Inventory Control for Farm Supply Cooperatives

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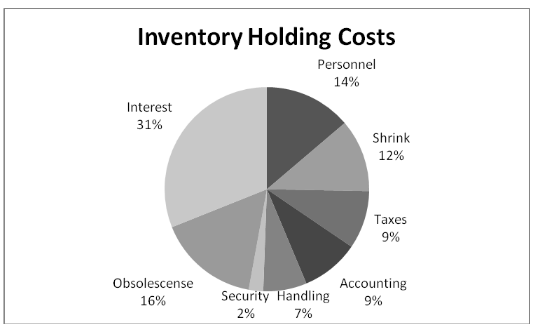
Inventory investment represents over 50% of current assets and 25% of total assets for the typical farm supply cooperative. Many managers fail to appreciate fully the true costs of carrying inventory, which include not only direct costs of storage, insurance and taxes, but also the cost of money tied up in inventory. These cost total 10-30% of the inventory value for the typical farm supply cooperative. Typical contributions to holding costs are illustrated below.



This fine line between keeping too much inventory and not enough is at the heart of inventory management. The goals of inventory management are to:

- Maintain the proper mix of inventory
- Maintain the efficient level of inventory
- Order efficiently
- Track inventory performance and make adjustments

Inventory Management Index
The inventory management index relates the turnover of inventory and the gross margin return it creates.

The inventory management index is calculated as

IMI =Turns x Earns

The rule of thumb is that the IMI for a category or product should equal or exceed 1.0.

The "Turns" term in the equation relates to inventory turnover which is calculated as:

Inventory Turnover =
Costs of Goods Sold/Average Inventory

The typical benchmark for inventory turnover for the entire farm supply department is 7-10 times per year. However inventory turnover varies across product categories. Typical guidelines for turnover are shown below

Category	Acceptable Turnover (times per year)
Petroleum	15-18
Propane	20-40
Oil	6-8
Tires	4-7
Batteries	6-8
Bulk fertilizer	1-3
Feed	12-25

The "earns" part of the IMI equation is the gross margin percentage which is defined as:
Gross margin =

$$\frac{\text{sales price-cost of goods sold}}{\text{Cost of goods sold}}$$

Typical guidelines for gross margins are shown below.

Category	Acceptable Gross Margin
Petroleum	14-18%
Propane	7-12%
Oil	10-20%
Tires	10-20%
Batteries	12-20%
Bulk fertilizer	5-10%
Feed	4-8%

Following these guidelines typically generates a "Turns" x "Earns" index of over 1.0 Some bulk items such as fertilizer can be profitable managed with an IMI lower than 1.0 while some categories with higher labor or obsolescence such as animal health may require an IMI of over 1.0

The IMI value provides an indication as to whether you have the appropriate level of inventory. If the IMI is over 1.0 the inventory investment is paying its way. When the IMI for a category, a product, or the farm supply department as a whole is less than 1.0 inventory levels should be reduced unless margins can be improved.

The Purchasing Plan

The purchasing plan encompasses two critical decisions: when to purchase at item and how much to order. One of the goals of inventory management is to have items in stock at the moment they are needed. The "re-order point" is the inventory level at which the stock should be replenished. The re-order point is generally determined as

Re-order point =

(average daily usage x lead time)
+ safety stock

Where lead time is equal to the time it takes to receive an item after ordering and the safety stock is the amount the manager wants on hand in case actual demand is higher than average or delivery is slower than anticipated. Many managers use a rule of thumb for safety stock such as 50% of the lead time amount.

As an example, consider the re-order point for fence posts when the average usage is 2 bundles per day and the average delivery time is 5 days. In this example the re-order point would be 15 bundles (10 bundles for the lead time usage and a 50% safety stock) and the manager would re-order when the inventory on-hand reached 15 bundles.

The Re-order Quantity

The second component of the purchasing plan is the re-order quantity, which is the amount that is ordered. The optimum order quantity is a balance between ordering costs and holding costs. The more often you order an item in small quantities, the more costly it is in terms time spent purchasing and receiving and freight fees. But if you order an item less frequently in larger quantities the inventory carrying costs escalate.

There are formulas to calculate the optimum order quantity based on the ordering costs and holding costs. Most farm supply managers find these techniques too complex and develop rule of thumb through experience. For most products (bulk petroleum might be an exception) it doesn't make sense to order more frequently than once a week. For almost all items it doesn't make sense to have more than a 90 day supply on hand.

Between these two endpoints (ordering a 7 day supply and a 90 day supply) the minimum amount required for favorable freight or delivery charges should be considered. A good rule of thumb is to order the smallest amount that will result in favorable freight charges but never order so little that you will have to order in less than a week or so much that you will have a 2-3 month supply. These guideline can then be tweaked with information from the IMI equation. For example, if the item has a profit margin of 15% you need 7.1 turns a year to reach an IM I of 1.0 which implies ordering and keeping less than a 2 month supply.

A-B-C Analysis

Selective inventory control, also called ABC analysis provides a mechanism for identifying items that will have a significant impact on inventory costs. The system recognizes the fact that a small portion of inventory accounts for a high portion of turnover and revenue.

The most common version of the ABC system classifies high turnover items such as dog food, salt or feed in the "A" category. These items typically represent less than 15% of your total inventory but more than 80% of your retail farm supply sales. The purchasing plan should always keep these items in stock during season.

The B category would include items with lower sales and turnover such as oil filters or lick tubs. These items may represent 65% of your inventory but only 5-10% of sales. These items should be monitored closely and the tradeoffs between carrying costs and the shortages can be weighed.

Items in the "C" category have low turnover and low importance. This may include seasonal or specialty items or items that the purchasing manager (or perhaps the previous manager) erroneous thought would perform in the A or B categories. Strategies such as consignment sales or requiring a customer to purchase a full case of special order products can reduce this category. Some "C" items should simply be eliminated.

Managing Seasonal Items

Another 80-20 rule is that seasonal items make up less than 20% of inventory but create 80% of the headaches. The first step in managing seasonal inventories is identifying the seasonal items. Sales from previous seasons should be examined. If 80% of the sales occurred in a 6 month period of time the item should be handled as seasonal inventory.

Demand for seasonal items should be based on monthly usage in previous years. The purchasing manager should develop a stocking plan for seasonal inventory. The plan should reflect the lead time is needed to build seasonal stock, when seasonal inventories should peak, and the re-stocking cutoff date. A key to managing seasonal items is realizing that it is acceptable, and usually desirable to run out of these items prior to the end of the season.

Shrinkage

Inventory shrinkage is the difference between the amounts that were purchased and available for sale and the amount actually sold or still held in inventory. The average shrinkage for the U.S. retail industry is around 1.5% of sales. Shrinkage increases the effective cost of goods sold and reduces the gross profit margin.

Caused of shrinkage include damage, broken packaging, obsolescence, theft, and paper work or computer entry errors. In the case of bulk products shrinkage also results from inaccurate measurement, moisture loss, and handling loss. Feed and fertilizer stored in three sided warehouses can also experience shrinkage from wind loss and from rain and snow entering the storage.

In the case of retail products shrinkage can be reduced by rotating stock, dating products and eliminating slow moving or obsolete inventory. Customer and employee theft can be addressed through a portfolio of strategies including security, monitoring, code of ethics policies, whistle blowing mechanisms and more frequent physical counts.

Good warehouse management can help reduce shrinkage in bulk commodities. This includes maintaining good warehouse condition including pest control and sanitation. Broken bags should be repaired or re-bagged immediately as research shows that warehouse personnel are less careful in a warehouse with one or more broken bags. Lift truck training can reduce product loss and also enhance safety.

Controlling Inventory

Most farm supply cooperatives maintain perpetual inventories using point of sales (POS) systems. These systems have facilitated more accurate and timely information on inventory levels and turnover. The most common problems with the POS system relate to employee error in recording purchases, coding sales and accounting for inter-company transfer between branches.

In addition to providing continuous information on inventory levels, POS systems provide the mechanism to monitor IMI ratios at the category and product level. Information on turnover and profit by item can be used to adjust purchase decisions or pricing points. POS systems can also provide information on seasonal sales trends.

Auditing procedures require physical inventories prior to the annual audit. More frequent periodic physical inventory checks can provide a more accurate indication of year to date cost of goods sold and margin. Physical inventory checks also serve as a deterrent to employee theft. Two common procedures for periodic inventories are visual inventory control and ticker control.

As the name implies, visual control involves the manager or other assigned individual to examining the inventory visually to determine if additional inventory is required. This simple method can be a good check and balance with the continuous inventory level indicated by the POS system.

Ticker control involves the manager or staff physically counting a small portion of the inventory each day so that each segment of the inventory is counted every so many days on a regular basis. In a warehouse, a grid system can be used with some section of the warehouse inventoried every day or every week.

After these physical counts, the inventory values in the accounting records can be reconciled to reflect the actual physical count. This more generates a more accurate estimate of cost of goods sold and year-to-date profits.

Dealing with Dead Inventory
At times, inventory items or sub-categories, stop moving and become dead inventory. For these items the IMI guideline are meaningless. The amount paid for the item is a sunk cost and is also not important. The best strategy is to liquidate the dead inventory and reinvest the proceeds in inventory that will turn at adequate margins.

Consider an example of an item purchased for $300 but is clearly not moving. One alternative would be to wait two years to sell the item for the desired $500 sales price. If inventory carrying costs, which include interest, insurance, labor, utilities, are 30% which is typical for hardware items, the profit is $200 less $180 carrying costs ($90/year) for a total of $20.

Alternatively, assume the item could be sold immediately for $250 and the proceeds invested in inventory that turns over 5 times a year at a 20% margin. The profit in two years would be a $50 loss on the dead item + $50 margin for each time the new item turned over (10 times) less the carrying cost of $75/year. The total profit would be $150. Taking a $50 loss netted $130 more over the two year period.

OSU Research on Farm Supply Inventory Management
Research conducted by Oklahoma State University examined the inventory management practices of a local farm supply cooperative. The case study cooperative had acceptable inventory performance at the department level. The goal of the research was to examine purchasing decisions, inventory turnover and profit at the category and item level. The research examined $35M of farm supply sales representing 300,000 transactions, 5,000 items and 30 branches over a 24 month period.

The results indicated that IMI performance varied substantially across categories. Petroleum, fertilizer, feed and crop protectants categories had the highest performance while animal health, seed and hardware were the lowest performing. The more important result was the variation in performance within the categories. In all of the categories the IMI performance could be improved above industry averages by eliminating 5% or less of the total items.

The research also examined the purchasing strategies. Overall, the actual purchasing strategies (re-order points and re-order amounts) closely corresponded to the optimal least cost strategies. The cooperative purchased slightly too frequently and held slightly too high inventory levels. However, the potential benefits from improved purchasing were not as great as those of eliminating non-performing items.

Summary
Inventory is a necessary but costly aspect of a farm supply operation. The goal of inventory management is to ensure that inventory items are generating sufficient margins to justify the carrying costs. The IMI provides a measure of inventory management. Tools for improving MI include the purchasing plan, selective inventory management, shrinkage control and periodic physical inventories.