With Ball Mill

	 Cleaning	 Roasting and Cooling	 Winnowing	 Melangeuring	 Conching	 Milling	 Tempering	 Molding	 Packaging	Remarks/Assumptions/Calculations/Source
Processing Weight (Kg)	200kg	250kg	450kg	119kg	2800kg	1400kg	200kg	140kg	Mostly Outsourced	From Case
Time Taken (Mins)	15mins	90mins	60mins	75mins	600mins	300mins	60mins	60mins	Mostly Outsourced	From Case
Service Time (Min/Kg)	0.075min/kg	0.36min/kg	0.13min/kg	0.65min/kg	0.21min/kg	0.21min/kg	0.3min/kg	0.42min/kg	Mostly Outsourced	From Case
Capacity (Pre-Loss) (Kg/Hr)	800kg/hr	167kg/hr	450kg/hr	92kg/hr	280kg/hr	280kg/hr	200kg/hr	140kg	Mostly Outsourced	From Case
Yield (%)	96%	100%	74%	100%	100%	100%	100%	100%	Mostly Outsourced	From Case
Capacity (Post-Loss) (Kg/Hr)	768kg/hr	167kg/hr	333kg/hr	92kg/hr	280kg/hr	280kg/hr	200kg/hr	140kg/hr	Mostly Outsourced	From Case
Bottleneck				Bottleneck						Step with the Lowest Capacity, According to the Theory of Constraints
System Capacity (Kg/Hr)				92kg/hr						Capacity of the Bottleneck - Melangeuring
Maximum System Output (Kg/Mth)				68.448kg/mth						Assume 24 hours and 31 days per mth
New Output Required Before Yield Loss at System Capacity (Kg/Hr)	129kg/hr	124kg/hr	124kg/hr	92kg/hr	92kg/hr	92kg/hr	92kg/hr	92kg/hr	92kg/hr	Quantity each step needs to produce, accounting for yield loss
New Utilisation at Max Capacity	17%	74%	37%	100%	33%	33%	46%	66%	Assume Sufficient from Outsourcing	Current Output Required Divided by Capacity (Post Loss)
Minimum Working Hours (Hrs/Wk)	28hrs/wk	124hrs/wk	62hrs/wk	168hrs/wk	55hrs/wk	55hrs/wk	77hrs/wk	110hrs/wk	Assume Sufficient from Outsourcing	Based on New Utilisation at Max Capacity
Proposed Shift Hours (Shifts Per Day Per Week)	One Eight Hour Shift, Four Days a Week	24 Hours a Day, Six Days a Week	Two Eight Hour Shifts, Four Days a Week	24 Hours a Day, Seven Days a Week	One Eight Hour Shift, Seven Days a Week	One Eight Hour Shift, Seven Days a Week	Two Eight Hour Shifts, Five Days a Week	Two Eight Hour Shifts, Seven Days a Week	Assume Sufficient from Outsourcing	Number of Hours Each Week Based on Shift
New Inventory Build-Up (Assessed)	Yes	No	Yes	No	No	Yes	Yes	No	No	Assume Inventory Build-Up when Preceeding Step has Higher Capacity than Next Step; Ignore Rigidities by Time and Space
Current Output Required Before Yield Loss at System Capacity (Kg/Hr)	76kg/hr	73kg/hr	73kg/hr	54kg/hr	54kg/hr		54kg/hr	54kg/hr	54kg/hr	From Base Case
Current Utilisation at Max Capacity	10%	44%	22%	59%	100%		27%	39%	Mostly Outsourced	From Base Case
Current Shift Hours (Shifts Per Day Per Week)	One Eight Hour Shift, Seven Days a Week	One Eight Hour Shift, Seven Days a Week	One Eight Hour Shift, Seven Days a Week	Two Eight Hour Shifts, Seven Days a Week	24 Hours a Day, Seven Days a Week		Two Eight Hour Shifts, Seven Days a Week	Two Eight Hour Shifts, Seven Days a Week	One Eight Hour Shift, Six Days a Week	From Base Case
Current Working Hours (Hrs/Wk)	56hrs/wk	56hrs/wk	56hrs/wk	112hrs/wk	168hrs/wk		112hrs/wk	112hrs/wk	48hrs/wk	From Base Case
Current Worker Utilisation at Max Capacity	33%	33%	33%	67%	100%		67%	67%	29%	From Base Case
Current Inventory Build-Up (Assessed)	Yes	No	Yes	Yes	No		Yes	No	No	From Base Case

Without Ball Mill

	 Cleaning	 Roasting and Cooling	 Winnowing	 Melangeuring	 Conching	 Tempering	 Molding	 Packaging		Remarks/Assumptions/Calculations/Source
Processing Weight (Kg)	200kg	250kg	450kg	119kg	2800kg	200kg	140kg	Mostly Outsourced		From Case
Time Taken (Mins)	15mins	90mins	60mins	75mins	2880-4320mins	60mins	60mins	Mostly Outsourced		From Case
Service Time (Min/Kg)	0.075min/kg	0.36min/kg	0.13min/kg	0.65min/kg	1.03-1.54min/kg	0.3min/kg	0.42min/kg	Mostly Outsourced		From Case
Capacity (Pre-Loss) (Kg/Hr)	800kg/hr	167kg/hr	450kg/hr	92kg/hr	39-58kg/hr	200kg/hr	140kg	Mostly Outsourced		From Case
Yield (%)	96%	100%	74%	100%	100%	100%	100%	Mostly Outsourced		From Case
Capacity (Post-Loss) (Kg/Hr)	768kg/hr	167kg/hr	333kg/hr	92kg/hr	39-58kg/hr	200kg/hr	140kg/hr	Mostly Outsourced		From Case
Bottleneck					Bottleneck					Step with the Lowest Capacity, According to the Theory of Constraints
System Capacity (Kg/Hr)					54kg/hr					Actual Capacity is 39-58kg/hr , but Assume 54kg/hr since maximum output from case is stated as 40,000kg over 31 days, 24 hours a day
Maximum System Output (Kg/Mth)					40,000kg/mth					From Case
Current Output Required Before Yield Loss at System Capacity (Kg/Hr)	76kg/hr	73kg/hr	73kg/hr	54kg/hr	54kg/hr	54kg/hr	54kg/hr	54kg/hr		System Capacity of 54kg/hr, with Additional Output Required based on Percentage of Yield Loss in Steps 1 and 3
Current Utilisation at Max Capacity	10%	44%	22%	59%	100%	27%	39%	Mostly Outsourced		Current Output Required Divided by Capacity (Post Loss)
Current Shift Hours (Shifts Per Day Per Week)	One Eight Hour Shift, Seven Days a Week	One Eight Hour Shift, Seven Days a Week	One Eight Hour Shift, Seven Days a Week	Two Eight Hour Shifts, Seven Days a Week	Three Eight Hour Shifts, Seven Days a Week	Two Eight Hour Shifts, Seven Days a Week	Two Eight Hour Shifts, Seven Days a Week	One Eight Hour Shift, Six Days a Week		From Case
Current Working Hours (Hrs/Wk)	56hrs/wk	56hrs/wk	56hrs/wk	112hrs/wk	168hrs/wk	112hrs/wk	112hrs/wk	48hrs/wk		Number of Hours Each Week Based on Shift
Current Worker Utilisation at Max Capacity	33%	33%	33%	67%	100%	67%	67%	29%		Current Working Hours Divided by Maximum Number of Working Hours Per Week
Current Inventory Build-Up (Assessed)	Yes	No	Yes	Yes	No	Yes	No	No		Assume Inventory Build-Up when Preceeding Step has Higher Capacity than Next Step; Ignore Rigidities by Time and Space
Remarks		Each type of bean roasted separately, including cooling; currently understaffed			Two conches					

Base Case (Product Mix: 62% ONLY)

	 Cleaning	 Roasting and Cooling	 Winnowing	 Melangeuring	 Conching	 Milling	 Tempering	 Moulding	 Packaging	Remarks/Assumptions/Calculations/Source
Processing Weight (Kg)	200kg	250kg	450kg	119kg	2800kg	1400kg	200kg	140kg	Mostly Outsourced	From Case
Time Taken (Mins)	15mins	90mins	60mins	75mins	600mins	300mins	60mins	20mins	Mostly Outsourced	From Case
Service Time (Min/Kg)	0.075min/kg	0.36min/kg	0.13min/kg	0.65min/kg	0.21min/kg	0.21min/kg	0.3min/kg	0.14min/kg	Mostly Outsourced	From Case
Capacity (Pre-Loss) (Kg/Hr)	800kg/hr	167kg/hr	450kg/hr	92kg/hr	280kg/hr	280kg/hr	200kg/hr	140kg	Mostly Outsourced	From Case
Yield (%)	96%	100%	74%	100%	100%	100%	100%	100%	Mostly Outsourced	From Case
Capacity (Post-Loss) (Kg/Hr)	768kg/hr	167kg/hr	333kg/hr	92kg/hr	280kg/hr	280kg/hr	200kg/hr	140kg/hr	Mostly Outsourced	From Case
Target Output (Kg/Hr)	190kg/hr	182kg/hr	134kg/hr	134kg/hr	134kg/hr	134kg/hr	134kg/hr	134kg/hr	134kg/hr	Assuming 100,000kg Required over 31 days, 24 hours a day
Able to Produce Target Output Based on Capacity	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Assume Sufficient from Outsourcing	No if Capacity (Post-Loess) is Lower than Target Output
Need to Purchase Another Machine	No	Yes	No	Yes	No	No	No	No	Assume Sufficient from Outsourcing	Yes if Unable to Product Target Output Based on Capacity
New Capacity with Purchase of Additional Machine		334kg/hr		184kg/hr					Assume Sufficient from Outsourcing	Assuming Purchase of Additional Roasting and Cooling As Well As Melangeuring Machines
Utilisation Rate at Target Output	25%	54%	40%	73%	48%	48%	67%	96%	Assume Sufficient from Outsourcing	Target Output Divided by Capacity
Minimum Working Hours Per Week	42hrs/wk	92hrs/wk	68hrs/wk	122hrs/wk	80hrs/wk	80hrs/wk	113hrs/wk	161hrs/wk	Assume Sufficient from Outsourcing	Utilisation Rate Multiplied by 168 Hours Per Week
Proposed Shift Hours (Shifts Per Day Per Week)	One Eight Hour Shift, Six Days a Week	Two Eight Hour Shifts, Six Days a Week	Two Eight Hour Shifts, Four Days a Week	Three Eight Hour Shifts, Six Days a Week	Two Eight Hour Shifts, Six Days a Week	Two Eight Hour Shifts, Six Days a Week	Three Eight Hour Shifts, Five Days a Week	Three Eight Hour Shifts, Seven Days a Week	Assume Sufficient from Outsourcing	Minimum Number of Shifts to Meet Required Working Hours Per Week
New Inventory Build-Up (Assessed)	Yes	Yes	Yes	No	No	Yes	Yes	No	No	