**REFLECTIVE REPORT ON FORECASTING FAO FOOD PRICE INDEX**

**Overview**

To analyze and forecast fluctuations in food prices, I used the FAO Food Price Index dataset. This dataset was selected because it is:

Reliable and widely cited, maintained by the Food and Agriculture Organization (FAO),

Covers a long time span, enabling trend and seasonality analysis, Includes key commodity indices (Meat, Dairy, Cereals, Oils, Sugar) that influence food policy.**Data Cleaning**

Converted Date to proper datetime format, Renamed columns to match Prophet and ARIMA input requirements, Removed missing or invalid values, Aggregated data at a monthly level to ensure consistent time intervals.

**Exploratory Data Analysis (EDA)**

A steady upward trend was observed over certain periods, with spikes linked to global events (e.g., droughts or political unrest).

Seasonality patterns emerged, showing recurring fluctuations around specific months.

Correlation analysis revealed that some sub-indices (like cereals and oils) strongly influenced the overall index.

**Forecasting Models Compared**

Two forecasting models were applied:

Prophet (Facebook/Meta’s library):

* Handles missing data and outliers well,
* Automatically models seasonality and trends,
* Produced clear confidence intervals.

ARIMA (AutoRegressive Integrated Moving Average):

* Traditional statistical model,
* Works well with stationary series but requires manual parameter tuning.

**Comparison:**

Prophet Captures seasonality & holidays easily, fast to deploy but Slightly less accurate when strong auto correlation dominates

ARIMA Performs well for short-term stable data but Requires differencing & tuning, less interpretable seasonality

Prophet performed better overall because the dataset exhibits long-term trends and seasonality, which Prophet handles automatically.

ARIMA performed reasonably but required extra parameter tuning and pre-processing.

F**orecast Confidence Intervals**

Both models provide confidence intervals:

The shaded region (Prophet) or upper/lower bounds (ARIMA) indicate the range where future values are expected with a certain probability (usually 80% or 95%).

Wider intervals in later months show higher uncertainty further into the future.

**Key Performance Indicators (KPIs)**

Monthly Average Food Price Index – monitors overall price level.

Year-over-Year Growth Rate – tracks inflationary pressure in food prices.

These KPIs are critical for:

Assessing market stability,Planning subsidies or interventions and Communicating risks to policy advisors.

**Recommendations to Policy Advisors and Civil Society**

Early Interventions: Use forecast signals to trigger early imports or buffer stock releases before predicted price spikes. Targeted Subsidies: Identify months with predicted high volatility and prepare safety nets for vulnerable populations.

**Climate Integration:**Combine this forecast with rainfall and drought data to anticipate agricultural output shocks. Public Dashboards: Share these forecasts through interactive dashboards to improve transparency and decision-making.

**Deliverables**

Jupyter Notebook: Includes full data wrangling, EDA, Prophet & ARIMA forecasts, and visualizations.

Interactive Dashboard (Plotly Dash): Allows stakeholders to explore time sliders and forecast charts.

HTML Export:Visual forecasts with confidence intervals.

This Report: Summarizing process, model comparison, and actionable recommendations.