

Regenerative Agriculture in Action: Dan and Tami Sanders' Journey on the Yellowstone

Nestled at the foot of the Crazy Mountains in Big Timber, Montana, Dan and Tami Sanders have embarked on a mission to transform their leased 500-acre ranch into their own unique model of regenerative agriculture. Guided by the wisdom of established area ranchers and fortified with modern regenerative practices, the couple endeavors to balance traditional knowledge and innovation to address contemporary agricultural challenges.

A Unique Partnership

Dan, a veteran Air Force pilot with an engineering degree, and Tami, a microbiologist and certified Soil Food Web Consultant, bring a powerful combination of skills to their operation. Both are honing their approach through Holistic Management International courses, learning to balance ecological health with economic sustainability. Their dedication to their craft stems from a shared commitment to local food systems and a strong connection to their community.

The Challenge: Too Much Water and Heavy Clay Soils

The Sanders' ranch benefits from operating in the Yellowstone valley; working on irrigated acres and receiving most of their water from a canal system fed by a tributary to the river. Yet, this proximity and low-lying ground also presents a significant challenge: too much water and too much clay. High water tables and aging, leaky irrigation ditches have caused persistent saturation in parts of their fields, impacting soil health and crop productivity.

“Water is both a blessing and a challenge,” Dan notes. Managing areas that drain poorly and collect water has been an ongoing struggle.”

A Helping Hand: Yellowstone River Conservation District Council and NRCS

Recognizing the complexity of their water management issues, the Sanders turned to the Yellowstone River Conservation District Council (YRCDC) and the Natural Resources Conservation Service (NRCS) for support. Through a partnership with NRCS, the YRCDC provided technical assistance in Irrigation Water Management (IWM), a critical tool for optimizing water use and minimizing its adverse effects and the Boulder River Watershed Association helped with funding and support for irrigation infrastructure, enabling this essential work.

With Cameron Skinner, YRCDC's technical specialist specializing in Irrigation Water Management, and Cooper Shicke, a Soil Conservationist from the USDA's NRCS, the Sanders met under their 134-acre pivot to discuss problems and explore potential solutions.

IWM involves a suite of practices designed to improve the efficiency of irrigation systems while reducing runoff and waterlogging. For the Sanders, this included a comprehensive assessment of their irrigation infrastructure and the development of tailored solutions to address their water challenges.

At the Sanders Ranch, part of the IWM involved 3 moisture sensor sites, all in distinct soil types, under their 134-acre pivot. With help from NRCS and YRCDC, who assisted in installing the sensors and interpreting the data, the Sanders are better able to see how their heavy clay soils behave, water infiltration rates, the height of the water table, and other variables to improve their irrigation efficiency, enhance crop production, ecosystem services, and profitability.

“The resources the NRCS and YRCDC provide have allowed us to better understand in real time how irrigation and precipitation are handled by our soils,” said Tami.

Implementing the Five Principles of Regenerative Agriculture

With the support of YRCDC and NRCS, the Sanders are working on applying the five principles of regenerative agriculture to their ranch:

1. **Keep the Soil Covered:** Using cover crops/standing forage to protect against erosion and promote organic matter.
2. **Minimize Soil Disturbance:** Practicing minimum tilling and minimal spraying methods to maintain soil structure.
3. **Maximize Diversity:** Incorporating diverse plant species to enhance biodiversity and soil health.
4. **Maintain Living Roots Year-Round:** Ensuring continuous photosynthesis and soil carbon capture.
5. **Integrate Livestock:** Utilizing managed grazing to recycle nutrients and improve pasture resilience.

These practices, combined with improved water management, should lead to improved soil health, but it’s a slow transition. The end goal is reducing waterlogged areas, improving water infiltration and growing vibrant crops.

A Community-Centered Approach

For Dan and Tami, regenerative agriculture extends beyond the boundaries of their ranch. They actively engage with their community, sharing their experiences and learning from neighbors, including experienced area ranchers whose practical wisdom complements their scientific and technical expertise.

“Regeneration is about more than soil,” Dan emphasizes. “It’s about regenerating community ties, furthering the local economy, and honoring the knowledge that has been passed down for generations.”

Looking Ahead

Dan and Tami Sanders embody the resilience and resourcefulness that define Montana’s agricultural heritage. Their story highlights the transformative power of collaboration, where partnerships with organizations like YRCDC, NRCS, Boulder River Watershed Association, and the USDA, act as catalysts for sustainable farming.

As they continue their journey, the Sanders remain committed to their vision of a healthier, more connected agricultural landscape—a vision that inspires not only their community but also the broader region to embrace the principles of regeneration and stewardship.

“We’re just getting started,” Tami says with a smile. “The land has so much to teach us, and we’re eager to keep learning.”



AutoSave | Bob Anderson - Pivot 1 - 2022 - Shows errors and give fixing recommendations | Search | Cameron Skinner

File Home Insert Page Layout Formulas Data Review View Automate Developer Help

B125 | Moisture sensor data that was put in this spreadsheet is highlighted yellow and if highlighted red, the data is not quite accurate. Make sure the centibar moisture sensor at each rooting depth all adds up to your awc to get the most accurate data possible. Any

CERTIFICATION OF AN IRRIGATION WATER MANAGEMENT PLAN

813: Bob Anderson Pivot 1 Phone: 406-232-1033 County: PARK
 814: All of a Net irrigation needed (Ld-CI-P): 24.08 in.
 815: 62.3 Net irrigation applied: 13.82 in.

816: **Flow Meter Numbers**
 817: Reading: 813.22 Ac-Ft. 258.30 Ac-Ft. - Ending Flow Meter Reading
 818: Gross water applied: 87.63 ac-ft. 1.41 feet 16.89 inches 16.87 inches of water applied from Irrigation

819: The management of this system is within 93.9 % of System efficiency
 820: in Efficiency - (Inches beneficially used/inches applied) : 81.9%
 821: The management of this system is within 93.9 % of System efficiency

822: If flags from page 1 indicate the crop was trying to get water from the lower half of the soil's water holding capacity. This causes
 823: wet, and if continued will lead to productivity losses. See the Recommended irrigation schedule.

824: Irrigation Management Plan will reduce irrigation runoff and deep percolation, improve crop productivity and conserve water.

825: Jason caused the available soil moisture to fall below the MAD level, the approximate yield loss is estimated (2.25 Tons/Ac \$3.50 Cost per Ton
 826: List any recommendations for improvements to be made next irrigation season

827: Moisture sensor data that was used in this spreadsheet is highlighted yellow and if highlighted red, the data is not quite accurate. Make sure the centibar moisture sensor at each rooting depth all adds up to your awc to get
 828: the most accurate data possible. Any readings that are on the day of an irrigation is not accurate, the system would be more accurate without it. Any readings taken when the centibar moisture sensor is less than 10. is field
 829: capacity would be useful soil moisture sensor was not used. The recommendations are based on what would be allowed for the amount of irrigation water to apply without using the moisture sensor data. So the
 830: pumping savings from using the soil moisture sensors for this pivot is 483.918 plus labor savings and crop growth. Note in this spreadsheet, changing all those corrections does not change the outcome of the pumping
 831: costs.

832: History records which include pages 1,2, 3 reflect proper irrigation water management applied.
 833: Monthly payment Date:
 834: Date:
 835: Date:
 836: Date:
 837: Date:
 838: Date:
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 840: Date:
 841: Date:
 842: Date:
 843: Date:
 844: Date:
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 899: Date:
 900: Date:

851: Irrigation water management to achieve a more advanced level include: Soil Probe, Tensiometers, Epsom Dunks,
 852: Data Logger, Agriment Size, Anemometer, Improved pivot panel.
 853: or all of these IPII tools.

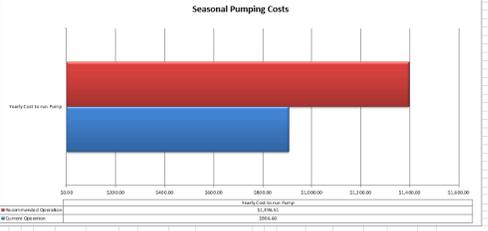
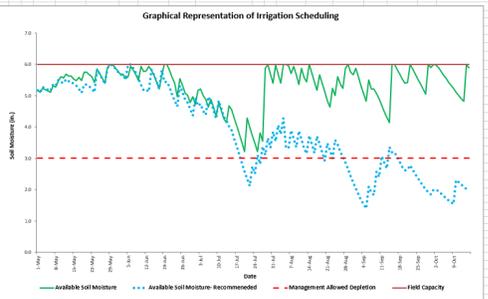
Existing Irrigation		Recommended Irrigati	
891: 1) water:	36.08 inches	Irrigation recommended water:	25.00 inches
892: 2) rate:	478 gpm	Pumping rate:	478 gpm
893: 3) applied:	87.63 Acre feet	Gross water applied:	134.58 Acre feet
894: 4) to All:	2.08 Acre/ft per day	Pumping rate converted to All:	2.08 Acre/ft per day
895: 5) running:	42.2 days	Irrigate days pump is running:	65.0 days
896: 6) Power:	15 Hp	Pump Horse Power:	15 Hp
897: 7) cost HP:	11.2 KW	Total kilowatts based on HP:	11.2 KW
898: 8) irrigation:	472.19 KW-days	Power consumption:	727.35 KW-days
899: 9) in hour:	8.08 kWh/acre	Cost per kilowatt per hour:	0.08 kWh/acre
900: 10) irrigate:	\$300.60 #/Season	Cost per year to irrigate:	\$1,336.51 #/Season

901: AWA: 2.25 Tons/Ac \$3.50 Cost per Ton

902: Moisture Balance & Cert Management allowed Depletion Feel and Appearance Instructions

903: Producer Interview sheet Temp and Precip Data Notes Centibar Moisture Sensors Volumetric Moisture Sensors Moisture Balance & Cert Management allowed Depletion Feel and Appearance Instructions

904: Ready | Accessibility Investigate | Display Settings | 62%



Pivots: Water Budgeting

3 Levels of IWM

Level 1:

- Moisture by feel and appearance
- Inputs - extractions

Level 2:

- Soil moisture probes
- Soil AWC - Texture
- Closest weather station
- Inputs - extractions
- Immediate data
- NRCS IWM Excel

Level 3:

- Soil moisture sensors
- Weather station
- Automatic computer data
- Exact micro - climatic data

