

Evaluation of Different Blended Fertilizers Types and Rates for Better Production of Wheat in Esera Woreda, Dauro Zone

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Abstract

Production and productivity of wheat is decreased mainly by soil fertility depletion and inappropriate rate of poor nutrients availability. Crop specific fertilizer recommendation is necessary for sustainable crop production. Accordingly, a field experiment was conducted during the main rainy season of 2017 and 2018 to evaluate blended fertilizer types and rates effect on improving production of wheat in Esera woreda, Dauro Zone, Southern Ethiopia. The experiment was laid out in Randomized Complete Block Design with three replications. The experiment consisted of ten treatments viz. control, (150NPSB+41urea) kg ha⁻¹, (250 NPSB+102) kg ha⁻¹, (150 NPSB+41urea+cu) kg ha⁻¹, (200 NPSB+71 urea +cu) kg ha⁻¹, 250NPSB+102urea+cu) kg ha⁻¹, (173.2 NPS + 4.87 ZnSO₄) kg ha⁻¹, (189.5k NPS + 6.5 ZnSO₄) kg ha⁻¹, (237NPS + 8.125 ZnSO₄) kg ha⁻¹, treatments. Blended fertilizers were applied at planting time and urea was top dressed after 35 days of planting. Application of blended fertilizer significantly ($p < 0.05$) increased the grain yield, and aboveground biomass, as compared to the control. On the other hand plant height, number of tillers per plant, spike length and number of seeds per spike were not shown significance. The maximum grain yield 2979.2 kg ha⁻¹ and minimum (1989.6 kg ha⁻¹) were obtained from the application of 237 NPS + 8.125ZnSO₄ kg ha⁻¹ and 200+71 urea +cu, respectively. The application of 173.2NPS + 4.87 ZnSO₄ kg ha⁻¹ had maximum and acceptable Marginal rate of return (MRR %) and net benefit. Therefore, this type and rate of blended fertilizer can be recommended since it produced a high marginal rate of return, high net benefit, and relatively low total cost of production, for wheat production in the study

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Wheat is one of the most important cereal crops in the world, and its production is highly dependent on the availability of nutrients. Soil fertility depletion and inappropriate rate of poor nutrients availability are major constraints to wheat production. Fertilizer recommendation is necessary for sustainable crop production. Blended fertilizers, which combine different nutrients, can provide a more balanced and efficient nutrient supply to the crop. This study evaluated the effect of different blended fertilizer types and rates on wheat production in Esera Woreda, Dauro Zone, Southern Ethiopia. The experiment was conducted during the main rainy season of 2017 and 2018. The results showed that the application of blended fertilizers significantly increased grain yield and aboveground biomass compared to the control. The maximum grain yield was obtained from the application of 237 NPS + 8.125 ZnSO₄ kg ha⁻¹, and the minimum was obtained from the application of 200+71 urea +cu. The application of 173.2 NPS + 4.87 ZnSO₄ kg ha⁻¹ had the highest marginal rate of return and net benefit. Therefore, this type and rate of blended fertilizer can be recommended for wheat production in the study area.

Materials and Method

Experimental details and treatment set-ups for Esera

The experiment was conducted during the main rainy season of 2017 and 2018. The experimental area was located in Esera Woreda, Dauro Zone, Southern Ethiopia. The soil type was a brown forest soil. The experiment was laid out in a Randomized Complete Block Design with three replications. The experiment consisted of ten treatments: control, (150NPSB+41urea) kg ha⁻¹, (250 NPSB+102) kg ha⁻¹, (150 NPSB+41urea+cu) kg ha⁻¹, (200 NPSB+71 urea +cu) kg ha⁻¹, 250NPSB+102urea+cu) kg ha⁻¹, (173.2 NPS + 4.87 ZnSO₄) kg ha⁻¹, (189.5k NPS + 6.5 ZnSO₄) kg ha⁻¹, (237NPS + 8.125 ZnSO₄) kg ha⁻¹. The fertilizers were applied at planting time, and urea was top dressed after 35 days of planting. The experimental area was divided into ten blocks, and each block was further divided into three replications. The plots were 10m x 10m in size. The wheat variety used was a local variety. The data were analyzed using ANOVA, and the means were separated using Duncan's multiple range test.

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