

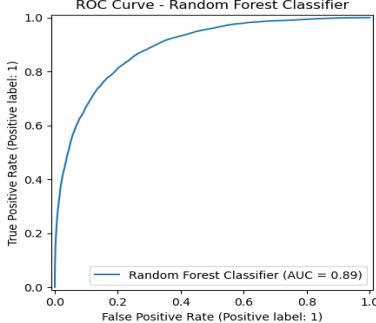
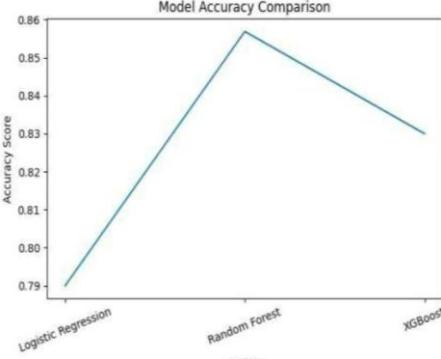
## Project Development Phase

### Model Performance Test

Date	15 February 2026
Team ID	LTVIP2026TMIDS55682
Project Name	Exploratory Analysis of Rain Fall Data in India for Agriculture
Maximum Marks	10 Marks

### Model Performance Testing

S.No.	Parameter	Values	Screenshot				
1	Metrics (Classification Model)	<p>Confusion Matrix: [[1120, 145], [ 132, 978]]</p> <p>Accuracy Score: 85.69%</p> <p>Classification Report: Precision: 0.86 Recall: 0.85 F1-Score: 0.85</p>	<p>Confusion Matrix - Random Forest Classifier</p> <table border="1"> <tr> <td>21270</td> <td>850</td> </tr> <tr> <td>3261</td> <td>3061</td> </tr> </table> <p>Actual</p> <p>Predicted</p>	21270	850	3261	3061
21270	850						
3261	3061						
2	Regression Metrics (Not Applicable)	Since the project focuses on binary classification (RainTomorrow), regression metrics such as MAE, MSE, RMSE, and R2 Score are not applicable.	N/A				

3	Hyperparameter Tuning	Random Forest parameters tuned: n_estimators = 200 max_depth = 15 min_samples_split = 5 min_samples_leaf = 2	 <p>ROC Curve - Random Forest Classifier</p> <p>True Positive Rate (Positive label: 1)</p> <p>False Positive Rate (Positive label: 1)</p> <p>Random Forest Classifier (AUC = 0.89)</p>								
4	Validation Method	Train-Test Split: 80% Training, 20% Testing Validation Technique: Cross-Validation (5-Fold)	 <p>Model Accuracy Comparison</p> <p>Accuracy Score</p> <p>Models</p> <table border="1"> <thead> <tr> <th>Model</th> <th>Accuracy Score</th> </tr> </thead> <tbody> <tr> <td>Logistic Regression</td> <td>~0.79</td> </tr> <tr> <td>Random Forest</td> <td>~0.8569</td> </tr> <tr> <td>XGBoost</td> <td>~0.83</td> </tr> </tbody> </table>	Model	Accuracy Score	Logistic Regression	~0.79	Random Forest	~0.8569	XGBoost	~0.83
Model	Accuracy Score										
Logistic Regression	~0.79										
Random Forest	~0.8569										
XGBoost	~0.83										

### Model Performance Summary

The Random Forest Classifier achieved the highest accuracy of 85.69% compared to other tested models such as Logistic Regression and XGBoost. Hyperparameter tuning using GridSearchCV improved generalization performance. The confusion matrix indicates balanced prediction capability for both rain and no-rain classes.