Optimum Allocation of Resources in IT Industry Through Goal Programming

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Abstract: ***Information Technology is a vast industry which comprises information technology services, consulting, and outsourcing by providing solutions to various problems. India's IT Services industry was born in Mumbai in 1967 with the creation of Tata Consultancy Services [1] who in 1977 partnered with Burroughs which began India's export of IT services [2]. The first software export zone, SEEPZ – the precursor to the modern-day IT park was established in Mumbai in 1973. More than 80 percent of the country's software exports were from SEEPZ in the 1980s. In 1991 the Department of Electronics broke this impasse, creating a corporation called Software Technology Parks of India (STPI) that, being owned by the government, could provide VSAT communications without breaching its monopoly. STPI set up software technology parks in Bangalore, Hyderabad, Chennai, Pune and Delhi NCR. Bangalore is a global technology hub and is India's biggest technical hub [3]. As of fiscal 2016–17, Bangalore accounted for 38% of total IT exports from India worth $45 billion, employing 10 lakh people directly and 30 lakhs indirectly [4]. The development and affluence of India's IT industry is dictated by few critical factors. Hence, numerous models are being constantly introduced to enhance growth of IT industries by establishing cordial relations among various departments within the IT industry through goal programming by allocating optimum resources.***

Keywords: Information Technology[1], Tata Consultancy Services[2], Goal Programming[3]

1. Introduction

Goal Programming (GP) is an extension of linear programming in which targets are specified for a set of constraints. In G P there are two basic models: the pre-emptive (lexicographic) model and the Archimedean model. The goals are met when the constraints are satisfied. In the present context, Goal Programming model is discussed for optimum resource allocation in the IT sector. GP helps the decision makers to postulate their objectives and goals. Subsequently, it provides suitable tools to determine possible solutions to the problems faced by individuals in fulfilling the objectives.

In this work, the GP model is discussed to optimize resource allocation in TATA CONSULTANCY SERVICES (TCS). The mission of TCS echoes the longstanding commitment to provide excellence, which follows as, "To assist the clients to accomplish their business goals by providing ground-breaking, cutting-edge technology solutions with best-in-class consulting, IT solutions and services,

2. Methodology

2.1 Goal Programming Model

It is important to consider **model formulation** before launching into the details of **GP** solutions. Model formulation is the process of transforming a real word decision problem into an operations research model. A key to successful application of goal programming is the ability to recognize when a problem can be solved by goal programming and to formulate the corresponding model. The approach to formulate the GP model is similar to that of linear programming model. The mathematical model used to develop GP is as follows:

$$Minimize \sum_{i=1}^{m} W_i\left(d_i^- + d_i^+\right) \; subject\ to \; \sum_{j=1}^{n} a_{ij}x_j\left(d_i^- - d_i^+ = b_i;\, i = 1, 2, \ldots\ldots, m\ and\ x_j, d_i^- - d_i^+ \geq 0\ for\ all\ values\ of\ i, j\right)$$

The objective function contains primarily the deviational variables (d_i^- & d_i^+) that represent each goal or sub goal. The deviational variables are represented as both positive and negative deviations from each goal or sub goal. Thus, the objective function becomes the minimization of these deviations based on the relative importance or priority assigned to them. Following steps are used to formulate Goal Programming are;

Define Variables and Constants. The first step in model formulation is the definition of decision variables (x_1, x_2, ..., x_n) and the right hand side constants. The right hand side constants may be either available resources or specified goal levels.

Formulate Constraints. The next step is to formulate a set of constraints. A constraint may be either a system constraint or a goal constraint.

Develop the Objective Function. Through the analysis of the decision makers goal structure, the objective function must be developed. If goals are classified in k ranks, the preemptive priority factors (symbolized by P1, P2, and so on) should be assigned to deviational variables according to their order of importance. If necessary, differential weights must be assigned to deviational variables at the same priority level.

To demonstrate of the G P application in IT industries for economic planning and development the data acquired from TCS for the year 2010 is used and presented in the Table-1 and Table-2 in the form of Income and Expenses

Table 1: Income for the year 2010 (Millions)

Sources	Constants	Assumed Value
Electricity Income (EI)	$a_1 x_1$	---
Rate per KWH	x_1	---
Estimated Demand	a_1	Rs. 35,298,553.40
Minimum or Maximum desired rate	a_{12}	4.17/KWH
Gas Income(GI)	a_2x_2	---
Rate per MCF	x_2	---
Estimated demand (MCF)	a_2	Rs.5,07,894
Min. or Max. desired Rate	a_{13}	18.87/MCF
Non-Operating Income (NOI)	a_3	Rs.2,280
Depreciation	a_4	Rs.1,11,543.44
Amortization	a_5	Rs.6.0
Establishment Funds		
Bond Fund (BF)	x_3	---
Assumed Upper Limit	a_6	0.0
Improvement & Contingency Fund	x_4	---
Ratio to earned income	a_7	0.125
Contribution from Customers	a_8	Rs.1,616.26
Recovery	a_9	Rs.533.3
Mutual Funds (MF)	a_{10}	Rs.52.0
Antitrust Funds (AF)	a_{11}	Rs.58.0

Table 2: Expenses for the year 2010 (Millions)

Sources	Constants	Assumed Value
Bond Retirement (BR)	b_1	Rs.40,169.00
Interest Payment	b_2	Rs. 4,845.5
Operating Expenses (OE)	b_3	Rs.75,379
Payroll & Employee Benefits (PE benefits)	b_4	Rs.24,871.76
Technical Improvement (T I)	x_5	---
Desired Ratio to earned income	b_5	0.005
Initial Payments to the Stakeholders (IPS)	$b_6 c_1$	RS. 8,951.73
Ratio of payments to total assets	b_6	0.1242
Final Payments to the stakeholders (FPS)	x_6	---
Ratio of payments to earned income	b_7	0.14
Construction	x_7	---
Desired Construction	b_8	Rs.59,45,721
Bond Reserve Fund (BRF)	b_9	Rs.2,020
Interest Reserve Fund(IRF)	b_{10}	Rs.1,714.7
Starting and Closing Balances		
Total assets at the Starting of the year	c_1	Rs.72,075.11
Starting Balance	c_2	Rs.5,670.76
Ratio of Surplus to Total assets to bottom Rates	c_3	0.25

G1: Operating Expenses and Payroll

[EI + GI + Starting balance + NOI + Depreciation + Contribution from customers + Recovery + MF + AF] – [OE + PE benefits] ≥ 0

$$[a_1x_1 + a_2x_2 + c_2 + a_3 + a_4 + a_5 + a_8 + a_9 + a_{10} + a_{11}] - [b_3 + b_4] \geq 0$$

$$\left[35,298,553.4x_1 + 5,07,894x_2 + 5,670.76 + 2,280 + 1,11,543.44 + 6.0 + 1,616.26 + 533.3 + 52.0 + 58.0\right] - [7,537,9 + 24,87$$

or

$$35{,}298{,}553.4\ x_1 + 507{,}894\ x_2 + d_1^- - d_1^+ = 21,509.0$$

G2: Payments of Principal and IRF

[EI + GI + Starting balance + NOI +Depreciation +Amortization + Contribution from customers + Recovery + MF + AF] – [BR + Interest payment + OE + PE benefits + BRF + IRF] ≥0

$$\left[a_1x_1 + a_2x_2 + c_2 + a_3 + a_4 + a_5 + a_8 + a_9 + a_{10} + a_{11}\right] - [b_1 + b_2 + b_3 + b_4 + b_9 + b_{10}] \geq 0$$

$[35, 298, 55.4x_1 + 5, 07, 894x_2 + 5, 670.76 + 2{,}280$

$+ 1, 11, 543.44 + 6.0 + 1, 616.26 + 533.3 + 52.0 + 58.0] - [40, 169 + 4, 845.5 + 75379 + 24, 871.76 + 2, 020 + 1, 7$

or

$$35, 298, 553.4x_1 + 507, 894x_2 + d_2^- - d_2^+ = 27, 240.2$$

G3: Initial Payment to IC F

[EI + GI + Starting balance + NOI + Depreciation + Amortization + Contribution from customers + Recovery + MF + AF] - [BR + Interest payment + OE + PE benefits + BRF + IRF + IPS] ≥ 0

$$\left[a_1x_1 + a_2x_2 + c_2 + a_3 + a_4 + a_5 + a_8 + a_9 + a_{10} + a_{11}\right] - \left[b_1 + b_2 + b_3 + b_4 + b_9 + b_{10} + b_6c_1\right] \geq 0$$

$$[35, 298, 55.4x_1 + 5, 07, 894x_2 + 5, 670.76 + 2, 280 + 1, 11, 543.44 + 6.0$$

$1, 616.26 + 533.3 + 52.0 + 58.0] - [40, 169 + 4, 845.5 + 75, 379 + 2, 4871.76\ 2, 020 + 1, 714.7 + 0.1242(72, 075.11$

Or

$$35, 298, 55.4x_1 + 507, 894x_2 + d_3^- - d_3^+ = 36, 191.93$$

G4: Initial Payments to the stakeholders (IPS)

[EI + GI + NOI] - [BR + Interest payment + OE + PE benefits + BRF + IRF+ IPS + Ratio of ICF to earned income (EI + GI + NOI)] ≥ 0

$$\left[a_1x_1 + a_2x_2 + a_3\right] - [b_1 + b_2 + b_3 + b_4 + b_9 + b_{10} + b_6c_1a_7\left(a_1x_1 + a_2x_2 + a_3\right)] \geq 0$$

$35, 298, 553.4x_1 + 5, 07, 894x_2 + 2, 280] - [40, 169 + 4, 845.5 + 75, 379 + 24, 871.76 + 2, 020 + 1, 714.7$

$+ 0.1242(72, 075.11) + 0.125(35, 298, 553.4x_1 + 507, 894x_2 + 2, 280)] \geq 0$

or

$$39710872.575x_1 + 571380.75x_2 + d_4^- - d_4^+ = 1, 55, 956.69$$

G5: Final Payments to the Stakeholders (FPS)

[FPS + IPS] ≥ Ratio of payments of TI to earned income [Ratio of stockholder's payments to earned income]

$$x_6 + b_6c_1 \geq b_7[a_1x_1 + a_2x_2 + a_3]$$

$$x_6 + 0.1242(72, 075.11) \geq 0.14[35, 298, 553.4x_1 + 5, 07, 894x_2 + 2, 280]$$

or

$$4, 94, 797.42x_1 + 71, 105.16x_2 - x_6 + d_5^- - d_5^+ = 6, 672.8$$

G6: Breakeven Constraint

[EI + GI + BF +starting balance+ NOI + Depreciation + Amortization + Contribution from customers + Recovery + MF + AF] – [TI + FPS + Construction + BR + Interest payment + OE + PE benefits + BRF + IRF + IPS] = 0

$$a_1x_1 + a_2x_2 + x_3 + c_2 + a_3 + a_4 + a_5 + a_8 + a_9 + a_{10} + a_{11}] - [x_5 + x_6 + x_7 + b_1 + b_2 + b_3 + b_4 + b_9 + b_{10} + b_6c_1] = 0$$

$$[35, 298, 553.4x_1 + 5, 07, 894x_2 + x_3 + 5, 670.76 + 2, 280 + 1, 11, 543.44 + 6.0 + 1, 616.26 + 533.3 + 52.0 + 58.0] -$$

$$[x_5 + x_6 + x_7 + 40, 169 + 4, 845.5 + 75, 379 + 2, 4871.76 + 2, 020 + 1, 714, 7 + 0.1242(72, 075.11)] = 0$$

or

$$35,298,553.4x_1 + 507,894x_2 + x_3 - x_5 - x_6 - x_7 + d_6^- - d_6^+ = 36,191.93$$

G7: New Bonds

BF ≤ Assumed bond upper limit

$$x_3 \leq a_6, \ x_3 \leq 0.0 \quad or \quad x_3 + d_7^- - d_7^+ = 0.0$$

G8: Lowest Electricity Rate

Electricity rate/KWH ≥ Required rate

$$x_1 \geq a_{12}, \ x_1 \geq 4.17/KWH, \ or \ x_1 + d_8^- - d_8^+ = 4.17$$

G9: Lowest Gas Rate

Gas rate/MCF ≥ Required rate

$$x_2 \geq a_{13}, \ x_2 \geq 18.87 /MCF \ or \ x_2 + d_9^- - d_9^+ = 18.87$$

G10: Technological Improvement

TIF ≥ Desired ratio of TI to earned income [EI + GI + NOI]

$$x_5 \geq b_5(a_1x_1 + a_2x_2 + a_3), \ x_5 \geq 0.005[35,298,553.4x_1 + 507,894x_2 + 2,280],$$

$$or$$

$$x_5 - 1,76,492.767x_1 - 2,539.47x_2 + d_{10}^- - d_{10}^+ = 11.4$$

G11: Final Payment to ICF

IC F≥ I&C ratio to earned income (EI +GI +NOI) + (depreciation + amortization + contribution from customers +Recovery + MF + AF)

$$x_4 \geq a_7(a_1x_1 + a_2x_2 + a_3) + (a_4 + a_5 + a_8 + a_9 + a_{10} + a_{11})$$

$$x_4 \geq 0.125[35,298,553.4x_1 + 5,07,894x_2 + 2,280] + [1,11,543.44 + 6.0 + 1,616.26 + 533.3 + 52.0 + 58.0]$$

or

$$x_4 - 44,12,319.175x_1 - 63,486.75x_2 + d_{11}^- - d_{11}^+ = 1,14,094$$

G12: Construction

Construction ≥ Desired construction

$$x_7 \geq b_8, \ x_7 \geq 59,45,721, \quad or \ x_7 + d_{12}^- - d_{12}^+ = 59,45,721$$

G13: Construction from ICF

The construction fund must be obtained from the BF and ICF, and it should be at least 5 million for uncertainty.

$$x_7 = x_3 + x_4 - 5,000,000$$

$$or$$

$$x_3 + x_4 - x_7 + d_{13}^- = 5,000,000$$

3. Priorities Levels

P_1 = To stop providing any new bonds in 2010 and preserve the issued 2009 bonds

P_2 = To reach the present payroll and OE, in addition to this payment to bond principal, IRF expenses. But, the management is given double importance to the payment of payroll and OE expenses than the other expenses

P_3 = To distribute the payments to the establishment and stakeholders. However, the management is given twice importance in Initial payments to ICP than the FPS.

P_4 = Stop the deficiency in the ICF

P_5 = To get the required funds for TI for the business performance

P_6 = To get the required amount of funds for continuous construction projects. And the management has given double importance to secure that establishment which is based on bond and ICF

P_7 = At least to keep up the present electricity and gas services rates

4. Objective Function

$$Min\, Z = p_1\left[d_7^- + d_7^+\right] + 2p_2d_1^- + p_2d_2^+ + 2p_3d_3^- + p_3d_5^+ + p_4d_{11}^- + p_5d_{10}^- + 2p_6d_{12}^- + p_6d_{13}^- + p_7[d_8^- + d_9^-]$$

In the above objective function, breakeven constraint (G6) and IPS (G4) goals were not used since management is not interested in to recover the cost and also IPS. The management is only concentrated on payments to Payroll, OE, ICF, Stakeholders and also to secure the fund for the continuous establishment.

5. Analysis and Evaluation

In this study we have used a GP model that contains 32 variables (decision and deviational variables) 13 constraints and 7 goals. The problem illustrated in this chapter can be solved by using QSB+ /LiPS / TORA software. The LiPS software is used for obtaining this solution.

5.1. Case study 1

$x_1, x_2, x_3, x_4, x_5, x_6, x_7$ are decision variables and

$d_1^-, d_2^-, d_3^-, d_4^-, d_5^-, d_6^-, d_7^-, d_8^-, d_9^-, d_{10}^-, d_{11}^-, d_{12}^-, d_{13}^-, d_1^+, d_2^+, d_3^+, d_4^+, d_5^+, d_6^+, d_7^+, d_8^+, d_9^+, d_{10}^+, d_{11}^+, d_{12}^+$ are deviational variables. Weights given to the priorities are P_1=100, P_2=45, P_3=20, P_4=15, P_5=12, P_6=5, P_7=3,

Table 3: Model Solution

```
>> Optimal solution FOUND
>> Minimum = 358138
```

*** RESULTS ***

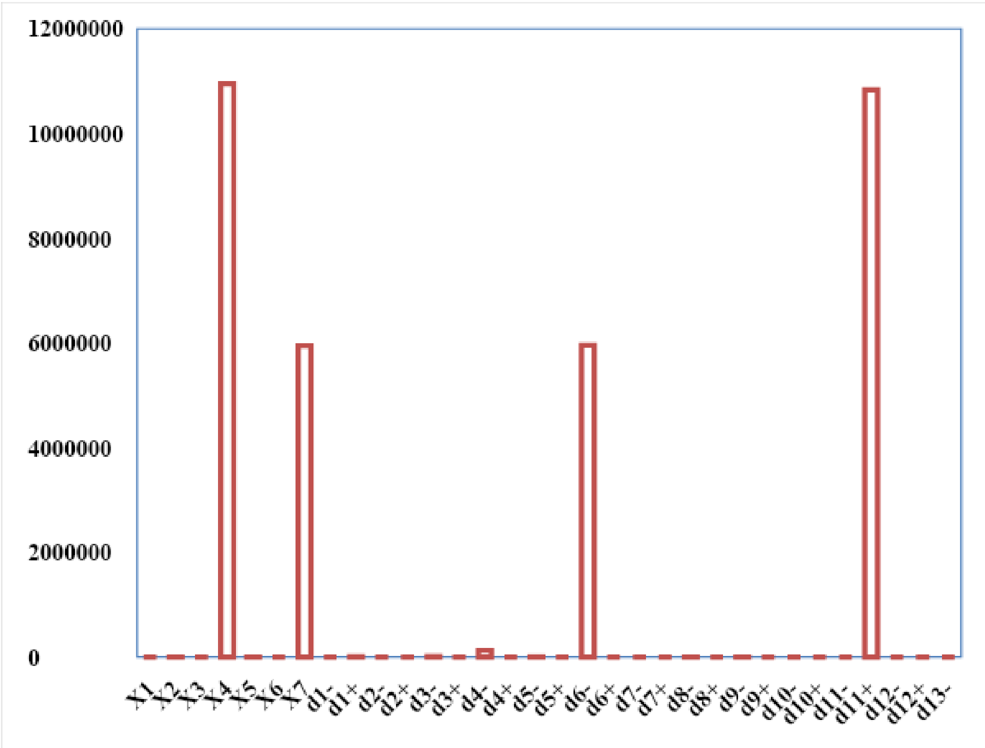
Variable	Value	Obj. Cost	Reduced Cost
X1	0	0	-205.5
X2	0.0536336	0	0
X3	0	0	0
X4	1.09457e+007	0	0
X5	147.601	0	0
X6	0	0	0
X7	5.94572e+006	0	0
d1-	0	90	-90
d1+	5731.2	0	0
d2-	0	0	-40
d2+	0	45	-4.99999
d3-	8951.73	40	0
d3+	0	0	-40
d4-	129057	0	0
d4+	0	0	0
d5-	2859.17	0	0
d5+	0	20	-20
d6-	5.95482e+006	0	0
d6+	0	0	0
d7-	0	100	-100
d7+	0	100	-100
d8-	4.17	3	0
d8+	0	0	-3
d9-	18.8164	3	0
d9+	0	0	-3
d10-	0	12	-12
d10+	0	0	0
d11-	0	15	-15
d11+	1.08282e+007	0	0
d12-	0	10	-10
d13-	0	5	-5

Min Z = 3,58,138, x_2 = 0.0536336, x_4 = 1,09,45,700 x_5 = 147.601, x_7 = 5,94,57,200, x_1 = 0 , x_3 = 0, x_6 =0, d_1^+= 5,731.2,

d_3^-= 8,951.73, d_4^-= 1,29,057, d_5^-= 2,859.17, d_6^-= 59,54,820, d_8^-= 4.17, d_9^-= 18.8164, d_{11}^+= 1,08,28, 200 and remaining d_1^- , d_2^-, d_2^+, d_3^+, d_4^+, d_5^+, d_6^+, d_7^-, d_7^+, d_8^+, d_9^+, d_{10}^-, d_{10}^+, d_{11}^-, d_{12}^-, d_{12}^+, d_{13}^- are zeros.

Constraint	RHS	Slack	Dual Price
Goal-1	21509	-	0
Goal-2	27240.2	-	-40
Goal-3	36191.9	-	40
Goal-4	155957	-	0
Goal-5	6672.8	-	0
Goal-6	36191.9	-	0
Goal-7	0	-	0
Goal-8	4.17	-	3
Goal-9	18.87	-	3
Goal-10	11.4	-	0
Goal-11	114094	-	0
Goal-12	5.94572e+006	-	0
Goal-13	5e+006	-	0

Graphical representation is as follows



Graph-1 Analysis of Case Study 1

Except the third, all goals are fully achieved. Since their deviational variables are zeros. For the continuity of existing rates between Gas and Electricity, here we did not allocate any differential weights. The payments to principal, operating and PE, IRF goals were fully achieved. The construction and construction from I&C goal were fully achieved. Preserve the issued bonds by stop providing any new bonds goal were fully achieved. FPS goal was fully achieved but the ICP goal was not achieved.

Table 4: Results for Case Study 1

Priorities	Goals	Goal Achievements	Deviational variables
P_1	G7	Fully Achieved	$d_7^- = 0,\ d_7^+ = 0$
P_2	G1&G2	Fully Achieved	$d_1^- = 0, d_2^+ = 0$
P_3	G3&G5	Not fully Achieved	$d_3^- = 8951.73, d_5^+ = 0$
P_4	G11	Fully Achieved	$d_{11}^- = 0$
P_5	G10	Fully Achieved	$d_{10}^- = 0$
P_6	G12&G13	Fully Achieved	$d_{12}^- = 0, d_{13}^- = 0$
P_7	G8&G9	X1 achieved, X2 increased to 0.05 per MCF though it was achieved	$d_8^- = 4.17$, $d_9^- = 18.8164$

5.2. Case Study 2

Suppose, if management wants to change decision as by changing the priorities of the goals P4, P_5, P_6, P_1, P_7, P_2, P_3 to P1, P_2, P_3, P_4, P_5, P_6, P7 respectively. Then the objective function becomes

$$Min\ Z = p_1 d_{11}^- + p_2 d_{10}^- + 2p_3 d_{12}^- + p_3 d_{13}^- + p_4\left[d_7^- + d_7^+\right] + p_5\left[d_8^- + d_9^-\right] + 2p_6 d_1^- + p_6 d_2^+ + 2p_7 d_3^- + p_7 d_5^+$$

Weights are given to the priorities are P1=50, P2=40, P3=15, P4=12, P5=10, P6=4, P7=1.

Table 5: (Modle Solution)

```
>> Optimal solution FOUND
>> Minimum = 18133.3
```

*** RESULTS ***

Variable	Value	Obj. Cost	Reduced Cost
X1	0	0	-685.1
X2	0.0536336	0	0
X3	0	0	0
X4	1.09457e+007	0	0
X5	147.601	0	0
X6	0	0	0
X7	5.94572e+006	0	0
d1-	0	8	-8
d1+	5731.2	0	0
d2-	0	0	-2.00002
d2+	0	4	-1.99998
d3-	8951.73	2	0
d3+	0	0	-2
d4-	129057	0	0
d4+	0	0	0
d5-	2859.17	0	0
d5+	0	1	-1
d6-	5.95482e+006	0	0
d6+	0	0	0
d7-	0	12	-12
d7+	0	12	-12
d8-	4.17	10	0
d8+	0	0	-10

d9-	18.8164	10	0
d9+	0	0	-10
d10-	0	40	-40
d10+	0	0	0
d11-	0	50	-50
d11+	1.08282e+007	0	0
d12-	0	30	-30
d12+	0	0	0
d13-	0	15	-15

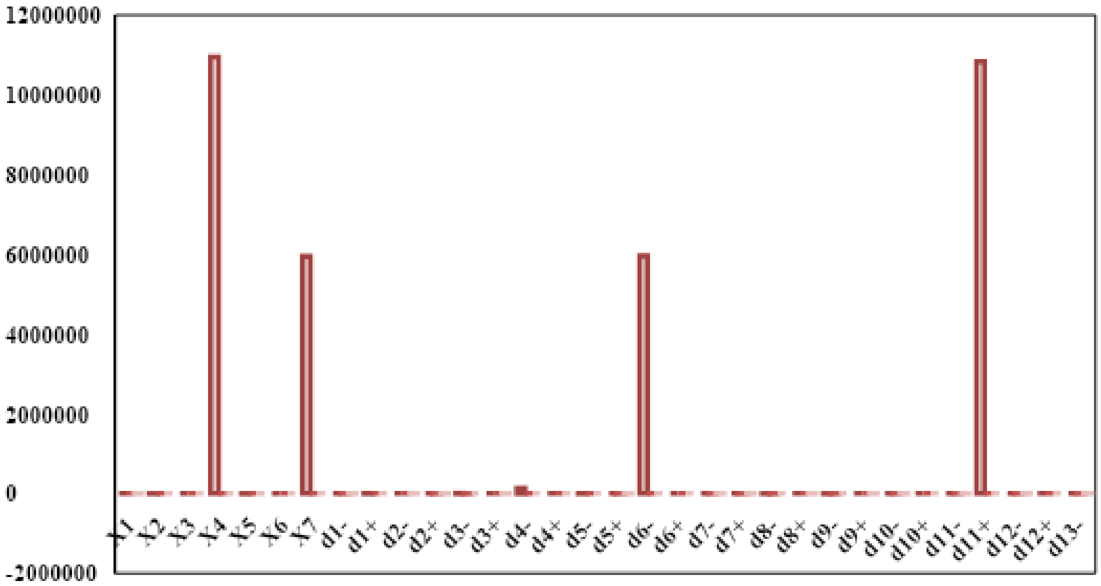
Constraint	RHS	Slack	Dual Price
Goal 1	21509	-	0
Goal 2	27240.2	-	-2.00002
Goal 3	36191.9	-	2
Goal 4	155957	-	0
Goal 5	6672.8	-	0
Goal 6	36191.9	-	0
Goal 7	0	-	0
Goal 8	4.17	-	10
Goal 9	18.87	-	10
Goal 10	11.4	-	0
Goal 11	114094	-	0
Goal 12	5.94572e+006	-	0
Goal 13	5e+006	-	0

Min Z = 18133.3, x2= 0.0536336, x_4 = 109457, x5 = 147.601,

x_7 = 594572, $d_1^+ = 5731.2$, $d_3^- = 8951.73$, $d_4^- = 129057$, $d_5^- = 2859.17$, $d_6^- = 595482$,

$d_8^- = 4.17$, $d_9^- = 18.8164$, $d_{11}^+ = 108282$,

x_1, x_3, x_6 and d_1^-, d_2^-, d_2^+, d_3^+, d_4^+, d_5^+, d_6^+, d_7^-, d_7^+, d_8^+, d_9^+, d_{10}^-, d_{10}^+, d_{11}^-, d_{12}^-, d_{12}^+, d_{13}^-, are all zeros.



Graph-2 Analysis of Case Study 2

The third goal is not achieved and all other goals are fully achieved. Since their deviational variables are zeros. The payments to principal, operating and PE, IRF goal, construction and construction from I&C goal were fully achieved. Preserve the issued bonds by stop providing any new bonds goal also fully achieved. FPS goal was fully achieved but the ICP goal was not achieved. The gas rate (x_2) is increased to 0.05 per MCF though it was achieved. The electricity rate (x_1) is fully achieved.

Table 6 : Results for Case Study 2

Priorities	Goals	Goal Achievements	Deviational variables
P_1	G11	Fully Achieved	$d_{11}^- = 0$
P_2	G10	Fully Achieved	$d_{10}^- = 0$
P_3	G13	fully Achieved	$d_{13}^- = 0$
P_4	G7	Fully Achieved	$d_7^- = 0, \ d7^+ = 0$
P_5	G8 & G9	X1 achieved, X2 increased to 0.05 per MCF though it was achieved	$d_8^- = 4.17$ $d_9^- = 18.8164$
P_6	G1 & G2	Fully Achieved	$d_1^- = 0 \, , d_2^+ = 0$
P_7	G3 & G5	Not Fully Achieved	$d_3^- = 8951.17, \ d_5^+ = 0$

6. Conclusions

Comparing the above two case studies, by changing the priorities also the priorities of all the goals are fully achieved except the third goal. But the optimal solution of minimization in case study-1 is Rs.3, 58,138 and in case study-2 is Rs. 18,133.3. Based on the collected data, management has taken a very good decision relative to the financial constraints. Like this we can find the solutions by changing the priorities orders. According to the present scenario management can take any suitable decisions. This is the advantage of GP.

	Case Study 1	Case Study 2
Min Z	3,58,138	18,133.3

variables	value	Obj. cost	Reduced cost	value	Obj. cost	Reduced cost
X_1	0	0	-205.4995298	0	0	-685.1
X_2	0.053634	0	0	0.053634	0	0
X_3	0	0	0	0	0	0
X_4	10945696	0	0	10945696	0	0
X_5	147.601	0	0	147.601	0	0
X_6	0	0	0	0	0	0
X_7	5945712	0	0	5945712	0	0
d_1^-	0	90	-90	0	8	-8
d_1^+	5731.2	0	0	5731.2	0	0
d_2^-	0	0	-40	0	0	-2.0015259
d_2^+	0	45	-4.99999	0	4	-1.9991
d_3^-	8951.72	40	0	8951.72	2	0
d_3^+	0	0	-40	0	0	-2
d_4^-	129057	0	0	129057	0	0
d_4^+	0	0	0	0	0	0
d_5^-	2859.172	0	0	2859.172	0	0
d_5^+	0	20	-20	0	1	-1
d_6^-	5954820	0	0	5954820	0	0
d_6^+	0	0	0	0	0	0
d_7^-	0	100	-100	0	12	-12
d_7^+	0	100	-100	0	12	-12
d_8^-	4.17	3	0	4.17	10	0
d_8^+	0	0	-3	0	0	-10
d_9^-	18.81637	3	0	18.81637	10	0
d_9^+	0	0	-3	0	0	-10
d_{10}^-	0	12	-12	0	40	-40
d_{10}^+	0	0	0	0	0	0
d_{11}^-	0	15	-15	0	50	-50
d_{11}^+	10828222	0	0	10828222	0	0
d_{12}^-	0	10	-10	0	30	-30
d_{12}^+	0	0	0	0	0	0
d_{13}^+	0	5	-5	0	15	-15

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