The focus on soil health has tremendously increased within the past few years, and cover crops have played a larger role in those discussions. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) defines cover crops as grasses, legumes and other forbs that are planted to control erosion, maintain or increase soil health and organic matter content, reduce water quality degradation by utilizing excessive soil nutrients, suppress excessive weed pressure and break pest cycles, improve soil moisture use efficiency, and minimize soil compaction. That is a long-winded definition, and nowhere does it mention forage for grazing purposes. However, many producers are interested in cover crops for multispecies grazing. So for the purposes of this article, we will think of cover crops as a multispecies grazing crop.

From research, we have learned that cover crops can help increase water retention and soil organic matter, regulate soil temperature, reduce erosion, and provide nutrients back to the soil. Some of these impacts are slow to realize and may take many years to see. Part of a cover crop’s beauty is that it is individualized, tailored to each piece of land. However, that also means the devil is in the details as we try to determine the economic value of cover crops. This is probably why there has been little written on the topic. It is difficult to generalize how cover crops will perform from location to location and what the cost and revenue figures might look like, especially when used as a multispecies grazing crop. Further, it becomes much more difficult to estimate the value of soil health benefits, such as increased water retention. To top it off, cover crops can be planted and used in a variety of settings. However, we will try to cut through all of this complicated mess and make the rubber meet the road on a couple of examples. At the Noble Research Institute, we see cover crops filling two predominant forage production gaps here in the Southern Great Plains. The first is for a summer cover crop to be used for grazing in conjunction with wheat between harvesting and planting. The second is for a cool-season cover crop to be interseeded into a warm-season pasture, providing early spring season forage for cattle.

**ECONOMICS**

The cover crop was seeded following wheat harvest, then 500-pound stocker calves were placed on the cover crop to graze for 70 days. The animals gained 2 pounds per head per day, totaling 140 pounds of gain per head. The cover crop cost approximately $50 per acre ($20 for seed, $15 for crop burn down, all per acre) and supported 3.6 head per acre. Putting 3.6 head per acre and 140 pounds per head together, we estimate 504 pounds per acre were gained. Then, dividing the $50 per acre cover crop cost by the 504 pounds per acre gained, we estimate the cost of gain to be 10 cents per pound. Pretty reasonable!

**Scenario 1**

**Summer Cover Crop for Wheat**

The following example is of a warm-season cover crop planted between wheat harvesting and planting. Let us caution that this example is what we think might be the best-case scenario.

The cover crop was seeded following wheat harvest, then 500-pound stocker calves were placed on the cover crop to graze for 70 days. The animals gained 2 pounds per head per day, totaling 140 pounds of gain per head. The cover crop cost approximately $50 per acre ($20 for seed, $15 for crop burn down, all per acre) and supported 3.6 head per acre. Putting 3.6 head per acre and 140 pounds per head together, we estimate 504 pounds per acre were gained. Then, dividing the $50 per acre cover crop cost by the 504 pounds per acre gained, we estimate the cost of gain to be 10 cents per pound. Pretty reasonable!
To make this scenario pay off, the value of gain would need to be greater than the cost of gain (10 cents per pound). Again, using our 140 pounds per head gained and 10 cents per pound (140 pounds × 10 cents), we see that if we can advance the animal by $13.89 per head, this cover crop investment will have paid for itself. (Note: This cost of gain figure does not include animal health costs, labor, interest, etc.)

Hopefully, a stocker animal would increase its value by more than $13.89 per head. However, we do not know what the effects were on the subsequent wheat crop or how this example would change with varying amounts of rainfall. Further, this is not a replicated study, and we do not know if these types of results can be repeated. It will take more research to understand this.

Currently, research is being done at the Noble Research Institute on cover crop systems in till and no-till settings, followed by winter wheat grazing with stockers to help answer these types of questions. This study, led by James Rogers, Ph.D., found decreased wheat forage production and weight gains in stocker calves on the wheat pasture during the first year. Again, we will better understand this as the study moves forward over the next few years.

Even if we do make a profit, we will also have gained in other soil health areas. If we just breakeven or the cattle don't gain, we haven't had a total loss. Typically, there may be a summer weed control pass on fallow wheat ground that we have avoided while also building soil health. Other advantages may be changing the timeframe in which you market your cattle. Cows might also be grazed on cover crops with their calves. Some anecdotal evidence points toward calves gaining around 3 pounds per head per day on their mother's side while on summer cover crops, as well as easier weaning by just pulling the cows. Again, we caution that the examples we provide are merely that – examples. However, they do show some of the results that could be observed.

### Scenario 2

**Cool-Season Cover Crop Interseeded Into Bermudagrass**

The second example is to interseed a cool-season mixed cover crop into bermudagrass in the fall at a rate of 50 pounds per acre with 30 pounds of in-row phosphorus at planting. Costs are $35 per acre for seed, $15 per acre for bermudagrass burndown, $15 per acre for fertilization and $15 per acre for planting, totaling $80 per acre.

This cool-season cover crop mix would provide forage at a time when hay is usually provided for cows. To compare the two, we assume one hay bale per head per month for two months and 1 acre of cover crop per head for two months. Good quality bermudagrass hay bales cost about $45 per bale. So, we would take the bale cost times the amount consumed per cow in those two months ($45 per bale × 2 months × 1 hay bale per head per month). This gives us a cost of $90 per cow. Taking a look at the cover crop option, we can calculate the cost per head is $80 ($80 per acre × 1 acre per head). Using a cool-season cover crop allows us to save $10 per cow and fill that early season spring forage gap.

Some producers may choose to top-dress fertilizer on the cover crop in the spring, which would increase the cover crop cost to more than feeding hay. Yet, we haven't taken into account the reduction in the time spent hauling hay, storage costs, or the reduction in wear and tear on equipment. Yes, there is time and equipment use put into the cover crop, but it is most likely a wash.

For a reduced cost, or even near same cost if you top-dress fertilizer, our pick would be for the cover crop for many of the reasons we have already mentioned: increased water retention, increased nutrient cycling, increased soil organic matter, better ground temperature regulation and reduced erosion. You must still be sharp with your own pencil to know if these examples and numbers fit you and your operation.

Today, we do not have a dollar value to assign to benefits such as increased water retention or better regulated ground temperature. We do know that increased water retention can increase soil moisture and will better help plants weather the summer heat. This will further allow more forage to be grown and stocking rates to be increased; that has a monetary benefit. Over the next few years, we will work on filling these gaps and help you further discern the true economic impacts of using cover crops.