

A Study on Inventory Management in A Cattle Feed Industry

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Abstract

Inventory management is essential for efficient production and profit-making in the cattle feed business. The cattle feed industry relies on different inputs like corn, molasses, oil cake, minerals, and feed additives, whose planning and control are required for sustained production operations. Ineffective inventory management will cause problems like wastage of materials, shortage of stock, too much inventory, as well as increased costs associated with storage and handling. Such challenges have adverse effects on production and profits as well as the overall viability of the business. Poor inventory management can cause inefficient resource use and delay in production activities. The proposed research project seeks to optimize inventory management in the cattle feed business by using ratio analysis and Economic Order Quantity (EOQ). Ratio analysis facilitates the assessment of inventory management and the identification of problems related to this aspect. EOQ method facilitates the determination of the appropriate ordering quantity to minimize ordering and holding costs. The research study will identify efficient ordering approaches that would allow the firm to sustain supply of inputs without increasing inventory costs.

Keywords: Cattle Feed Industry, Cost Optimization, Economic Order Quantity (EOQ), Inventory Control, Inventory Management

1. Introduction

Effective inventory control goes beyond mere procedural activities; it is an important skill that guarantees efficient running of organizations. It entails controlling not only the stock and the stock amounts but the entire flow of materials from purchase right through production until delivery. The main issue here is to have enough inventory without having too much inventory that would otherwise tie down cash.

It is necessary for organizations to monitor their inventory from the stage of raw materials through sub-assemblies, work in progress, and finally to the final goods. This makes it possible to make adjustments such as ordering additional stock when there is a shortage and reducing production where there is surplus. Technological advances have made inventory management a holistic and analytical process. Today's systems link purchase, warehouse management, and logistics, offering almost instant feedback. Techniques, such as Just-in-Time purchasing and Material Requirements Planning, harmonize inflows and outflows, aiming to achieve balance and maintain readiness without extra stock. Technologies, such as barcodes, RFID, WMS, and ERP solutions make monitoring more efficient.

Nevertheless, holding inventory is costly and hazardous. Keeping inventory involves tying up capital, paying for storage and insurance, and running risks of becoming outdated or spoiled. Globalization complicates logistics – increased lead times, disruptions, and problems integrating data further complicate matters. Inconsistencies in measurements and lags in communication affect decision-making.

To cope with these contradictions, firms need to adopt continuous monitoring, forecasting, strategies related to safety stocks, and technological capabilities. Cross-departmental coordination of procurement, production, marketing, and accounting turns data into actions. Expertise in inventory management decreases waste, enhances customer service, and provides additional resources for expansion.

2. Research Objectives

1. How effective is the management of inventory levels in the cattle feed industry, and what contributes to the existence of overstocking and understocking imbalances in the same?
2. How does the occurrence of overstocking and understocking affect the efficiency of operations, the continuity of production, and the cost structures within the cattle feed industry?
3. How does poor inventory management affect the financial stability of firms in the cattle feed industry and their ability to balance their supply and demand requirements?
4. What role do Economic Order Quantity (EOQ) models play in helping with inventory management and decision-making in the cattle feed industry?

3. Research Methodology

The study used a descriptive-analytical method in assessing inventory management methods as well as their implications financially. Data collection was done using random, site inspections to the company's offices where the researcher reviewed and recorded information from available financial and operational documents. Information sources included inventories, purchases and sales journals, ledgers, invoices and balance sheets among others. Random inspections were done to achieve representative samples of transactional and operational periods.

Analytical methods used financial ratios, inventory indicators and inventory control models. Indicators used include Inventory Turnover Ratio, Inventory Holding Period, Inventory/Total Assets ratio and Finished Goods Turnover. These indicators were important in determining the financial health and efficiency of the processes being examined. The ABC analysis was done based on the valuation and level of movement of stocks in the inventory management process. The Economic Order Quantity model was used to determine the order size efficiency.

The process of data analysis included gathering of data into tables, cleansing for uniformity, and computations of ratio and EOQ calculations using formulae. The ABC approach relied on Pareto criteria (A – high value/low quantity, B - medium, and C – low value/high quantity). Findings were analyzed comparatively by comparing performance to benchmarks within the industry and past performances. Triangulation between documentation and quantifiable measures strengthened validity. Constraints in this study include data availability and the snapshot nature of random visits which were addressed through period sampling and matching ledgers and invoices.

4. Data Analysis

The importance of data analysis and interpretation is great in relation to increasing efficiency and productivity. Every process involved from buying supplies to producing goods or even maintaining stocks

yields useful data whose analysis leads to saving, increased productivity, and competitive advantage. Analysis involves statistical analysis, data mining, and analytics of output of machines, quality, and stocks. It is equally essential to put the results into action. Correlations between production factors and defects are crucial in improving quality; likewise, supply chain analysis helps minimize delays and improve stock levels. Technologies like IoT sensors, predictive maintenance, and real-time monitoring provide visibility through which problems can be detected quickly, resulting in less downtime and timely adaptation to changes. Efficient stocks management becomes essential, making sure that there will be no interruption in supply, but not too much waste either. Among other analysis techniques used are ratio analysis, trend analysis, ABC analysis, and EOQ.

5. Findings and Analysis

The findings identify inefficiencies in the company's inventory systems and evaluate the advantages of optimizing its inventory operations.

Major challenges

- Excess money blocked in the inventory: Inventory/Total Asset Ratio = 0.56 (51% of total assets).
- Excessiveness in raw materials due to speculating in buying large quantities without proper forecast for demand.
- Losses arising from inventory storage: moisture contamination, fungal contamination, loss of nutrients, and infestations.
- Excessive inventory is a cause for inefficiency in working capital and increased need for inventory storage.

Storage capacity and constraints

- Storage capacity: 2,500 – 3,000 tonnes; Total Warehouse space: 20,000 sq. ft.
- The storage capacity of existing infrastructure determines the realistic maximum limit for storing goods; value of inventory should conform to this constraint.

Value of inventory and holding cost

- Practical inventory value to be used is: ₹8,000 lakhs (due to existing infrastructure).
- Annual holding cost: ₹964,500.

EOQ and Ordering Process

- Annual demand (D): 5,289,789 units; ordering cost (S): ₹9,339.86; Holding cost (H): ₹964,500.
- EOQ equation: $EOQ = \sqrt{\frac{2DS}{H}}$. By substituting values, get a calculated value 102,472.47, which yields the optimal EOQ of 320 units, the most cost-effective order quantity given the current conditions.

Effects of Inventory Levels

- The holding cost is directly proportional to the inventory levels: increased inventory leads to increased costs of storing, warehouses, capital tie-up, and reduced profitability. Optimal inventory leads to reduced holding cost, improved inventory turnover

Target versus current

- Target inventory (inventory based at the facility): ₹8,000 lakhs.
- Current inventory: ₹15,538.17 lakhs.
- Inventory needed to be cut: ₹7,538.17 lakhs (approximately 48.51% cut).

Ratio changes due to optimization

- Inventory to Total Assets Ratio: improves from 0.56 to 0.29 (more efficient use of assets).

- Finished Goods to Inventory Ratio: improves from 0.21 to 0.41

A reduction in inventory to the desired minimum would generate significant working capital savings, reduced holding costs, minimize the risk of spoilage and obsolescence, and increase profit margins and cash flow. The use of demand-based order quantity (EOQ) techniques, forecasting, procurement in phases, improved storage practices (moisture control, pest control, environmental control), and supplier relations is vital in accomplishing this task. Tracking key performance indicators (inventory/assets, finished goods/inventory, inventory turns, and holding costs) will be crucial for continuous improvement and verification of results.

6. Solutions

Strategy For Inventory Management:

Inventories should be bought based on accurate demand forecasts to avoid overstocking and shortages. Bulk purchase of inventories in smaller quantities should be practiced in accordance with production plans to ensure constant supplies. Long-term contracts with suppliers will offer bulk prices and save inventories that are costly to hold on site. Inventories will be received from suppliers according to production schedules to ensure cash flows. A combination of demand forecasts with safety stocks and periodic review practices will ensure efficient inventory management. Gradual decrease in inventories to the desired level of ₹8,000 lakhs will improve financial performance.

Strategic Supplier Relationship Model:

Develop strategic relationships with suppliers that provide stable prices and supply. Utilize phased deliveries to synchronize supply with manufacturing requirements, decrease inventory holding costs, and avoid obsolescence. Adopt Vendor Managed Inventory (VMI), if possible, where suppliers can manage usage and stock accordingly. Forecast future demand and share performance indicators. Ensure lead time, quality assurance, and backup support through formalized agreements. Such practices decrease order cycles, costs, and supply chain vulnerabilities.

Further Storage Management Techniques:

Plan for proper warehouse redesign that promotes the systematic segregation, accessibility, and handling of materials, which will minimize losses as well as damage caused by delay. Adhere to FIFO policy to eliminate spoilage and guarantee freshness of products. Purchase special storage methods such as silos and environmental controls including moisture and climate control to safeguard the feed ingredients from environmental risks. Also introduce pest control and fumigation techniques.

Inventory Control & Monitoring:

Set up a systematic inventory management system having minimum, maximum, reorder, and safety stock limits for important goods. Use real-time tracking through ERP systems or Internet of Things to keep track of movement, consumption, and availability of stocks in order to make timely replenishments and manufacturing decisions. Perform physical inventory checks at regular intervals to ensure accuracy and to counter any pilferages. Measure KPIs such as Inventory/Total Assets Ratio (goal range 0.15-0.30), turns, and carrying cost to inform policy changes.

7. Suggestions

- **Conduct data-based demand forecasting.**

Utilize past records and seasonality information to forecast demand, establish safety stocks, and plan pro-

duction schedules to mitigate any risks.

- **Formulate strategic relationships with suppliers.**

Create long-term agreements with key suppliers that will help manage pricing, delivery time, and backup plans. Work closely together in predicting demand and planning production capacity.

- **Apply Vendor Managed Inventory (VMI).**

If possible, shift the responsibility of managing inventories to your vendors, who will continuously replenish stocks according to the agreed minimum levels. Establish service level agreements, replenishment triggers, and exceptions.

- **Undertake periodic inventory audit and key performance indicators (KPIs).**

Perform a regular inventory audit and analyze KPIs such as the Inventory-to-Total-Assets Ratio (0.15 to 0.30), turnover ratio, carrying costs, and shortage rates. Adjust reorder points, safety stock, and procurement policies based on the analysis.

- **Enhance inventory storage facilities.**

Upgrade the storage infrastructure by installing silos, air conditioning and dehumidification systems, and pest management services.

- **Ensure FIFO and product rotation.**

Implement the first-in-first-out technique in the feeding materials and final products to reduce expiration losses.

- **Use ERP with integrated inventory software.**

Use an ERP with Internet of Things (IoT)-enabled monitoring, barcodes, RFID, and automation of ordering. Make sure to integrate the software in all departments, including purchasing, manufacturing, and sales.

- **Pilot the improvement process.**

Start with implementing one improvement pilot program and observe its effects on operations, and then expand the successful processes company-wide.

Table 1: Comparison of Values

Parameter	Existing	Proposed
EOQ	292.76	320
Holding Cost	1152864	964,500
Inventory	15538.17 Lakh	8000 Lakh
Inventory to Assets Ratio	0.56	0.29
Finished Goods to Inventory Ratio	0.21	0.41

8. Conclusion

This research shows that efficient inventory management is crucial for organizational efficiency, stability, and profitability. With modern techniques of procurement, forecasting and phase buying, inventory remains optimal by avoiding not only stockouts but also excesses. The existence of excess inventory means that resources are tied up with the risk of increased costs associated with inventory management. On the other hand, with proper inventory management, resources are liberated.

Supplier coordination, together with phase buying, helps organizations have their inventory supplies continuously without keeping large inventory on site. EOQ ordering, stocktaking, FIFO management, and

scientific inventory storage reduce losses through spoilage and theft while enhancing accuracy in accounting. Real-time information about the state of the organization's inventory can be facilitated through inventory management information systems.

The implementation of these strategies would see the firm's inventory/total assets ratio fall within the desired range of 0.15 to 0.30. Ultimately, such a blend of EOQ, ratios, collaboration with suppliers, improved warehousing facilities, and the use of technology is bound to generate cost savings and superior financial and operational performance.

9. References

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