**Analysis and Forecast of the Global Price of Agricultural Commodities: A Comprehensive Integration of Interpretable Machine Learning and Econometric Approaches**

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**Abstract**

We present a comprehensive method for medium-term analysis and forecasting (CMAF) of monthly global prices of agricultural commodities (AC). The method provides a detailed explanation of the forecasts and enables their interpretation. Integrating eight econometric and machine learning (ML) methods, CMAF combines the joined effects of over 100 possible variables. In addition, it can consider the inclusion of additional potential explanators according to specific needs or purposes. It uses different cross-validation techniques to avoid forced pre-research assumptions and realistically capture these complex relations. The learning process begins with comprehensive stationary and causality tests, which detect the nature of each possible variable and its suitability to serve as an explanatory factor for the change in the AC price. Second, it performs a retrospective analysis while considering a large number of variables from three different groups: market fundamentals, financial and climatic. Third, it uses relative importance analysis to reduce the number of features to include only those with the highest positive impact on accurate AC price forecasting performance. Lastly, it provides a detailed and intelligible visual interpretation of the results and the learning process in a manner that even those with no academic or financial background could understand. CMAF can be easily trained from publicly available data and will be made an available open-source. It is thus easily adaptable to analyse and forecast the price of various AC regardless of any budget, language or other skills-related constraints. The result is a powerful and applicable tool that may promote transparency in the global food trade and thus enhance food security and social equality.

**Keywords:** Food-security, Agricultural commodity trade, Price forecasting, Price analysis, Interpretable Machine learning