**DECLARATION BY THE STUDENTS**

We, *Vinayak Bagali, Manjunath Sagar, Omkar Vibhute and Deepak Kongali* hereby declare that the project report entitled **“A study to enhance the agriculture efficiency by analysis of soil parameters of farmland”** submitted by me/us to KLS Gogte Institute of Technology, Belagavi, in partial fulfillment of the Degree of **Bachelor of Engineering** in **Civil Engineering** is a record of the project carried out at KLS Gogte Institute of Technology, Belagavi. This report is for the academic purpose.

We further declare that the report has not been submitted and will not be submitted, either in part or full, to any other institution and University for the award of any diploma or degree.

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**ABSTRACT**

This study investigates the potential of improving agricultural efficiency by analyzing the key soil parameters of farmland. Healthy soil is vital for optimal crop growth and yield. By understanding the chemical, physical, and biological properties of the soil, farmers can make informed decisions to optimize resource utilization and maximize production.

The study will involve collecting and analyzing soil samples from representative farmland areas. Key parameters such as nutrient availability (nitrogen, phosphorus, potassium), pH level, organic matter content, and soil texture will be assessed. This data will be used to create detailed soil health profiles for the studied farmland by correlating soil health data with crop performance and resource inputs (fertilizers, water), the study aims to identify areas for improvement. The findings will be used to develop data-driven recommendations for:

Precision fertilization: Applying fertilizers only where and when they are most needed, reducing waste and environmental impact.

Crop selection: Matching crop types to the specific capabilities of the soil, promoting optimal growth and yield.

Soil amendments: Improving soil health through targeted amendments like compost or lime, enhancing long-term sustainability.

This study contributes to the field of precision agriculture by demonstrating how soil parameter analysis can be a powerful tool for boosting agricultural efficiency. The findings hold promise for increased crop yields, reduced environmental impact, and improved farm profitability.

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**List of Abbreviations**

|  |  |
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| **Abbreviation** | **Description** |
| SP | Saturation percentage |
| FC | Field capacity |
| PWP | Permanent wilting point |
| D-W | Drying and wetting cycling |
| CEC | Cation exchange capacity |
| AWC | Available water capacity |
| OC | Organic carbon |
| RAWC | Readily available water capacity |
| TAWC | Total available water capacity |
| CA | Conservation agriculture |

**List of Symbols**

|  |  |
| --- | --- |
| **Symbol** | **Description** |
| G | Specific gravity |
| W | Water content (%) |
| K | Hydraulic conductivity cm/sec |