GRAZING

Increasing Forage & Pasture Production for Changing Climates

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It is no news that climate is changing. Midwestern winters have become warmer, snow cover is less reliable, and frost-free periods are longer. Rainfall patterns have become less predictable, while heavy storms and freezing rain are more frequent. These are not model predictions, but actual trends recorded over the last 50 years. In central Wisconsin, annual temperature has increased 3°F, and average winter temperatures increased 5°F from 1950 to 2006, according to a report by the Wisconsin Initiative on Climate Change Impacts. Annual rainfall has increased 7″ in southern and western Wisconsin. Predictions for future trends consistently indicate that climate will get warmer and wetter in this part of the world.



Crop scientists agree corn and soybean yields have been negatively impacted by these trends. Although more water and higher temperature can be good for crops, they also increase weed, insect, and disease pressure, resulting in a negative net effect. Furthermore, more rain and storms have increased soil erosion risk and nutrient leaching from agriculture fields, with a subsequent decline in water quality. Projections are that erosion rates could double by 2050 from 1990 rates if no adaptation measures are taken.

New opportunities and challenges are facing forage and pasture farmers. Warmer weather means extended growing and grazing seasons, increasing potential yield. Grazing can start earlier in the spring, while the last harvest can be later, decreasing the need for winter forage storage. However, tolerance to extreme temperatures becomes more of a need when choosing varieties to realize higher yields. With less consistent snow cover, and more freeze-thaw periods, greater winter-hardiness becomes necessary. Greater heat tolerance is needed with warmer summers. Insect and disease pressure has increased, so resistance to biotic stresses is a priority. Forage breeding plays a key role – more research is needed to identify species and cultivars with these improved traits.

Increased spring rainfall causes soil waterlogging and lowers chances of planting corn for grain or silage. Minimizing the farm area to prepare and plant each year becomes a higher priority, so longer forage rotations may be preferred. If optimal planting dates cannot be met for corn, summer alfalfa planting may be a good option. Whether by choice or necessity, it is likely perennial forage production will expand.

For the same reasons, grazing is likely to increase. Forage harvest under wet spring conditions is challenging and grazing provides more opportunities for forage utilization. In grazing systems, management of grazing intensity is key to improving pasture productivity, and also improving resilience to summer drought.

Increased summer heat stress calls for more soil water storage. Perennial forages and pastures increase soil organic matter and structure, increasing water infiltration, and improving the ability to withstand droughts. So with increasing climate variability, perennial forages and pastures provide a more reliable feed source.

Forage mixtures like alfalfa-grass can be as productive as a pure stand of alfalfa in good weather conditions, and are more stable over the years, because of complementarity between different species (Picasso et al, 2011). Alfalfa-grass mixtures have shown lower heaving than pure stands in some soils. In increasing variable climate, persistence and stability of production are more relevant goals, and mixtures provide insurance if any single specie fails.

Finally, perennial forages and pastures are a long-term soil erosion and nutrient leaching solution since they provide continuous cover, and their roots absorb nitrogen and phosphorous as long as there is water in the soil. Strategically placing perennial forages and pastures in runoff areas has a great impact on improving water quality. With increasing intensity of rains and storms, expanding the area in pastures and perennial forages is a much greater need, and is increasingly required by conservation and regulatory agencies.

In summary, present climate variability and future climate trends provide significant opportunities to increase perennial forages and pasture area and production. Higher forage production would be realized if both researchers and farmers focus on increasing cold, heat, and disease stress tolerances. More farm area in perennial forages and pasture can enhance production, reliability, and stability, as well as reduce the environmental impacts of extreme climatic events.

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