International Wool Company operates a large farm on which sheep are raised.The farm manager determined that for the sheep to grow in the desired fashion,they need at least minimum amounts of four nutrients (the nutrients are nontoxic so the sheep can consume more than the minimum without harm).The manager is considering three different grains to feed the sheep.Table B-2 lists the number of units of each nutrient in each pound of grain,the minimum daily requirements of each nutrient for each sheep,and the cost of each grain.The manager believes that as long as a sheep receives the minimum daily amount of each nutrient,it will be healthy and produce a standard amount of wool. The manager wants to raise the sheep at minimum cost.

**Step 1: Identify the decision variables.**

Let X1 be the Grain no.1

Let X2 be the Grain no.2

Let X3 be the Grain no.3

**Step 2: Write the objective function.**

Objective sheep can consume more than the minimum without harm

the total Grain of 1 is 41

**41X1** will be the total grain.

the total Grain of 2 is 36

**36X2** will be the total grain.

the total Grain of 3 is 96

**96X3** will be the total grain.

**Minimize M = 41x1 + 36x2 + 96x3**

**Step 3: Formulate the constraints.**

Nutrient A : 20x1 + 30x2 + 70x3 ≥ 110

Nutrient B : 10x1 + 10x2 + 0x3 ≥ 18

Nutrient C : 50x1 + 30x2 + 0x3 ≥ 90

Nutrient D : 6x1 + 2.5x2 + 10x3 ≥ 14

**Step 4: State the non-negativity constraints.**

No. of grain 1 (X1) must be greater than or equal to zero

No. of grain 2 (X2) must be greater than or equal to zero

No. of grain 3 (X3) must be greater than or equal to zero

LPP Model:

**Minimize M = 41x1 + 36x2 + 96x3**

subject to:

20x1 + 30x2 + 70x3 <= 110

10x1 + 10x2 + 0x3 <= 18

50x1 + 30x2 + 0x3 <= 90

6x1 + 2.5x2 + 10x3 <= 14

X1 , X2, X3 ≥ 0