

Lean, Green and DMADV Tool Based Approach for an Effective Execution of Residential Building Project

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Abstract: In this paper introduce how to use the principal of LEAN and SIX SIGMA in Residential Water Supply Project and how to supply treated water at minimum price rate. Now a days State of Rajasthan and Gujrat affected by water scarcity Problem. By the help of six sigma principal, water scarcity problem can be reduce and cover the full population.

Keyword- Lean, Design, water Supply, DFSS

I. INTRODUCTION

This Research Paper Based on Application of Lean and Six Sigma Principal on Residential Water supply Project. Current water supply system is insufficient for water supply. By the help of Lean and Six sigma tool water supply system can be Redesign and water will be provide continuously.

II. TOOLS

1. Lean

Lean is Principal introduce by Toyota. Lean shows the wastage of material and how to reduce the amount of wastage during the production.

2. Green

In this research paper Green word refers to reduce unhealthy water Impact on human body, because due to industrial activity, Ground water are toxic.

3. DMADV

DMADV (Define, Measure, Analysis, Design, Verify) it is tool of six sigma. It is use for development of New product, New process.

Define: Define is the First Step of the Lean and Six Sigma Process. It consists of defining the problem, the process and the Customer.

Tools- Project Charter, Voice of Customer, SIPOC (Supply, Input, Process, Output, Customer)

Measure: This phase consist of data analysis and find out the reasons of waste in the Process.

Tool- Cause & Effect Diagram or Fishbone Diagram.

Analysis: It is consist of statistical analysis of the problem.

Tools- Process Analysis, Data Analysis.

Design- It is consist of improvement of alternatives.

Verify: The Performance of design should be according to customer needs.

III. CASE STUDY

Ahmedabad Residential water Project

	Area	Population
Metropolis	540 Km ²	20,35,922
Metro	5573Km ²	53,40,000

Kishanghar (Rajasthan) Residential water supply Project

Population	1,55,019
Area	895.78 Km ²
Population Density	170 Km ²

Define Phase

Step 1: Define Aim of Project

Tool- Project Charter

Project Name- Water Supply Project For Ahmedabad & Kishanghar		
Problem Statment	Goal Statment	Team Members
<ul style="list-style-type: none"> Water Scarcity Problem in Gujrat and Rajasthan 	<ul style="list-style-type: none"> Fullfill the water supply and Demand Gap Supply the water in Economical Rates 	<ul style="list-style-type: none"> Team Leader Sponsor Water Analyst Operation

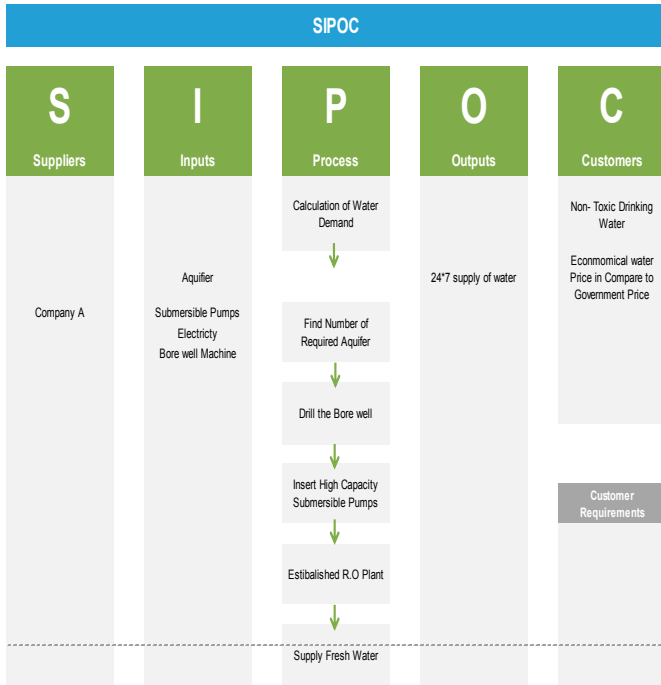
Step 2: Define Customer Requirement

Tool- Voice of Customer Translation Matrix

Type of Need	Customer Comment	Customer Requirement
Supply	Water Availability only 2 hour in a day	24×7
Requirement	110 LPCD Water Supply	150 LPCD Required
Health	Water is Un healthy	R.O Plant is Required
Tax	Water Tax is High	Economical water price model required
Water Sources	Depends on River Narmada	New Source Required

Step 3: Define Process

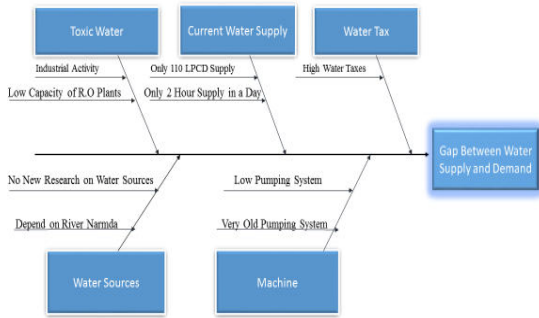
Tool- SIPOC



Measure Phase

Tool-Fishbone Diagram

Fishbone Diagram



Analysis Phase

Tool-Process Analysis, Data Analysis

Population and Area of Ahmadabad

	Area	Population
Metropolis	540km ²	20,35,922
Metro	5,573km ²	53,40,000

Average Depth of water Level

District	Jan-15	May-15	Dec-15	Jan-16
Ahmedabad	5.25m	7.86m	5.37m	5.74m

Present water supply & Projected Demand for Ahmedabad

Year	1991	2001	2011	2021	2023
Population in Lakh	33	44.27	53.99	79.58	101.44
Requirement in MLD@ 150 LPCD	528	706	863	1273	1623

For Kishanghar

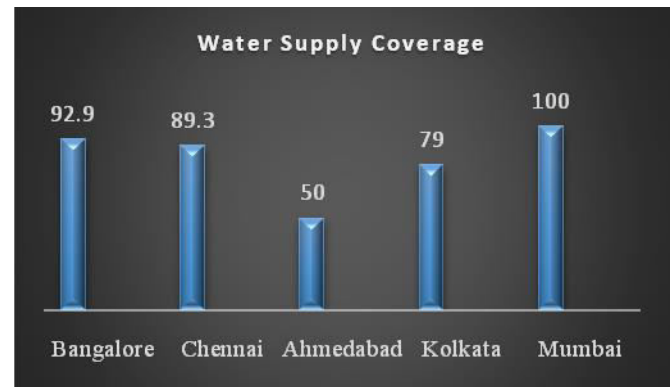
Town	Supply(LPCD)	Supply Interval (Hours)	Source of Supply
Kishanghar	110	48	Bisalpur Dam

Ground Water Quality Problem

Contaminates	Quantity
Fluoride	>1.5 mg/l
Chloride	>1000 mg/l
Iron	>1.0 mg/l
Nitrate	>45 mg/l

Performance indicators for water utility in Ahmedabad in comparison with water Consumption in major Cities of India

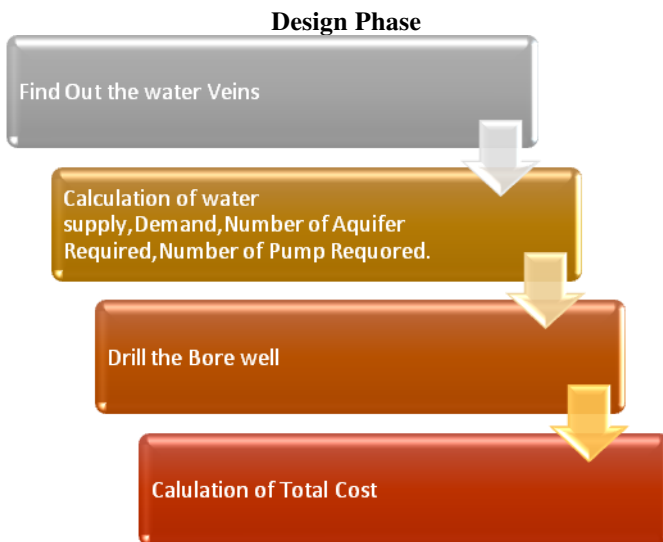
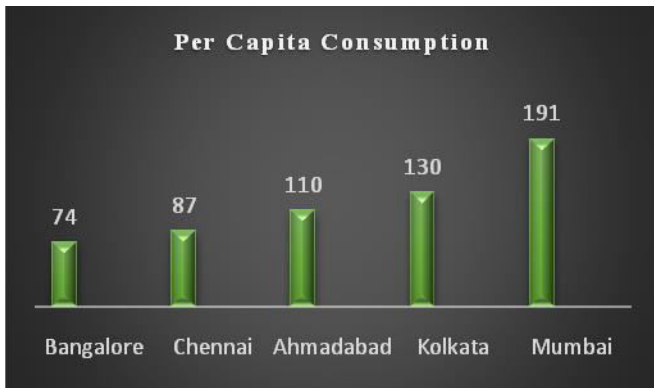
Water Supply Coverage



Water Availability (Hour)



Per Capita Consumption (LPCD)



For Ahmedabad

Total cost of pump on per person= Rs. 3.08
Total cost of water on per person= Rs. 18.77/month

Total Cost of Treated water on per person= Rs. 31.95/month

For Kishanghar

Total Drilling cost of 6 Bore well= Rs. 344400
Total Drilling cost on Per Person= Rs. 2.21/Person

Total Cost of water on Per Person= Rs. 6.96/Person

IV. Results

For Ahmedabad

	Current Situation	Six sigma Water Model
Supply	2 Hour in a day	24×7
LPCD	110	150
Coverage	50%	100%
Water Quality	Toxic	Non Toxic
Water Price	Rs. 8/KL	Rs.31/month/Person

For Kishanghar

	Current Situation	Six Sigma Water Model
Supply	Once in 2 days	24×7
LPCD	110	150
Price	Rs. 8/KL	Rs.6.96/month/person

V. Conclusion

Overall, by the help of Design tool of Six Sigma water supply system can be Redesign and Treated water can be supplied. By the help of lean and six sigma tool water scarcity problem can be reduce and also reduce the toxic impact of water on human health. Any existing system can be redesign and it will be economical in compare to current water price model and also reduce the wastage of water by new system.

VI.References

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