New FarmLab Project to Inform Policy & Farming Practices

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What is farm sustainability? While the answer varies depending on whom you ask, most farmers understand sustainability requires a farming system that balances productivity and economic viability with environmental health and quality of life. Recognizing that balance, and putting it into practice, are two different things. For example, with the exception of incentive payments, ag policy and markets rarely reward farmers for implementation of conservation practices. Conservation and ag production are often perceived to be at odds, with annual yields as the primary benchmark for assessing farm performance.

How might we broaden our assessment of farm performance to include measures of economic, environmental, and social outcomes? Can we diversify ag operations to include commodity production and ecosystem services (i.e., water purification, pollination, nutrient cycling, soil building) on which human society depends? These questions have inspired the development of the new FarmLab program at the U.S. Dairy Forage Research Center (USDFRC). FarmLab's mission is to develop an integrated, whole-farm management and research program investigating the long-term, quantitative ag production and ecosystem services outcomes under various land uses and land management practices. The FarmLab project will provide farmers and land managers with evidence and support in evaluating short- and long-term performance of agronomic and conservation practices. It is based at USDFRC's Prairie du Sac, WI, farm. With USDFRC's history and surrounding partners, FarmLab is uniquely positioned to provide a forum for investigating sustainability in working landscapes. With an interdisciplinary team of world-class scientists, the USDFRC has 35+ years of research and outreach expertise that has advanced the sustainability of the dairy industry. We are building on this foundation by realizing the potential of the 2,200 acre land base at Prairie du Sac as a farm-scale laboratory studying the various trade-offs associated with land use and farming practices.

Specific to the forage industry, integration of perennials within the cropping system remains an important practice for improving environmental outcomes and maintaining soil health. Like many Wisconsin dairy farms, the Prairie du Sac farm includes both cropland (1,300 ac) and non-cropland (900 ac). The latter includes degraded pasture, unmanaged shrub land, and forestry tracts. Cropland land use is shaped by the dietary requirements of the research herd (390 cows and ≤400 youngstock). While research applied to cropland acres is a priority, non-cropland acres are typically undervalued. So, in addition to the farmed acreage research, FarmLab will investigate practices and ecosystem services associated with pasture management and restoration of grassland, savanna, and forestry acres. Non-cropland acres will also be evaluated for their potential to generate income (under current and potential market contexts), or products that can be used in an integrated dairy system.

The whole-farm, agro-ecosystem management approach envisioned for FarmLab allows for greater study of the interactions across cropland and non-cropland acres. Environmental and agronomic value of diversity in cropping systems and across farming landscapes are well established. Less attention has been directed toward understanding where and how complex, diverse plant communities can improve soil health and farm resilience to changing conditions. Pre-European settlement landscape of the area included tallgrass prairie, oak savanna, wetlands, and oak woodland. While remnants of these communities exist, the farm currently has few such examples today. Benefits of integrating diverse native prairie vegetation within Midwest farming systems is gaining attention, and we are particularly interested in relationships among diverse land cover and soil fertility, water infiltration, water quality, and insect pest predation. Exploration of new and expanded cropping rotations, to include more perennials and warm-season annuals, is also of interest.

FarmLab was launched in early 2017, and our first research field season is nearly complete. We started by collecting comprehensive farm baseline data allowing us to track changes in soil health, develop a farm carbon budget, monitor biological diversity, and quantify nutrient cycling of the farm landscape over time. This research will inform the development of sustainability metrics, or decision-making tools farmers may use to assess relative value of practices applied to their operations.

FarmLab's long-term success depends on research and outreach collaborations with academic, industry, and government partners, and farmer participation as we develop research questions and assess practices in the context of a working dairy farm. Planning for FarmLab demonstration sites, field days, and events is underway, and we welcome questions and suggestions as the project moves forward.