Impact Prediction of Climate Change on Crop Yield and It's Solutions

Vivek Bhosale[1], Tejas Nirmal[2], Aayush Bhakare[3], Piyush Beldar[4], Prof. Manoj Kharde[5]

Students, Computer Department, Pravara Rural Engineering College, Loni, Rahata, India[1,2,3,4]

Assistant Professor, Computer Department, Pravara Rural Engineering College, Loni, Rahata, India [5]

Abstract: *Climate change (temperature rise, erratic rainfall, humidity swings) threatens yields of wheat, rice, maize, cotton and sugarcane in Maharashtra. We integrate 25+ years of historical yield & weather data (State Ag. Dept.), IoT sensing (NodeMCU ESP8266 + DHT11 + soil-moisture + NEO-6M GPS) and AI (Random Forest Regressor, CNN disease detection, Gemini chatbot). The Random Forest model achieved $R^2 \approx 0.91$ (rice), 0.93 (cotton); RMSE ~0.3 t/ha. IoT-driven irrigation alerts saved 12–15% water; pilot trials showed 6–8% yield gains. Economic analysis predicts 20–25% income loss under moderate warming, half recoverable via our AI-IoT solutions. Adaptive strategies include crop recommendations, optimized sowing, disease alerts, and conversational guidance.*

Keywords: Climate Change, Crop Yield Prediction, IoT Sensors, Random Forest, Economic Impact