



# Getting Started in Ag: Hay and Forage Production and Storage Methods

## AN INTRODUCTION TO HAY AND FORAGE PRODUCTION

Successful hay production involves a variety of complex steps and factors. Weather-related elements such as drying time, humidity and rainfall play a key role in hay production. Hay must also be cut and windrowed in a timely manner.

Numerous methods are available to make a bale of hay; managers must evaluate the best option for their situation. For example, a producer selling hay to small-scale horse owners will most likely to use a different method than a cow-calf producer whose primary goal is winter feed.

If you are new or just starting out in production agriculture, considering various hay-making technologies may seem a bit overwhelming. It is important to find the system that best suits your production goals and maximizes the quality and quantity of hay produced.

## PROTECT YOUR HAY AND FORAGE INVESTMENT

Prices for most types of hay are at or near record levels. From a profitability standpoint, it is essential to cut the amount of waste and loss associated with storage and feeding. Production losses in hay can occur in a number of ways, but are generally related to moisture. Hay that isn't baled in a timely matter degrades in quality (appearance and nutritive value). Bales that aren't picked up in a timely manner will degrade, as will those that are not stored properly.

As quality declines, the price received will most likely drop; hay tonnage will also decline over time due to spoilage and waste. Over time these losses can add up.

Consider this example: A grower produces 500 tons of alfalfa hay each year, at an average value of \$200/ton (\$100,000 total value). Now suppose that the operation

lacks adequate storage facilities. Due to quality loss in storage, the grower could lose an average 10 percent of that value—resulting in a \$10,000 annual loss.

## PRODUCTION METHODS

There are three main packaging systems for baled hay: small-square bales, round bales and large square bales. Other forage storage methods include loose hay, where hay is not baled but piled in a loose stack, and making silage.

**Small square bales** are easily handled by one person, are often geared toward small-scale producers and buyers, and require less expensive equipment and horsepower to produce. The main disadvantages of small squares is that they are sensitive to weather and require timely retrieval and stacking. They also require some type of protection from the elements if stored for longer time periods.

**Large square bales** are usually 8 feet long and either 3 x 3 feet, 3 x 4 feet or 4 x 4 feet in dimension. They range in size from 650 to 2,000 pounds and are often preferred by larger scale producers due to the speed of baling and ease of handling and transport using large equipment.

Like small squares, these bales are not very weather resistant and require timely stacking and storage. The equipment required to bale them is also costly.

**Round bales** range from 4 feet to almost 6 feet in diameter and are inherently more weather resistant due to their shape, especially if baled using net wrap. They are the most common bale type in the U.S. However, as with square bales, the larger the bale, the bigger and more expensive the equipment required to bale and handle them.



Swather cuts hay for drying prior to baling. Photo by James Sedman.

**Silage** is the process of either chopping forage with a forage harvester and packing it in a silo or pile to seal in the moisture or baling and then wrapping with plastic to seal it; the feed then ferments and transforms into a wet, highly digestible feed. Silage requires specialized equipment both to produce and deliver the resulting feedstuff. However, it can be a very



Forage harvester cutting corn for silage. Photo by James Sedman.

economical production method under the right circumstances.

## STORAGE SYSTEMS

**Covering** involves using large tarps or covers to keep precipitation and sun off the bales. This is most commonly used for square bales but can be used for round bales as well. The main advantages are the cost relative to other capital-intensive methods (like permanent structures) and how quickly tarps can be installed and secured. Care should be taken to ensure a dry surface for the stack, as well as making sure the top of the stack will shed water.

**Permanent structures**, such as hay sheds or awnings, are more expensive options to protect hay. The more valuable the hay being stored, the more economic such structures become. Although these

constructions are often the most expensive storage option, they can also provide the best protection.

**Wrapping** systems have gained in popularity around the country in recent years. Originally, wrapping was used in the southern U.S. and other places where substantial rainfall is a problem. There are two types of wrapping systems: wrapping a single bale or wrapping an entire stack.

Single-bale wrapping systems are most commonly used on round bales where, after a bale is ejected from the baler, it is picked up by a wrapping machine that wraps the hay in a white plastic film, similar to plastic food wrap. The bales are then picked up with specialized handlers, either stack wagons or loader heads, that do not puncture the plastic.

In areas where structures like hay sheds are not an option, a whole-stack wrapping system may be used. Similar to a grain bagger, the system involves setting bales into a wrapper in a stack as it moves along, creating an airtight and weatherproof covering. Popular in Europe, these systems are gaining acceptance in the U.S. to keep hay dry and weatherproof. Similar systems are also available for storing chopped feed to make silage.



Round bales wrapped for storage. Photo by James Sedman.

The main downside of any type of wrapping system is the quantity of plastic waste that must be either recycled or disposed of. The cost of the specialized handling equipment is another barrier to adoption.

**Drying systems** utilize an emerging technology that allows hay to be baled at a higher moisture content, possibly even in adverse weather conditions. These specialized machines are like a high-temperature oven with fans designed for hay bales, most often used with large square bales. While not a storage option per se, hay baled using drying systems can be stored and shipped at optimum moisture and quality levels. These systems are designed to bring hay to optimum moisture levels for transport or export, usually in containers.

## FOR MORE INFORMATION

Visit [farmanswers.org](http://farmanswers.org) for more information on topics related to hay production and storage. Visit [RightRisk.org](http://RightRisk.org) for risk management resources, including RightRisk Analytics, designed to help hay producers manage risk in their operation.



Large square bales in stack. Photo by James Sedman.

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## RIGHTRISK ANALYTICS BUDGETING TOOLS

The RightRisk Analytics toolbox offers several tools covering budgeting, forage leasing, machinery costs, financial statements, record keeping and whole farm budgeting.

To view or download the toolbox, visit [RightRisk.org](http://RightRisk.org) and select the Resources tab.