Optimisation Methods in Engineering

Name: Bhukya Vasanth Kumar
Roll: B180441CS
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Product	Yield	Cultivation	price	Fertilisers
Tomatoes	2000 kg	5 days	10	100
Lettuce	3000 kg	6 days	7.5	100
Potatoes	1000 kg	5 days	20	50

Total land = 1000 sq. area
cost of fertiliser = Rs 5 per kg

A Total of 400 days of cultivation labour with Rs 500 per day

→ let required quantity of field for toamatoes, lettuce, potatoes be x, y, z acres.

→ Given cost of cultivation, harvesting:

5 X 500 = 2500 / acre
6 X 500 = 3000 / acre
5 X 500 = 2500 / acre.

→ cost of fertiliser

100 X 5 = 500 / acre
100 X 5 = 500 / acre
50 X 5 = 250 / acre.

Total cost of production

(2500 + 50) X = 3000 X → T
= 3500 Y → L
= 2750 Z → P

Total selling price:

$2000 \times 10 = 20000X$

$3000 \times 7.5 = 22500Y$

$1000 \times 20 = 20000Z$.

Total profit

$U = (20000X - 3000X) + (22500Y - 2500Y) + (20000Z - 2750Z)$

$$U = 17,000X + 19,000Y + 17250Z \quad \text{--- (1)}$$

Farmer has 1000 acre.

$X+Y+Z \leq 1000$.

no. of days = 500.

$X+Y+Z \leq 1000$.

$X, Y, Z \geq 0$.

$5X+6Y+5Z \leq 500$ →

Hence, LPP should be.

$U = 17,000X + 19,000Y + 17,250Z$

maximised.