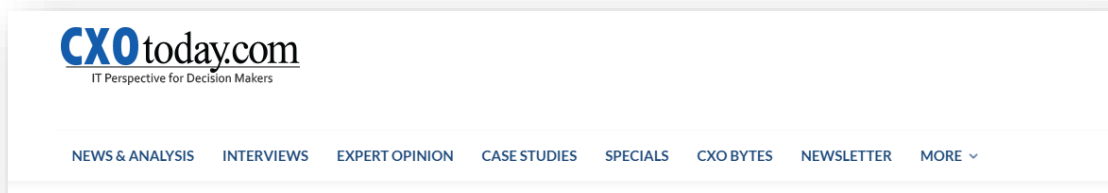




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The challenge isn't production; [India generates 88.97 million](#) metric tons of fruits, 162.98 million metric tons of vegetables, and 323 million metric tons of food grains annually. However, only 1–2% of this output is exported, and 18% is lost before reaching consumers. Farmers, especially in rural areas with unreliable electricity, face financial setbacks due to limited access to proper storage solutions.

Data-Driven Decisions: A Game Changer for Agri-Logistics

To address these inefficiencies, data-driven decision-making has emerged as a key solution. By leveraging big data, AI, and analytics, agribusinesses can pinpoint critical inefficiencies, predict disruptions, and implement solutions to optimize logistics.

Data-driven insights helps stakeholders track demand patterns, enhance storage efficiency, and streamline distribution networks. With real-time insights, logistics operators can allocate resources effectively, ensuring food reaches markets in optimal condition. This shift toward data-backed logistics is reducing losses and improving profitability across the agricultural supply chain.

The Impact of AI and Machine Learning on Agri-Logistics

The integration of AI and machine learning (ML) has been a revelation in agri logistics by enabling rapid, data-driven decision-making. AI needs massive amounts of data to unearth statistical truths—a reality that underpins its effectiveness. In complex environments like agri-logistics, where countless variables influence outcomes, AI relies on diverse datasets to detect patterns, forecast trends, and make accurate decisions.

These advancements in traditional methods have enabled companies to better manage dry crops, particularly under varying climate conditions, by precisely tracking crop health and predicting responses to different environmental factors. This knowledge is further helping the timely actions that are required to keep the crop safe and healthy in various topographies.

Optimizing Storage through Real-Time Monitoring

Real-time monitoring technologies are also critical in minimizing food spoilage. IoT-enabled sensors track key quality impacting factors such as temperature, humidity, and warehouse conditions. This allows for immediate corrective actions, ensuring food remains in optimal storage conditions.

In recent years, innovations in Warehouse Management Systems (WMS) within Agri-logistics have significantly transformed real-time commodity management in warehouses. This advancement is evident in the substantial reduction of post-harvest losses—from approximately 10% to as low as 0.5%—when proper warehousing SOPs are implemented, as highlighted in the FICCI report.

For example, smart cold storage facilities equipped with IoT sensors can detect temperature fluctuations and automatically adjust cooling systems. Farmers and warehouse managers receive real-time alerts, preventing spoilage and extending shelf life.

Benefits of Data-Driven Approaches in Agri-Logistics

- **Reduced Post-Harvest Losses:** Optimized storage, demand forecasting and transportation lead to lower food wastage.
- **Improved Farmer Profitability:** Efficient logistics and increasing market efficiency by locating prospective local buyer and seller help farmers sell more produce at better prices, reducing financial strain.
- **Enhanced Supply Chain Transparency:** Real time data and Blockchain integration ensures tamper-proof records, fostering trust among stakeholders.
- **Sustainable Agricultural Practices:** Data-driven logistics help minimize resource wastage and promote eco-friendly farming methods.

The Future of Agri-Logistics

The transformation of India's agricultural sector hinges on the seamless integration of AI, IoT, and blockchain technologies, which collectively generate and leverage vast amounts of data to redefine the entire agricultural supply chain. This advanced data ecosystem will create unparalleled efficiency, transparency, and resilience. AI, with its predictive analytics and pattern establishing capabilities, will optimize complex logistics routes and demand forecasting. IoT, through pervasive sensor networks, will provide real-time, granular data on environmental conditions and asset location, minimizing spoilage and enhancing operational control across the supply chain. Blockchain, by establishing immutable and transparent records, will build trust and accountability, reducing fraud and facilitating faster transactions from farm to consumer. As businesses and policymakers increasingly embrace these data-driven strategies, they stand to gain a significant competitive advantage. This holistic approach will not only improve overall supply chain efficiency and lower operational costs but also enhance reliability and strengthen market connectivity for agricultural produce. For an industry where every wasted kilogram translates directly to financial loss, embracing these integrated data-driven solutions is not merely an option; it is the fundamental key to forging a more sustainable, profitable, and equitable future in agri-logistics.

(The author is Prashant Sharma, Chief Technology Officer, Sohan Lal Commodity Management Ltd., and the views expressed in this article are his own)