

# Strategic Forage Storage Planning

By Joe Lawrence and Ron Kuck



The dairy and livestock industries have seen continued advances in options available to improve forage management, from crop species and variety selection, to harvest management, to recognizing the class of animals on the farm that will most benefit from different forage types and qualities.

A shift away from upright silos over the last several decades has largely been driven by the need to store increased quantities of feed and to increase the speed of filling and feeding out. The tradeoff in this is storage systems that provide more efficiency and flexibility present additional challenges to preserve the forage, particularly with horizontal silos (bunks and drive-over piles). As a result, a number of resources developed focus on how to minimize storage losses. These efforts include strategies to improve packing density, use of inoculants and preservatives, options to cover, and strategies to minimize exposure to oxygen at feed out. All of these remain critical and should continue to be a high priority for every farm. However, as producers look to get the most out of recent and forthcoming advances to forage management, an area that warrants more discussion is how to store these feeds in a way that optimizes feeding programs.

The ability to develop and maintain the number of storage options necessary to adequately separate forages is a challenge, particularly for farms experiencing change. This challenge is intensified by the fact that it is also an area of the farm where implementing such changes can be very difficult. Regardless of forage storage structures used by a farm, all available options require a sizable footprint, are often capital intensive, and are fairly

rigid in location and capacity. These commonalities often challenge a farm's ability to adapt their storage options to match the advances made in forage production and feeding programs.

Fortunately, the wide-ranging approaches to operating a farm has fostered the development of many different options for forage storage. While there are inherent characteristics of certain storage systems that make sense for certain farms, the ability to consider all of the options can help overcome some of the limitations associated with each system. Regardless of farm size and management, a mix-and-match approach warrants consideration and no farm should rule out any storage options.

In developing or updating a storage plan, a number of considerations and ways to attack the planning process depend on current status. The various attributes of commonly available storage options are known by most, but a review of the main points will assist in thinking about how each option may have a place on your farm (Table 1).

## TYPES AND QUANTITY OF FEED REQUIRED FOR EACH ANIMAL CLASS

Work with your farm's nutrition team to develop a list of forages most desirable for each group of animals and the quantities needed. Not every animal benefits from the high quality desired for lactating cows, and when these forages can be targeted to the correct group (dry cows or young stock) their value to the farm is enhanced.

In doing this, keep in mind the need to balance what crops will work best for the animals with your land base

and management system. Frequently debated examples include the use of highly digestible crops, such as BMR corn and low-lignin alfalfas. Other important options include the use of grasses (alone or with alfalfa), double-cropping with winter grains for forage, and summer annuals.

Is this crop a good fit on my soils?

How many tons of this will I need, keeping in mind shrink and carryover needs?

Do I have enough acres to support these needs and at what cost?

The ability of the harvest team to execute the plan needed to harvest at the proper quality is also important. This question will mean different things to different farms but will include labor availability, equipment, timing with other farm activities (i.e., first cutting or manure hauling) and length of time needed to harvest. Similar to the mix-and-match approach to storage structures, utilizing custom services does not have to be an all-or-nothing strategy. The access to custom harvesting and equipment rentals can facilitate this approach while minimizing capital investments. Targeted use of custom service providers for certain tasks or times of the year can effectively reduce the effect of bottlenecks and achieve desired forage qualities.

## MAPPING OUT STORAGE OPTIONS AND NEEDS

A useful exercise for all farms is to evaluate current storage options and strategize what modifications or additions

*Continued on back*

## Strategic Forage Storage Planning, cont'd from front

could enhance their storage system. While this exercise is often prompted by the need for additional space, modifications to better meet current needs can pay large dividends.

When considering modifications or additions, look at the feed system in the context of the whole farm layout and potential future growth to avoid investments that will be in the way down the road. Considerations for feed preservation, accessibility and environmental stewardship are also important.

Is the current use of each structure the best use?

How can I adapt what I have to better suit my needs?

Are current structures leading to unacceptable losses?

If so, can these losses be minimized by changes in management or are they inherent to the structure?

Does the current setup and placement of different forages lead to certain feeds being inaccessible when access is needed?

Are additional options needed? What type would work best in the short and long term?

Each farm faces unique challenges and opportunities related to forage storage. No matter what your farm's feed situation is, all can benefit from re-evaluating and setting a course for improvements. Use a team of key on-farm personnel and advisors to critically assess the strengths and weaknesses of the current storage system. An improved forage and feed center will

**TABLE 1**  
Storage Opportunities and Challenges

| Structure  | Opportunities   | Challenges   |
|--|---|--|
| <b>Upright Silos</b><br>It is not common to see new upright silos built given their capital cost and inflexibility once built, but they do offer some benefits to store certain feeds in a small footprint.  | <ul style="list-style-type: none"> <li>• Small footprint</li> <li>• Ease of maintaining feed quality in storage</li> <li>• Repurpose existing facilities for classes of animal or feeds needed in smaller quantities</li> </ul>   | <ul style="list-style-type: none"> <li>• Cost per unit of storage</li> <li>• Inflexibility once built</li> <li>• Stuck feeding whatever is in that layer of silo</li> </ul>  |
| <b>Wrapped Bales (Baleage)</b><br>Large silage bales are viable as a primary storage option to certain farms. They can also be used as a strategic supplemental storage option for other farms, but this application has some limitations.   | <ul style="list-style-type: none"> <li>• Flexibility at feed out</li> <li>• Can be moved to and from remote locations</li> <li>• Ease of maintaining feed quality in storage</li> <li>• Less capital cost</li> </ul>  | <ul style="list-style-type: none"> <li>• Wildlife damage</li> <li>• Feed variability from bale to bale</li> <li>• Requires specific equipment that is only applicable to certain forages</li> </ul>  |
| <b>Silo Bags</b><br>Often pigeonholed to certain size farms or as temporary options for farms in transition, silo bags can be used on their own as a complement to another system present. This is a tremendous opportunity for strategic forage management successfully used by farms with 40 to over 4,000 cows. | <ul style="list-style-type: none"> <li>• Flexibility in segregating different quality forages at harvest</li> <li>• Flexibility at feed out</li> <li>• Ease of maintaining feed quality in storage</li> <li>• Expandability</li> <li>• Less capital cost</li> </ul>   | <ul style="list-style-type: none"> <li>• Footprint</li> <li>• Best used with a good base under bags</li> <li>• Annual cost</li> <li>• Wildlife damage</li> <li>• Small face leads to variability in forage at feed out</li> <li>• Matching filling equipment to bagger options for larger acreage</li> </ul> |
| <b>Bunk Silos</b><br>These can and have been adapted to a number of farm sizes and scenarios. They require a great deal of management and farms often feel forced to make them work amidst other changes on the farm.  | <ul style="list-style-type: none"> <li>• Cost efficiency per unit of forage</li> <li>• Potential for segregation of different quality forages at harvest</li> <li>• Potential for flexibility at feedout</li> <li>• Uniformity of feed nutrient profile at feedout when forage is layered horizontally during filling and fed out vertically</li> </ul>     | <ul style="list-style-type: none"> <li>• Capital cost</li> <li>• Ability to adapt once built</li> <li>• Maintaining feed quality in storage</li> <li>• Ability to access target feeds at certain times of the year</li> </ul>  |
| <b>Drive-over Piles</b><br>These can and have been adapted to a number of farm sizes and scenarios. Require the highest level of management but can provide benefits in flexibility.   | <ul style="list-style-type: none"> <li>• Cost efficiency per unit of forage</li> <li>• Expandability</li> <li>• Ability to segregate different quality forages at harvest</li> <li>• Flexibility at feed out</li> <li>• Uniformity of feed nutrient profile at feedout when forage is layered horizontally during filling and fed out vertically</li> </ul> | <ul style="list-style-type: none"> <li>• Require a good base</li> <li>• Footprint</li> <li>• Maintaining feed quality in storage</li> <li>• Controlling face size at feedout</li> </ul>  |

prove productive and will capitalize on other forage management advances, from improved varieties to precision equipment, implemented in the coming years. ■

**Joe Lawrence** (jrl65@cornell.edu) is a Dairy Forage Systems Specialist with Cornell CALS PRO-DAIRY. **Ron Kuck** (rak76@cornell.edu) is a Dairy Educator for Cornell Cooperative Extension of Jefferson County.