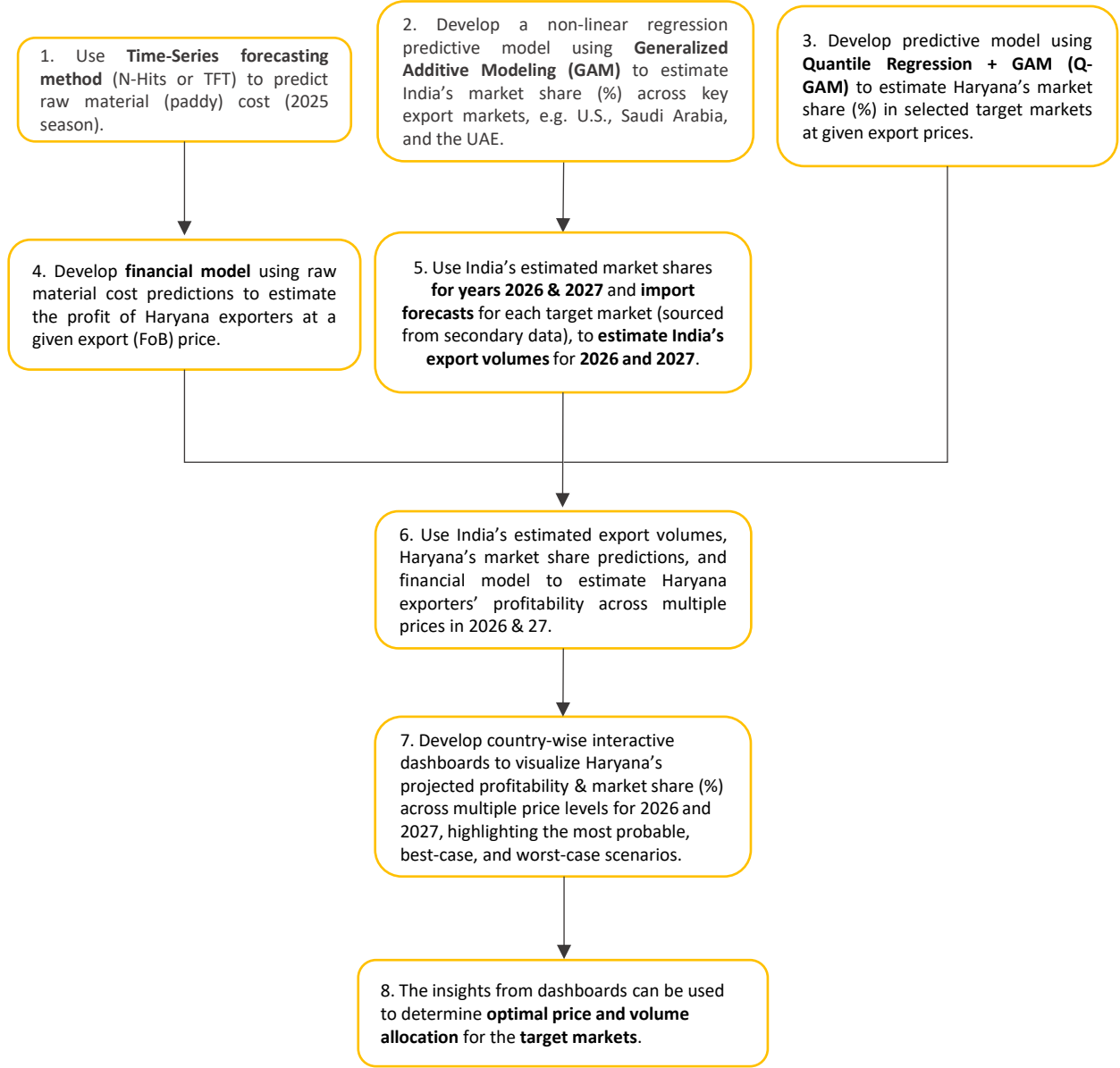


Predictive Modeling Framework for Pricing and Market Allocation



1. Use Time-Series forecasting models (N-Hits or TFT) to predict raw material (paddy) cost (2025 season)-completed
2. Develop a non-linear regression model using **Generalized Additive Modeling (GAM)** to predict India's market share (%) across key export markets, e.g. U.S., Saudi Arabia, and the UAE.
 - The GAM model will capture influence of export prices from **major competitors**, including direct competitors (e.g., *Pakistan*) and substitute competitors (e.g., *Thailand, China*).
 - The model should also account for **lag effect of India's export prices**, estimating how a higher/lower price set in one year impacts market share in both the current and subsequent year.
 - Use regression equations derived from the model and financial model described in **point 4** to determine the most **profitable export price point** for Indian exporters in selected target markets, for **2026 and 2027**.
3. Develop predictive model using **Quantile Regression + GAM (Q-GAM)** to estimate Haryana's market share (%) in selected target markets at given export prices.
 - Historical export data of Haryana and its key competitors in each target market (e.g., Madhya Pradesh and Punjab for the U.S.) can be obtained from **APEDA** and used for the model development.
 - In addition to estimating **market share (%)**, this model will generate **confidence bands or quantiles** representing the *probable case* (50% quantile), *worst case* (10% quantile), and *optimistic case* (90% quantile) for the market share. Quantiles serve as indicator for risk uncertainty and can be helpful for stakeholders in allocating supplies to different markets and in determining the right export price.
4. Develop **financial model** using paddy cost predictions from point 1, which could estimate profit of Haryana exporters at a given export (FoB) price.
5. **Estimate India's export volumes for 2026 and 2027** using India's predicted market shares for respective years and import forecasts for each target market (sourced from secondary data).
6. Use **India's projected export volumes, Haryana's market share forecasts**, and the **financial model** to estimate **Haryana exporters' profitability** at **multiple price levels** across the selected target markets for 2026 and 2027.
7. Develop **target market-specific dashboards** for Haryana exporters that visualize **market share projections** (most probable, best-case, and worst-case) and display **profit estimates under the most probable scenario** across **multiple price points**.
8. The insights from dashboards can be used by stakeholders to determine **optimal price and volume allocation** for the **target markets**.

Use case example:

- If **Haryana exporters** are projected to **lose market share in 2026 or 2027**, and the **price elasticity** (i.e., % change in share / % change in price) is unfavorable, indicating that lowering prices is unlikely to retain market share they may consider diverting a portion of supply to **alternate markets** or countries where there is potential for share growth and **lower risk uncertainty** (i.e., the gap between probable, worst, and best-case scenarios is narrow).
- If a market shows **high risk** reflected by a significantly lower worst-case market share, stakeholders may prefer to avoid price increases. Conversely, if the best-case market share is strong, stakeholders may choose to allocate a higher share of supply to that market.

Models and data source:

Time-Series forecast model for paddy cost –
Agmarknet.gov.in

GAM Model for India's market share% vs other
country export prices – WITS.Worldbank.org

Q-GAM Model for Haryana's market share% vs
other state export prices – APEDA

Financial Model – cost estimates from different
sources