

## Target Yield Concept

### (i) Wheat

The fact that the fertilizer are becoming a constraint in agricultural production due to energy crisis particularly in developing countries such as ours, it is of great benefit to work out the most economical dose of this input based upon target yield approach in which the efficiency of a nutrient from soil and fertilizer sources is taken into consideration to complete fertilizer doses for attaining desired yield level of a particular crop in a given soil system. Such an information has been generated for wheat crop being grown on the acid soils of Himachal Pradesh. The information is as follows:

(a)	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
1) Nutrient requirement (kg) to produce 1 q of wheat grain	2.35	0.63	1.66
2) Per cent contribution from available nutrient from soil	6.0	41.6	12.8
3. Per cent contribution from applied fertilizer	47.8	8.0	68.3

(b) Computation of fertilizer dose based upon the basic information :

$$\text{Fertilizer dose (kg/ ha)} = \frac{\text{(Nutrient required (kg) to produce 1 q grain)}}{\text{\% contribution from fertilizer}} \times T \times \frac{\text{\% contribution for soil}}{\text{\% contribution for fertilizer (kg/ha)}} \times \text{STV}$$

OR

$$\text{Fertilizer dose (kg/ha)} = \text{Constant} \times T - \text{Constant} \times \text{STV (kg/ha)}$$

Where T= Yield target (q/ha)

STV = Soil test value (kg/ha)

Soil Analysis

pH	OC	Texture	Available nutrient (kg/ha)		
			N	P	K
5.7	0.63	CL (Clayloam)	600	30	95

(c) Transformation of the data (b) into fertilizer equations to achieve specified yield target for wheat :

$$FN=491 T-0.124 SN$$

$$FP_2O_5 = 7.86 T-5.16 (SP)$$

$$FK_2O = 2.44 T-0.187 (SK)$$

## (ii) Lentil (HPL-5)

FN = 10.53 T-0.40 SN  
FP<sub>2</sub>O<sub>5</sub> = 8.77 T-8.62 SP  
FK<sub>2</sub>O<sub>5</sub> = 3.26 T-0.13 SK

## (iii) Gram (C-235)

FN = 13.35 T-0.46 SN  
FP<sub>2</sub>O<sub>5</sub> = 4.56 T-7.02 SP  
FK<sub>2</sub>O<sub>5</sub> = 2.12 T-0.09 SK

FN, FP<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O stand for fertilizer N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O  
T - Target yield (q/ha)  
NS, SP, SK stand for available N, P and K in the soil.

Treatment	Yield target (kg/ha)	Fert. dose	Yield obtained kg/ha	Per cent Deviation	Yield response	Response yardstick kg/ha NPK	Price of add. Yield Rs/ha	Cost of fertilizer Rs/ha	Cost of Net profit Rs/ha	Benefit cost ratio
T1*	--	O <sub>0</sub> P <sub>0</sub>	1343	--	--	--	--	--	--	--
T2*	--	N <sub>90</sub> P <sub>90</sub> K <sub>45</sub>	3132	--	1789	14.3	1376.15	779.40	596.75	0.76
T3	2000	N <sub>16</sub> P <sub>2</sub> K <sub>31</sub>	2032	+1.6	689	14.1	895.70	119.30	776.40	6.50
T4	2500	N <sub>41</sub> P <sub>42</sub> K <sub>43</sub>	2597	+3.9	1254	10.0	1630.20	392.65	1237.55	3.17
T5	3000	N <sub>65</sub> P <sub>81</sub> K <sub>55</sub>	3110	+3.7	1767	8.8	2297.10	658.09	1639.01	2.49
T6	3500	N <sub>90</sub> P <sub>120</sub> K <sub>67</sub>	3546	+1.3	2203	7.9	2863.90	927.68	1936.22	2.09
T7	4000	N <sub>114</sub> P <sub>160</sub> K <sub>80</sub>	4125	+3.1	2782	7.8	8616.60	1198.30	2418.22	2.02
T8	5000	N <sub>64</sub> P <sub>238</sub> K <sub>104</sub>	4275	-14.5	2932	5.8	381.60	1737.40	2074.20	1.19

T1\* = control

T2\* = yield obtained as per state level dose

Soil properties

Texture	O.C%	AvN	AvP	AvK
Clayloam	0.43-0.78	436-698	16-38	80-121

**Conclusion:** Based upon the benefit ratio, one can conclude that farmers of the region can obtain wheat yields upto 30-40 q/ha if they apply fertilizers in acid soils of H.P. in accordance with the target yield concept.