

Answer on question #42664 -Economics - Other

1) Formulate a LP problem to determine what blend of the four chemicals will allow Golding to minimize the cost of a 50-pound bag of the fertilizer. Explain clearly how you formulate the constraints.

If E-11 = x_1 , C-92 = x_2 , C-30 = x_3 and D-21 = x_4 , then:

$$W = 0.06 \times x_1 + 0.1 \times x_2 + 0.14 \times x_3 + 0.11 \times x_4 \rightarrow \min$$

$$\begin{cases} x_1 + x_2 + x_3 + x_4 = 50 \\ x_1 \geq 7.5 \\ x_2 + x_3 \geq 22.5 \\ x_2 + x_4 \leq 10 \end{cases}$$

- a) $x_1 + x_2 + x_3 + x_4 = 50$ – Total weight of all compounds is 50 pounds;
- b) $x_1 \geq 7.5$ – E-11 must constitute at least 15% (7.5 pounds) of the blend;
- c) $x_2 + x_3 \geq 22.5$ – C-92 and C-30 must together constitute at least 45% (22.5 pounds) of the blend;
- d) $x_2 + x_4 \leq 10$ – D-21 and C-92 can together constitute no more than 20% (10 pounds) of the blend.

2) Solve using a computer to find the best solution:

a) To minimize the cost of a 50-pound bag of the fertilizer, Golding should use such amount of chemicals:

E-11	C-92	C-30	D-21
27.5	10	12.5	0

In this case, the cost is 4.4 \$.

b) In case Golding have to use at least 1 pound of each chemical, the amount will be:

E-11	C-92	C-30	D-21
26.5	9	13.5	1

In this case, the cost is 4.49 \$.