



Returns Management of Maize and Paddy Seeds

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study focuses on examining the returns management processes in the selected seed firm, particularly for maize and paddy seeds in the Telangana districts of Karimnagar and Nizamabad. The research identifies significant challenges in managing seed returns, such as inefficiencies that affect seed quality and availability, as well as the financial costs involved in handling returns. The study underscores the importance of a well-organized returns management system, especially since approximately 15 per cent of seed returns occur every year. Viable seeds are reprocessed and stored for future use, while non-viable seeds are safely disposed of or repurposed for other

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uses. The financial transactions associated with the returns process are carefully managed, ensuring efficient compensation for distribution partners. The findings highlight that an effective returns management process is crucial for preserving seed quality, minimizing waste and improving customer satisfaction. The study concludes with suggestions for refining the returns management process to bolster the sustainability and competitiveness of the selected firm. This manuscript offers valuable insights for researchers, policymakers and industry professionals involved in the agricultural supply chain.

Keywords: Seed returns; supply chain management; returns management; agribusiness industry; inventory management.

1. INTRODUCTION

Agriculture, vital to Indian civilization for millennia, supports 55% of the population and contributed 18.3% to the GDP in 2022 [1] [2]. The seed industry, crucial for agricultural productivity, ranks India as the fifth-largest seed market globally, with the top five companies—Bayer AG, Advanta, Corteva Agriscience, Syngenta and Kaveri Seeds—holding 27.52% market share in 2022 [3] [4]. In 2023, India produced 135.50 million tons of paddy, making it the world's second-largest rice producer, with Telangana contributing 42.37% to the nation's paddy cultivation area [5]. India, a leading rice consumer, also ranks third in global maize production, with 38.08 million Metric Tons in 2023 and Telangana contributing 2.58% to the country's maize cultivation area [6].

The fragmented seed market complicates both inventory and returns management, making it essential to maintain seed quality, ensure timely availability and minimize waste [7-10]. Returns management, especially for maize and paddy seeds, faces challenges such as delays, quality degradation and financial costs, leading to operational inefficiencies, financial losses and dissatisfaction among distribution partners [11-15]. Streamlining the returns process through standardized procedures and better communication can improve seed quality, inventory accuracy and customer satisfaction while reducing costs. This study aims to identify the current returns processes for maize and paddy seed and identify the challenges in returns management and propose practical solutions to enhance the overall inventory management efficiency of the firm [16-18].

2. MATERIALS AND METHODS

The study is conducted in reference to a seed firm located in Hyderabad. The study is conducted in Karimnagar district for paddy and

Nizamabad district for maize in Telangana, selected purposively due to their significance in paddy and maize cultivation. The sample included all available depot manager, dealers and distributors in each district, along with a total of 30 retailers—15 from each district—selected from five mandals per district based on the highest crop production, with three retailers from each mandal. Data was collected through structured questionnaires and interviews, focusing on the process of returns management for seed and money flow, reasons for returns, classification of returned seed, disposal policy of seed and satisfaction level with the returns policy. The data analysis employed descriptive statistics to identify trends and patterns in returns management, financial flows, reasons for returns and stakeholder satisfaction.

3. RESULTS AND DISCUSSION

The results of this study highlight the significance of an efficient returns management process in maintaining inventory efficiency and ensuring customer satisfaction followed by the firm.

Process of Returns management of maize and paddy seeds: The analysis revealed that a well-structured returns management system, consisting of several key stages, plays a crucial role in handling returned seeds effectively. The flow of the returns management process was systematically organized, beginning with return authorization and progressing through return shipment, inspection, classification, processing, inventory updates and communication with distribution partners.

The study found that return authorization was crucial, with most returns due to quality issues, incorrect orders or seasonal demand changes. Authorized seeds were promptly shipped back to depots, where they underwent inspection. Many seeds were restocked after passing

quality checks, some required reworking, and unsellable seeds were disposed of according to policy. Detailed record-keeping and consistent communication ensured accurate inventory updates. This structured returns management approach effectively reduced losses, maintained seed quality and enhanced customer satisfaction, underscoring the importance of an organized system in the firm.

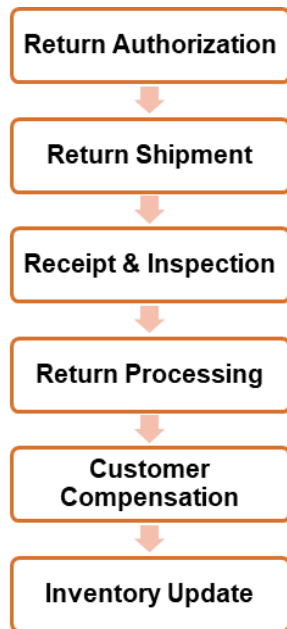


Fig. 1. Process of returns management

Table 1. Reasons for seed returns by distribution partners

S. No	Reasons for seed returns	% of seed returns
1	Overstocking	90 %
2	Packaging problem	4 %
3	Quality issues	1 %
4	Environmental factors	2 %
5	Changing customer preferences	3 %

Based on the data collected from distribution partners—namely distributors, dealers and retailers.

Table 2. Distribution partner’s satisfaction level on returns policy and compensation

S. No	Distribution partners	Highly satisfied	Moderately satisfied	Neutral	Moderately dissatisfied	Highly dissatisfied
1	Distributor	✓				
2	Dealer	✓				
3	Retailer		✓			

This overstocking largely results from inaccurate demand estimation. In other words, when the forecasted demand for seeds is higher than the actual market demand, distributors end up with excess inventory, leading to higher returns. The figure also indicates that other factors contributing to seed returns have a significantly lower impact, accounting for less than 5% of the total returns. This suggests that issues like product quality, transportation delays or customer preferences are relatively minor in comparison to the problem of overstocking. Therefore, improving demand estimation accuracy could substantially reduce the volume of seed returns.

The high satisfaction among distributors and dealers indicates that returns policy and compensation effectively meet their needs, fostering strong partnerships. However, the moderate satisfaction of retailers suggests that while the policy is functional, it may not fully address challenges like limited storage capacity and the risk of holding unsold inventory, highlighted a potential area for improvement to ensure more equitable support across the supply chain.

Returned seeds are classified as either viable or non-viable. Viable seeds, which meet quality standards are reprocessed, repackaged or stored for future use. Non-viable seeds, failing to meet germination or purity standards are disposed of safely through composting, incineration or repurposing for non-agricultural uses like poultry feed, fuel purpose. Seed viability can be compromised by poor storage conditions at distribution partner’s place, mechanical damage and pest attacks, ensuring that only high-quality seeds are distributed while minimizing waste and optimizing resource use.

The distribution partners involves in the process are depot manager, distributor, dealer and retailer and flow of inventory and money is explained in the Fig. 3.

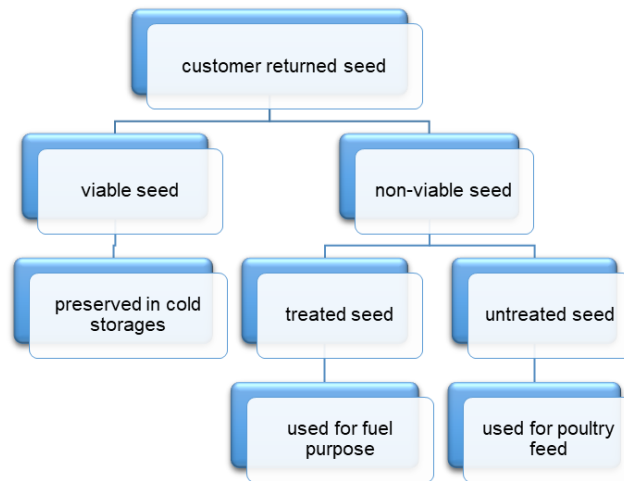


Fig. 2. Return and Disposal Process for Usable and Unusable Seeds

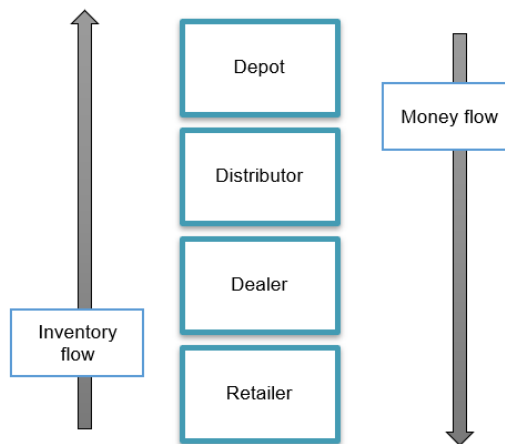


Fig. 3. Flow of Seed Returns and Financial Transactions in the Returns Management Process of Seeds

The seed returns process begins with retailers identifying unsold or defective seed stock and initiating the return by sending the seeds back to the dealer from whom they were purchased. Dealers then receive these seeds, conduct a physical inspection and pass approved returns on to the distributor. After another inspection, the distributor forwards viable seeds to cold storage at the depot. In terms of financial flow, the depot

credits or refunds the distributor for the returned seeds, which can be either adjusted in future transactions or reimbursed directly. Distributors then issue credit notes or refunds to dealers, who in turn compensate retailers in the same way. This structured process ensures efficient management of both inventory and finances, reducing losses and ensuring transparency throughout the returns process.

Return Rate for Maize and paddy seeds:

$$\text{Return Rate} = \frac{\text{No. of units returned}}{\text{No. of units sold}} \times 100$$

S. No	Seeds	No. of units returned	No. of units sold	Return rate
1	Maize	3686.7 tons	19,662.4 tons	18.7 %
2	Paddy	657 tons	4384.8 tons	14.9 %

The return rates of 18.7% for maize seeds and 14.9% for paddy seeds suggest that a notable portion of seeds distributed to dealers, distributors and retailers is being returned to the company, with overstocking being the primary cause. Compared to the issue of overstocking, factors like product quality, packaging problems or customer preferences play a relatively minor role in these returns. The higher return rate for maize seeds indicates that these challenges are more significant in maize seed distribution than in paddy seeds. This discrepancy highlights potential areas for improvement in the inventory management and distribution processes, particularly for maize seeds, to reduce return rates, enhance operational efficiency and boost overall customer satisfaction.

Challenges in returns management: The selected firm faces several key challenges in its returns management process, which affect both operational efficiency and customer satisfaction. One major issue is the potential decline in seed quality over time. While the firm advises returning seeds within three months, it allows returns for up to a year, which can lead to reduced vigor and germination due to prolonged exposure to environmental conditions. Additionally, logistical difficulties arise in managing return shipments, as these require careful handling, clear labeling and specific storage conditions during transit, which can cause delays and increase costs. Customer satisfaction is also at risk, as compensating distribution partners through refunds, replacements or credits is a sensitive process. Any delays or perceived inequities in compensation can damage trust, strain relationships and hinder long-term partnerships. Furthermore, some distribution partners may face financial strain due to capital being tied up in pending refunds, adding another layer of complexity to the returns management process.

Suggestions: To overcome the challenges in the returns management process, several strategies can be employed. First, revising the seed return guidelines by shortening the return period from one year to six months could help minimize the risk of seed quality deterioration. In addition, stricter environmental controls during storage and transportation would further protect seed quality, ensuring that returned seeds remain suitable for reuse or resale. Improving logistics and shipment processes is also key; partnering with specialized logistics providers who have experience in handling

agricultural products can enhance the efficiency of returns. This may involve using advanced packaging and monitoring systems to maintain ideal conditions during transit, thereby reducing the likelihood of damage and ensuring prompt processing of returns. Lastly, enhancing customer communication and support is essential. By improving communication with distribution partners, providing real-time updates on the status of returns and offering proactive solutions in the event of delays or problems, trust can be strengthened, relationships maintained and overall customer satisfaction and loyalty supported.

4. CONCLUSION

The study highlights the need for precise demand forecasting to lower seed returns, which stand at around 15 – 18%. Major challenges include reduced seed quality from prolonged return periods, logistical difficulties and complications in compensating distribution partners. Recommendations include shortening the return window, enhancing storage and transport conditions and improving communication with distribution partners. Implementing these strategies is vital for improving returns management, boosting competitiveness and advancing sustainability in the selected firm.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that they have no known competing financial interests or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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