

# Analyzing the Effects of Environmental, Fertilizer, and Management Factors on Agricultural Yield

PREPARED FOR  
**STAT 31631 GROUP 8**

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# AGENDA

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## CONCLUSION

This study aimed to analyze the effects of environmental factors, fertilizer application, and management practices on agricultural yield, with the goal of providing actionable insights for optimizing farming practices and improving crop productivity. For this we selected wheat as the experimental crop. Through a comprehensive analysis using multiple linear regression, the relationships between key variables such as fertilizer amount, seed variety, rainfall, irrigation schedule, soil quality, and the number of sunny days were quantified and evaluated.

The regression model developed in this study was robust, explaining a significant portion of the variance in agricultural yield with a high adjusted  $R^2$  value. That means the selected factors have approximately 93.5% of the variability in crop yield. The model's coefficients were statistically significant, suggesting strong and meaningful relationships between the independent variables and the dependent variable (yield).

### Following conclusions can be made on predictor variables

- **Fertilizer Amount:** The positive and significant coefficient suggests that increasing the amount of fertilizer per hectare gives higher yields, showing the importance of proper fertilization in crop management.
- **Seed Variety:** The high significance of seed variety indicates that choosing the right seed variety is crucial for maximizing yield, potentially overshadowing other environmental factors.
- **Rainfall:** The negative coefficient for rainfall suggests that excessive rainfall may have a harmful effect on yield, showing the need for balanced water management



## CONCLUSION

- **Irrigation Schedule:** The significant positive impact of irrigation schedules on yield shows it is important to have strategic water application, especially in regions with variable rainfall patterns.
- **Soil Quality and Sunny Days:** Both factors were found to positively influence yield, showing the importance of soil health and adequate sunlight in crop production.



The residual analysis and multicollinearity checks confirmed the model's reliability, and the low residual standard error (49.99) suggests that the model predictions are relatively precise.

Finally, this study provides strong evidence that a combination of proper fertilizer application, seed variety selection, and well-planned irrigation schedules, along with favorable environmental conditions, can significantly enhance agricultural yield. These findings can serve as a valuable resource for farmers, agronomists, and policymakers aiming to improve agricultural practices and promote sustainable farming.



## REFERENCES

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