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Comparative study of micronutrient cum fertilizers on crop production and benefit-cost ratio in Babina block, Bundelkhand region

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Abstract
This review will be focused on the integrated nutrition management to enhance production of crop in Babina block, Bundelkhand region. The aim of this study is to analysis the effect of micronutrient cum fertilizers on crop production and effect on employment generation. It has also reveals the Benefit-Cost ratio of wheat cultivation by adopting micronutrient (Zinc and Boron) with DAP (Study-1) and fertilizers (Urea) with DAP (Study-2) and recorded as 1.478 and 1.429 respectively while the net gain was recorded as Rs. 21,743 and Rs. 17,953 per hectare respectively.

Keywords: Micronutrient, fertilizers, crops, crop production, cost analysis and benefit-cost ratio

Introduction
Soils are dynamic ecosystem that supports a diversity of life. Therefore, the concept of soil quality or health like that of human health, is not difficult to understand or recognized when system is viewed as a whole. The beneficial effects of adding mineral elements e.g. Zinc, Boron etc. To improve the plant growth has been known in agriculture for more than 2000 years.

Anonymous (2000) [1] discuss the current use of soil test to predict the probability of crop response to application of fertilizers and consider their possible use for plant growth. Soil testing plays an important role in crop production and nutrition management (Reid, 2006) [4]. For high productivity rate large amount of fertilizers are used and due to that result soil fertility reduced with constant rate and becomes in fallow condition.

Under the present scenario, India's land resources are under immense pressure. These share only 2 percent of the world's geographical area, but support around18 per cent of global population and over 15 percent of the world livestock number (Katyal, 1998) [3]. It is estimated that by 2025, one-third of the world's population (especially in the developing countries)would face severe water scarcity (Secklar *et al*., 1998) [5]. To achieve food security, minimize water convicts' and reduce poverty, it has become essential to increase the productivity of rainfed systems by harnessing the existing potential (Wani *et al*., 2003). Since 2003, watershed management has been adopted as a national policy (Joshi *et al*., 2004) [2].

Presently, the Government of India is investing more than Rs. 2500 crore annually on improving the condition of natural resources through watershed management under the Integrated Watershed Management Programme (IWMP) for better eco-system services.

The study will be beneficial for farmers to provide micronutrient most profitable as compared to fertilizers and get more crop production with low cost.

Materials and Methods
The study area is located at 25 º 28' 42.6" - 25 º 40' 05.1" N and 78º 21' 06.5" - 78º 37' 28.0" E, and about 265-310 m above mean sea level in babina block, Bundelkhand region. The annual rainfall in the Bundelkhand region varies from 800 mm to 1300 mm, about 90 per cent of which is received during south-west monsoon period (Singh *et al*., 2002) [7].

The length of growing season in Bundelkhand ranges between 90 and 150 days, depending upon rainfall and temperature regimes. Wheat is the major crop during *rabi* season and groundnut is the major crop in the *kharif* season. Long term weather data show that the average rainfall in study region is 877 mm, about 85% falling from June to September (Singh *et al*., 2014) [6]. Mean annual temperature ranges from 24 to 25 ^{0}C.

The mean summer (April-May-June) temperature is 34 ^{0}C which may rise to a maximum of 46 to 49 ^{0}C during the month of May and June. The mean winter temperature (December-January-February) is 16 ^{0}C.

Methodology

Economic Feasibility Evaluation

The economic feasibility of crop cultivation was worked out in wheat crop. All the fields were digitized in the GIS environment and data was collected by personal interview. Income from selected crop was worked out on the basis of procurement price. The net return was calculated by subtracting the cost of cultivation incurred from sowing to harvesting from the gross return and then benefit-cost ratio was estimated.

Results and Discussion

Economic Analysis

Most of the area was cultivated under wheat crop. The productivity of wheat crop was calculated as study-1 and study-2. Considering all the inputs at prevailing market price and output at procurement price, benefit-cost ratio in study-1 and study-2 was worked out as 1.478 and 1.429 respectively. The output from cultivation was Rs. 67160/ ha against the input of Rs. 62560/ ha and Rs.59800/ ha against the input of Rs. 41847/ ha in wheat by study-1 and study-2 respectively (Table 1 & 2). The net gain through crop cultivation in watershed has been estimated to be of Rs. 6196755 and 5116605 in study-1 and study-2 respectively (Table 3).

Table 1: Production and Benefit-Cost ratio of wheat cultivation by using micronutrient (Zinc and Boron) with DAP (Study-1)

Particulars	Input or Output	Rate (Rs.)	Amount (Rs./ha)
Seed (kg/ha)	188	22	4136
Ploughing (hours/ha)	5	600	3000
Fertilizer/Chemicls (kg/ha)			
a) DAP	63	29	1827
b) Zinc	22	200	4400
c) Boron	5	500	2500
Thresher (7.5% of production kg/ha)	247.5	18.4	4554
Labour (humandays/ha)			
a) Ploughing	3	250	750
b) Sowing	1	250	250
c) Irrigation	28	250	7000
d) Weedicide	5	250	1250
e) Harvesting	25	250	6250
f) Threshing	10	250	2500
Irrigation (hours/ha)	60	100	6000
Weedicides			1000
Total cost			45417
Production (q/ha)			
a) Grain	34	1840	62560
b) Fodder	23	200	4600
Total income			67160
B:C ratio			1.478

Table 2: Production and Benefit-Cost ratio of wheat cultivation by using Urea with DAP (Study-2)

Particulars	Input or Output	Rate (Rs.)	Amount (Rs./ha)
Seed (kg/ha)	188	24	4136
Ploughing (hours/ha)	5	600	3000
Fertilizer (kg/ha)			
a) Urea	65	7.6	494
b) DAP	63	29	1827
Thresher (7.5% of production kg/ha)	225	18.4	4140
Labour (humandays/ha)			
a) Ploughing	3	250	750
b) Sowing	1	250	250
c) Irrigation	36	250	9000
d) Weedicide	4	250	1000
e) Harvesting	25	250	6250
f) Threshing	10	250	2500
Irrigation (hours/ha)	75	100	7500
Weedicides			1000
Total cost			41847
Production (q/ha)			
a) Grain	30	1840	55200
b) Fodder	23	200	4600
Total income			59800
B:C ratio			1.429

Table 3: Net gain of wheat crop cultivation

Crop	Chemicals/Fertilizers	Crop Area (ha)	Net gain (Rs./ha)	Net gain in lakh
Wheat	Chemicals (Zinc and Boron) with DAP	285	21743	6196755
Wheat	Urea with DAP	285	17953	5116605

Conclusions

The results exhibits that use of micronutrient viz. (Zinc and Boron) reveals better production than rest. It isalso helpful to maintain the soil fertility and increase B:C ratio.

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