plans
2. Establish effective communication
3. Training: requirements and programs
4. Key Performance Indicators (KPIs)
5. Implementing reporting processes
6. Post implementation review
7. Ongoing management practices

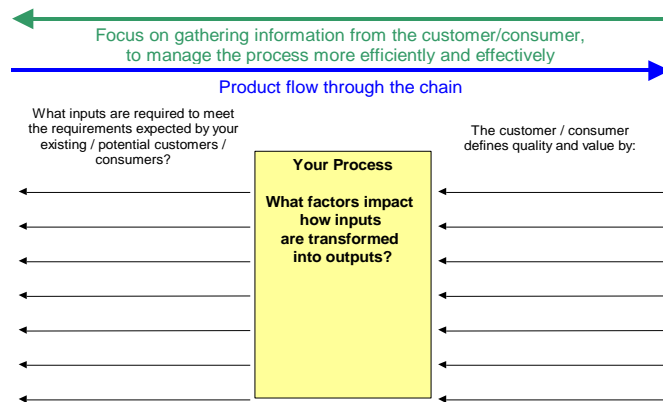
## Setting Priorities



**Action Log vs. Project Charter?**

## Everything is a Process

The more you understand those processes, the more opportunity to improve.  $Y = f(Xs)$



## Define Phase 1 - Charter

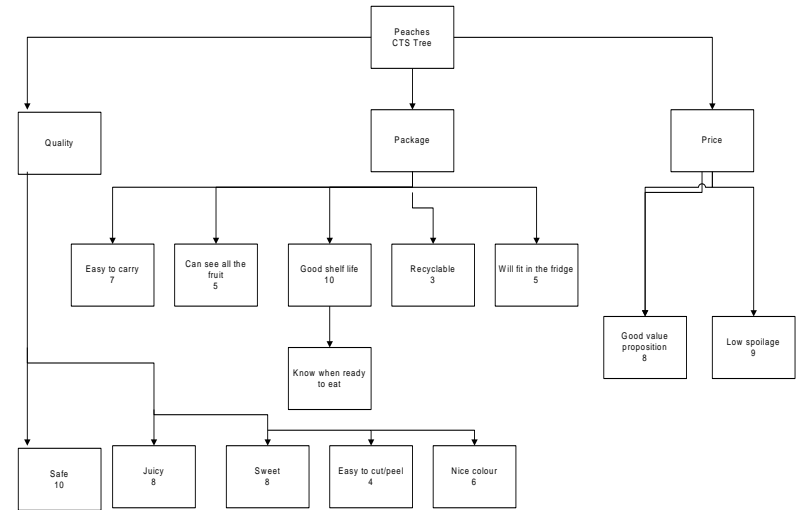
- Problem statement – what, when, where, who
  - » Don't describe the symptoms
- Objectives
  - » Need some basic data
- Scope
  - » Don't set off to boil the ocean
- \$
  - » What is the problem costing, or the cost of doing nothing different
  - » How much of that \$ can you recover



**Define phase 2  
Peach SIPOC**

SUPPLIER(S)	INPUTS	PROCESS	OUTPUTS	CUSTOMER(S)
· Industry · Grower	· Varieties · Density · Irrigation · Spraying · Pruning · Thinning · Age of Trees	<b>Orchard Husbandry</b>	· Size · Volume · Colour · Quality	· Packer · Retailer · Consumer
· Grower	· Pressure · Brix · Acid · Colour	<b>Pre-Harvest Testing</b>	· Quality · Shelf Life	· Packer
· Grower	· Training · Supervision · Safety · Ladders · Maturity Testing	<b>Picking</b>	· Quality · Volume	· Packer
· Grower · Packer	· Handling · Picking Rate · Cool Chain	<b>Post Harvest</b>	· Quality · Storage	· Packer
· Packer	· Cool Chain · Fruit Quality · Equipment · Training · Rate of Pack · Grower Interest	<b>Grade and Pack</b>	· Volume · Quality · Reports	· Retailer
· Retailer	· Time in Storage · Cool Chain · Demand for Fruit · DC Practices · Receipt · Inspection	<b>Retailer DC</b>	· Volume · Quality · Schedule	· Retailer
· Retailer · Consumer	· Produce Standards · Display Size · Demand	<b>Retail Produce Department</b>	· Volume · Margin · Customer Satisfaction	· Consumer

**Define phase 3 - CTS Tree**



### Define phase 4 - Association Matrix

	CTS Attributes	CTS Safe	CTS Juicy	CTS Sweet	CTS Easy to Peel/cut	CTS Nice Colour	CTS Etc...	Total
	Score	10	8	8	4	6		
Value Chain Activities	Seed							
	Pre-Harvest							
	Picking							
	Post-Harvest							
	Distribution							
	Retail							
Total								

	The whole family will eat it	Taste	Overall healthiness	Value for money	Quick to prepare	Versatile - can be prepared in a wide variety of ways	Affordable price	Easy to prepare from scratch	Consistency in quality	Freshness	Appropriate sizes of the cuts	Tenderness	Availability of recipes, preparation and serving suggestions in the store	Easy to locate in my regular store	Available in a variety of quick to prepare products	Availability of the desired cuts in my regular store				
<b>FRESH PORK</b>																				
Consumer criticality score	10	7	8	4	10	6	7	6	5	4	3	4	8	4	9	3				
Consumer satisfaction	80%	82%	77%	77%	67%	78%	74%	81%	79%	82%	79%	79%	61%	83%	77%	79%				
Store display/meat counter	8	7	7	8	9	9	9	7	9	9	6	3	9	9	9	9				
Retailer operations	6			7			7		9	9		6		9	9	9				
Retailer procurement	6	9	8	9	6	3	9	4	9	9	8	7			9	9				
Distribution and logistics	5	4	3	6		6		6	6	9		3								
Cool chain and transportation	4	4					4		7	9		3								
cut pack and label	7	7	9	9	9	9	8	9	9	9	9	7	9		9	9				
Post kill cooling and logistics	6	7		6			4		8	9		6								
Slaughter	4			5		2			9	3		9								
Animal Sale/Purchase	2						6		6		6	3								
Housing and handling	3		8	3			6		5		3	6								
Animal genetics	3	6	5	6			3		5		6	6								
Production system and feed	4	6	9	5		3	6		5		6	9								
	<b>4223</b>	540	378	392	256	240	156	476	120	430	264	132	272	144	72	243	108			
																		<b>4223</b>	100%	

Ve element association score  
 % contribution to consumer





<b>FRESH PORK</b>		Availability of recipes, preparation and serving suggestions in the store
Consumer criticality score	8	
Consumer satisfaction	61%	

If we consider just one critical attribute, there is significant opportunity to increase consumer satisfaction.

Store display/meat counter	9
Retailer operations	
Retailer procurement	
Distribution and logistics	
Cool chain and transportation	
cut pack and label	9
Post kill cooling and logistics	
Slaughter	
Animal Sale/Purchase	
Housing and handling	
Animal genetics	
Production system and feed	



## Define phase 5 - Data Collection Plan

In order to obtain meaningful data you need a Data Collection Plan addresses the following questions:

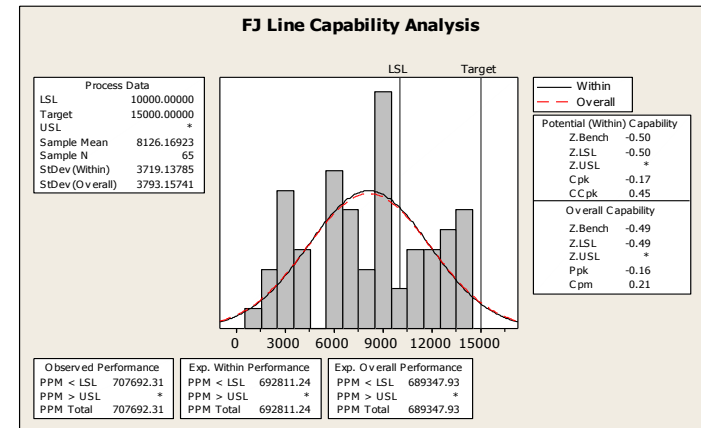
1. What do you need to know?
2. Where will you measure it?
3. What is the unit of measure?
4. How many do you need to measure?
5. How long do you need to measure for?
6. Who will collect the data?
7. How will they take the measurement?
8. Do they know how to take the measurement?
9. How will they record the measurements?

## Define Phase 'tollgate' review

- Have all steps been properly completed?
  - » What are the remaining actions
- Is this still a project or 'JDI'?
- What are our conclusions?
- Are we OK to proceed with the next phase?

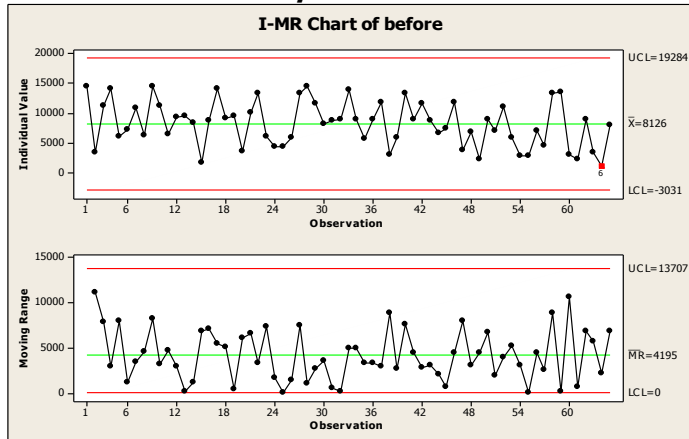
## Measure Phase – step 1

### PROCESS CAPABILITY CHART of OUTPUT

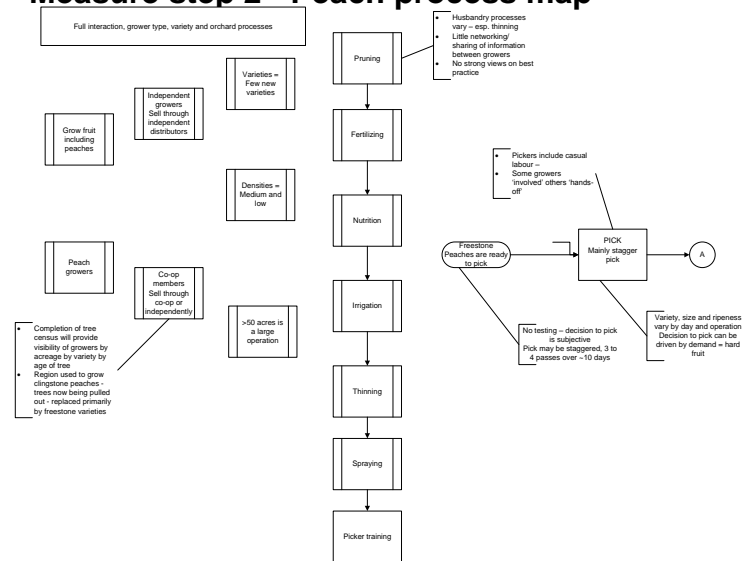


## Measure Phase – step 1

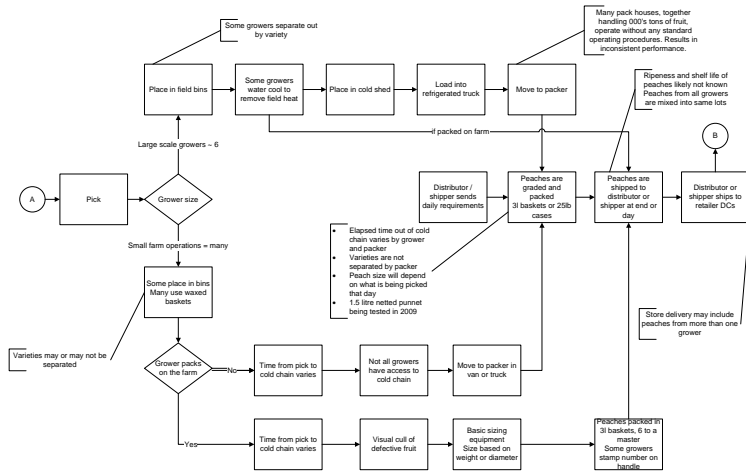
**Control chart of output**



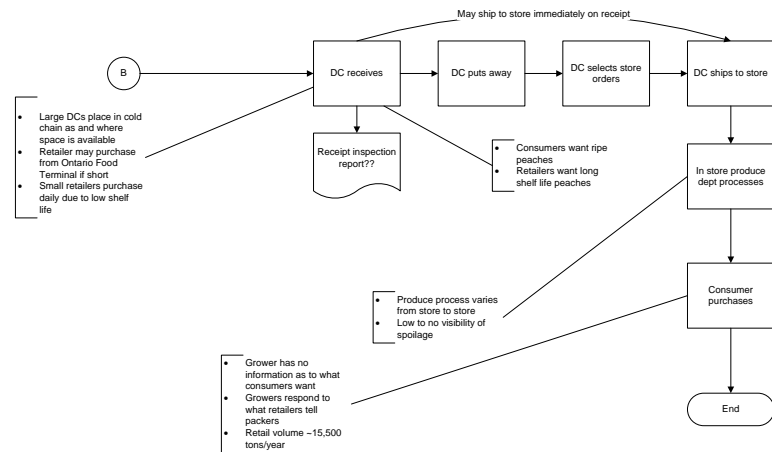
## Measure step 2 - Peach process map



### Peach process map (2 of 3)



### Peach process map (3 of 3)

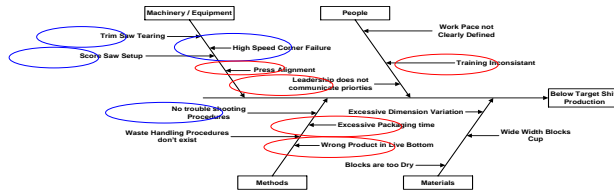


## Measure phase step 3 – Cause and effect

Fingerjoint Line Cause & Effect Matrix  
Six Sigma Measure Phase

Blue circles are potential x's

Red circles are quick hits



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## Measure phase step 4 – apply lean to waste

- T** **Transporting** material or product further than necessary
- I** Carrying **Inventory** of finished goods, raw material or work in process
- M** Unnecessary **Motion** of people and machinery
- W** **Waiting** for material, equipment, maintenance  
- not producing when you should
- O** **Over producing**  
- making more than is required = inventory
- O** **Over processing** – making it better than is required
- D** **Defects** leading to scrap, rework, downgraded product and operating losses

### Measure phase step 5 - FMEA

				Inadequate packing reports and feedback to grower	1	Most packing and packing is done on the farm. Very little field maintained here.	5	376										
Post harvest processing	Production cold chain	operator error -3-4	5	Significant variation in produce back off (cold chain problems) that will reduce shelf life	4		None	18	200									
Grading and packing	variation in quality of produce, equipment, training and standards	variation in quality of produce, equipment, training and standards	5	variation in critical humidity and packing decisions	4	the standard approach or measure controls	5	376										
			5	variation in treatment and type of equipment	4	large produce operations, equipment is adequate for produce	4	102										
			2	inadequate grower/packer training	2	training is generally adequate	2	32										
			2	grower/packer dispute	2	Produce is largely unsorted & marketed. Mostly not let loose.	2	32										
Retail distribution process	inappropriate weight inspection criteria and/or produce product handling	good cause	5	Lack of inspection standards and training	4	Education and experience of personnel	5	200										
			2	Poor internal handling processes	2	Retainers use product and are inaccurate & too slow	2	32										
Retail produce department	inadequate handling and display maintenance	High risk of produce	5	Lack of standards and inconsistent produce dept practices	4	Height of produce bins are down. Many produce bins are down. Many produce bins are down.	5	376										

