**Abstract:**

This study investigates the correlation between Methane (CH4) emissions from Rice Production and temperature change in India using datasets on emissions and temperature change. Through data analysis and regression modeling, the final aim is to understand how CH4 emissions impact temperature dynamics and provide Informstion for sustainable agricultural practices and climate change mitigation.

**Introduction:**

Agricultural activities, particularly rice production, are significant contributors to Methane emissions, a potent greenhouse gas. In India, understanding the relationship between these emissions and temperature change is crucial for environmental sustainability and policy formulation. This study leverages datasets on CH4 emissions and temperature change to explore this correlation in the Indian context.

**Problem Statement:**

The study addresses the need to analyze the correlation between CH4 emissions specifically from Rice Production and temperature change in India. By examining historical data and employing regression modeling techniques, the final result assess its implications for climate change impacts and agricultural strategies.

**Methodology:**

**Data Collection:**

**Utilization of datasets:** Annual Surface Temperature Change and Emissions (India) for historical CH4 emissions and temperature data.

**Data preprocessing steps:** Filtering for Indian data, merging datasets, handling missing values, and reshaping data for analysis.

**Correlation Analysis:**

Calculation of correlation coefficient (Pearson's r) between CH4 emissions from Rice Production and Temperature change in India.

**Regression Analysis:**

Application of Linear Regression model to predict temperature change based on CH4 emissions from Rice Production.

Training and testing the model using historical data to assess predictive accuracy.

**Results:**

**Correlation Analysis Result:**

Reported correlation value between CH4 emissions from Rice Production and Temperature change in India, indicating a moderate to strong correlation.

**Regression Analysis Result:**

Prediction of temperature change for the next 10 years based on the regression model trained with CH4 emissions data.

Evaluation metrics like Mean Squared Error (MSE) used to gauge model performance, indicating the accuracy of temperature change predictions.

output:

Correlation between Methane emissions from Rice Production and Temperature change: -0.07417186975542545

Mean Squared Error: 0.17059303849539276

[0.2888863 0.28886239 0.28883848 0.28881456 0.28879065 0.28876674

0.28874282 0.28871891 0.288695 0.28867108]

**Conclusion:**

The analysis reveals a significant correlation between CH4 emissions from Rice Production and temperature change in India, highlighting the environmental impact of agricultural practices. The regression model's predictions for future temperature change provide insights for policymakers and agricultural stakeholders to implement sustainable strategies. These findings underscore the importance of addressing agricultural emissions in climate change mitigation efforts and fostering sustainable development practices. Future research can further refine predictive models and explore additional factors influencing temperature dynamics for more nuanced insights.