**Richard M. Cruse**

Professor, Department of Agronomy

Director, Iowa Water Center

Iowa State University

Ames, Iowa 50011

515-294-7850, rmc@iastate.edu

**CANDIDATE INFORMATION**

**Education**

Ph.D. Soil Physics University of Minnesota 1978

M.S. Soils University of Minnesota 1975

B.S. Agronomy Iowa State University 1972

**Professional Experience**

Appointment Year

Director, Iowa Water Center 2006 – present

Iowa State University, Ames, Iowa

Professor, Iowa State University 1988 – present

 Department of Agronomy, Ames, Iowa

Associate Professor, Iowa State University 1983 – 1988

 Department of Agronomy, Ames, Iowa

Assistant Professor, Iowa State University 1979 – 1983

 Department of Agronomy, Ames, Iowa

Assistant Professor, North Carolina State University 1978 – 1979

Department of Soil Science, Raleigh, NC

**Areas of Specialization**

My current research emphasizes quantifying water-driven soil erosion rates as affected by soil and crop management. I work to improve spatial and temporal erosion rate estimates across the Midwest. My career has focused on soil management practice impacts on soil properties and crop production. I co-lead the Daily Erosion Project team, lead the Agricultural Conservation Planning Framework National Hub, and am the Director of the Iowa Water Center.

**Current appointment at Iowa State University**

 50% Research/ 25% Administration/ 10% Teaching/ 10% Extension/

5% Institutional Service

**RESEARCH**

**Honors and Awards (20)**

Award Year

*Friend of Family Farmers Award.* Iowa Farmers Union. 2019

*Best Research Paper Award for Impact and Quality (Honorable Mention)* 2018

 Journal of Soil and Water Conservation

*Member of the Expert Base in China’s State Administration of Foreign Experts* 2016 – present

*White House Invitation to participate in “Gaining Ground-Soil as a Renewable*  2016

*Resource.”* White House Office of Science, Technology and Policy.

August 1, 2016.

*President, National Institutes for Water Resources.* October 1, 2015 – 2015 - 2016

 September 30, 2016.

*White House Invitation to participate in Round Table on Soil Health.* White 2015

 House Office of Science, Technology and Policy. December 17, 2015

*Fellow*, Soil Science Society of America 2002

*Sustainable Agriculture Achievement Award*, Practical Farmers of Iowa 1994

*Fellow*, American Society of Agronomy 1993

*Excellence in Applied Research and Extension*, Iowa State University 1992

**Refereed journal articles (40 of 121)**

Google Scholar recognizes 112 professionals conducting research and publishing in the area of soil management. As of November 1, 2023, Cruse was the fifth most cited professional in this group, with 8169 citations. Of 520 soil erosion research professionals google scholar recognizes, this number of citations places him 20th most cited. Cruse has an H index of 51 and an *i*10 of 108.

1. David A. Reece, John A. Lory, Timothy L. Haithcoat, Brian K. Gelder, and **Richard Cruse**. 2023. Using Google Earth imagery to target assessments of ephemeral gully erosion. Journal of the ASABE. 66(1): 155-166. (doi: 10.13031/ja.15254) @2023
2. Weigel, C., **R. Cruse** and S. Reddy. 2022. Using targeted messages to improve farmer engagement in conservation programs. Soil and Water Cons. J. 77 (5) 546-551; DOI: <https://doi.org/10.2489/jswc.2022.00145>
3. Luquin, Eduardo, Miguel A. Compo-Bescos, Rafael Munoz-Carpena, Ronald L. Bingner, **Richard M. Cruse**, Henrique G;. Momm, Robert R. Wells, and Javier Casali. 2021. Model prediction capacity of ephemeral gully evolution in conservation tillage systems. Earth Surf. Process. Landforms. 46:1909-1925.
4. Wang, E., **Cruse, R.M**., Sharma‐Acharya, B., Herzmann, D.E., Gelder, B.K., James, D.E., Flanagan, D.C., Blanco‐Canqui, H., Mitchell, R.B. and Laird, D.A. 2020. Strategic switchgrass (*Panicum virgatum)* production within row cropping systems: Regional scale assessment of soil erosion loss and water runoff impacts. GCB Bioenergy. 12:955–967. doi:[10.1111/gcbb.12749](https://doi.org/10.1111/gcbb.12749)
5. Bharat Sharma Acharya, Humberto Blanco-Canqui, Robert B. Mitchell, **Richard Cruse**, and David Laird. 2019. Dedicated Bioenergy Crops and Water Erosion. Journ. Env. Qual. doi:10.2134/jeq2018.10.0380
6. Xuewen Chen, **Richard M. Cruse**, Shuang Niu,and Xingyi Zhang. 2018. Effect of loading time on soil structural failure. Soil & Tillage Research. 186:87-93.
7. Gelder, B., Sklenar, T., James, D., Herzmann, D., **Cruse, R. M**., Gesch, K., and Laflen, J. (2017) The Daily Erosion Project - Daily Estimates of Water Runoff, Soil Detachment, and Erosion. Earth Surf. Process. Landforms, doi: 10.1002/esp.4286.

1. Li, H, **R**. **M. Cruse**, R. L. Bingner, K. R. Gesch, and X. Zhang. 2015. Evaluating ephemeral gully erosion impact on *Zea mays* L. yield and economics using AnnAGNPS. Soil Till. Res. 155:157-165.
2. X. Zhou, M.J. Helmers, H. Asbjornsen, R. Kolka, M.D. Tomer, and **R.M. Cruse.** 2014. *Nutrient removal by prairie filter strips in agricultural landscapes*. J. Soil Water Conserv. 69:54-64.
3. Hatfield, J.L., **R.M. Cruse**, and M.D. Tomer. 2013. *Convergence of Agricultural Intensification and Climate Change in the Midwestern United States: Implications for Soil and Water Conservation*. Mar. Freshwater Res. 64:423-435.
4. Wang, E., **R.M. Cruse**, X. Chen, and A. Daigh. 2012. *Effects of moisture condition and freeze/thaw cycles on surface soil aggregate size distribution and stability.* Can. J. Soil Sci. 92(3): 529-536.
5. Wilson, H., **R.M. Cruse**, and C.L. Burras. 2011. *Perennial grass management impacts on runoff and sediment export from vegetated channels in pulse flow runoff events.* Biomass Bioenerg. 35:429-436.
6. **Cruse, R.M**. and C. Herndl. 2009*. Balancing corn stover harvest for biofuels with soil and water conservation*. J. Soil Water Conserv. 64(4):286–291.
7. Robertson, G.P., V.H. Dale, O.C. Doering, S.P. Hamburg, J.M. Melillo, M.M. Wander, W.J. Parton, P.R. Adler, J.N. Barney, **R.M. Cruse**, C.S. Duke, P.M. Fearnside, R.F. Follet, H.K. Gibbs, J. Goldemberg, D.J. Mladenoff, D. Ojima, M.W. Palmer, A. Sharpley, L. Wallace, K.C. Weathers, J.A. Wiens, and W.W. Wilhelm. 2008. *Sustainable biofuels redux*. Science. 322:49-50.
8. Gelder, B.K., **R.M. Cruse**, X.Y. Zhang. 2007. *Comparison of track and tire effects of planter tractors on corn yield and soil properties.* Trans. ASABE: 50(2):365-370.
9. Perez-Bidegain, M., **R.M. Cruse**, and A. Ciha. 2006*. Tillage system by planting date interaction effects on corn and soybean yield*. Soil Sci. Soc. Am. J. 70:613-619.
10. **Cruse, R.M.,** D. Flanagan, J. Frankenberger, B. Gelder, D. Herzmann, D. James, W. Krajewski, M. Kraszewski, J. Laflen, J. Opsomer, and D. Todey 2006. *Daily estimates of rainfall, water runoff, and soil erosion in Iowa*. J. Soil Water Conserv. 61:191-198.
11. Kanwar, R.S., **R. Cruse**, M. Ghaffarzadeh, A. Bakhsh, D. Karlen, and T. Bailey. 2005. *Corn-soybean and alternative farming systems effects on water quality.* Appl. Eng. Agric. 21:181-188.
12. Exner, D.N. and **R.M. Cruse**. 2001. *Profitability of crop rotations in Iowa in a stress environment.* J. Iowa Acad. Sci. 108:84-89.
13. Ghaffarzadeh, M., F. García Préchac, **R.M. Cruse**, and M.M. Harbur. 2001. *Tillage effect on soil water content and soybean yields in a strip intercropping system*. J. Iowa Acad. Sci. 108: 19-23.
14. Harbur, M.M., M. Ghaffarzadeh, and **R.M. Cruse**. 2000. *Corn (Zea Mays L.) yield response to N fertilizer in conventional and alternative rotations* J. Iowa Acad. Sci. 107: 42-45.
15. Froese, J., **R.M. Cruse**, and M. Ghaffarzadeh. 1999. *Erosion mechanics of soils with an impermeable subsurface layer*. Soil Sci. Soc. Am. J. 63:1836-1841.
16. Ghaffarzadeh, M., F. García Préchac, **R.M. Cruse,** and M.M. Harbur. 1998. *Fertilizer and soil nitrogen use by corn and border crops in a strip intercropping system*. Agron. J. 90:758-762.
17. Ghaffarzadeh, M., F. García Préchac, and **R.M. Cruse**. 1997. *Tillage effect on soil water content and corn yield in a strip intercropping system*. Agron. J. 89:893-899.
18. Robinson, C.A., **R.M. Cruse**, and M. Ghaffarzadeh. 1996. *Cropping system and nitrogen effects on Mollisol organic carbon.* Soil Sci. Soc. Am. J. 60:264-269.
19. Robinson, C.A., M. Ghaffarzadeh, and **R.M. Cruse**. 1995. *Vegetative filter strip effects on sediment concentration in cropland runoff*. J. Soil Water Conserv. 51:227-230.
20. Karlen, D.L., G.E. Varvel, D.G. Bullock, and **R.M. Cruse**. 1994. *Crop rotations for the twenty‑first century*. Adv. Agron. 53:1‑45.
21. Exner, D.N. and **R.M. Cruse**. 1993. *Interseeded forage legume potential as winter ground cover, nitrogen source, and competitor.* J. Prod. Agric. 6:226‑231.
22. Blaylock, A.D. and **R.M. Cruse**. 1992. *Ridge‑tillage corn response to point‑injected N fertilizer*. Soil Sci. Soc. Am. J. 56:591‑595.
23. Brown, H.J., **R.M. Cruse**, and T.S. Colvin. 1988. *Tillage system effects on crop growth and production costs for a corn‑soybean rotation*. J. Prod. Agric. 2:273‑279.
24. Benjamin, J.G., **R.M. Cruse**, A.D. Blaylock, and L.V. Vogl. 1988. *A small-plot point injector for liquid fertilizer application*. Soil Sci. Soc. Am. J. 52:1194‑1195.
25. Garcia, F., **R.M. Cruse**, and A.M. Blackmer. 1988. *Compaction and nitrogen placement effect on root growth, water depletion, and nitrogen uptake*. Soil Sci. Soc. Am. J. 52:792‑797.
26. Potter, K.N., R. Horton, and **R.M. Cruse**. 1987. *Soil surface roughness effects on radiation reflectance and soil heat flux*. Soil Sci. Soc. Am. J. 51:855‑859.
27. Erbach, D.C., and **R.M. Cruse**. *Evaluation of the paraflow for continuous corn production*. 1986. Soil Till. Res. 8:336.
28. **Cruse, R.M.** 1985. *Watch soil temperatures—managing crop residues brings several benefits*. Crops Soils. 38:17‑18.
29. Hill, R.L., R. Horton and **R.M. Cruse**. 1985*. Tillage effects on soil water retention and pore size distribution of two mollisols*. Soil Sci. Soc. Am. J. 49:1264‑1270.
30. Potter, K.N., **R.M. Cruse** and R. Horton. 1985. *Tillage effects on soil thermal properties*. Soil Sci. Soc. Am. J. 49:968‑973.
31. Yakle, G.A. and **R.M. Cruse**. 1984. *Effects of fresh and decomposing corn plant residue extracts on corn seedling development*. Soil Sci. Soc. Am. J. 48:1143‑1146.
32. **Cruse, R.M**., G.A. Yakle, T.S. Colvin, D.R. Timmons, and A.L. Musselman. 1983. *Tillage effects on corn and soybean production in farmer‑managed, university‑monitored field plots.* J. Soil Water Conserv. 38(6):512‑514.
33. Yakle, G.A. and **R.M. Cruse**. 1983. *Corn plant residue age and placement effects on early corn growth*. Can. J. Plant Sci. 63:871‑877.

**Guest Editorials (1)**

1. Clara Lefèvre, **Richard M. Cruse**, Lucia Helena Cunha dos Anjos, Costanza Calzolari, and Nigussie Haregeweyn. 2020. Guest editorial – Special issue: Global Symposium on Soil erosion –Soil erosion assessment, tools and data; creation, consolidation and harmonization. International Soil and Water Conservation Research. *8(4): 333-336. ISSN 2095-6339.* [*https://doi.org/10.1016/j.iswcr.2020.11.004*](https://doi.org/10.1016/j.iswcr.2020.11.004)

**Non-refereed technical publications: conference proceedings, reports etc. (5 of 34)**

1. Cruse, R.M., D.E. Herzmann, B.K. Gelder, D.E. James, and D.C. Flanagan. 2023. Impacts of changing precipitation events on landscape soil erosion estimates. Presented at Soil Erosion Research Under a Changing Climate Symposium. Punta Borinquen Resort, Aguadilla, Puerto Rico. <https://elibrary.asabe.org/abstract.asp?aid=53772>
2. Bates, Hanna and **Richard Cruse**. 2021. Chapter: The Black Gold of Iowa. Compelling Ground: Landscapes, Environments, and Peoples of Iowa. University Museums, Iowa State University, Ames, Iowa.
3. **Cruse, Rick,** Brian Gelder, David James, and Daryl Herzmann**.** 2017. Soil erosion: How much is occurring, when and where? Wisconsin Agribusiness Classic. Available at: <http://agclassic.org/proceedings/2017Cruse-etal.pdf>
4. **Cruse, Richard M.,** Brian Gelder, David James, and Daryl Herzmann. 2016. Daily Erosion Project: daily estimates of soil erosion and water runoff. Pp. 193-194. In Integrated Crop Management Conference Proceedings. Ames, IA.
5. Rogovska, N. and **R.M. Cruse**. 2010. Consequences for Iowa Agriculture. In: Connie Mutel (ed.) *Climate Change Impacts on Iowa 2010. Report to the Governor and Iowa General Assembly*.

**Refereed books and book chapters (5 of 15)**

1. **Cruse, Richard M**., Enheng Wang, Chunmei Wang, Fernando García-Préchac, Panos Panagos, Baoyuan Liu, Emily Heaton, and Dennis Todey. 2022. Agricultural Adaptation to Climate Change - Limiting Degradation of Soil and Water Resources. *In: Brenda Groskinski (ed):*  Climate Action. Taylor & Francis.
2. **Cruse, R.M.,** S. Lee, T.E. Fenton, E. Wang, and J. Laflen. 2013. Soil renewal and sustainability. In: R. Lal and B. A. Stewart (eds.) *Principles of Sustainable Soil Management in Agroecosystems*. CRC Press, Boca Raton, LA. p. 477-500.
3. **Cruse, R.M.**, E. Wang, S. Lee, and X. Chen. 2013. Agriculture and water quality. In: S. Ahuja, M.C. Larsen, J. Eimers, C. Patterson, S. Sengupta, and J.L. Schnoor (eds.) *Comprehensive Water Quality and Purification*. Elsevier, Boston, MA. p. 42-54.
4. **Cruse, R.M.**, H. Olson, and J.M. Laflen. 2010. How did the flood affect farmland? In: C. Mutel (ed.) A Watershed Year: Anatomy of Iowa Floods of 2008. Bur Oak Books, University of Iowa Press, Iowa City, IA. p. 147-154.
5. **Cruse, R.M**., M.J. Cruse, and D. Reicosky. 2009. Soil quality impacts of residue removal for biofuel feedstocks. In: R. Lal and B.A. Stewart. (eds.) *Soil Quality and Biofuel Production*. CRC Press. Boca Raton, LA. p. 45–62.

**Invited keynote and plenary presentations (5 of 10)**

1. **Cruse, Richard** and Dennis Flanagan. May 15, 2019. Assessment and mapping soil erosion: Does it tell our story? Food and Agriculture Organization of the United Nations Global Symposium on Soil Erosion. Rome, Italy.
2. **Cruse, Richard.** December 4, 2017. Why conserving Minnesota soil and water resources is a global necessity. Minnesota Association of Soil and Water Conservation Districts Annual Convention. Bloomington, MN.
3. **Cruse, R.M.** July 28,2014. Is soil and water degradation inevitable? Don’t bet your life on it! Pritchard Lecture, Soil and Water Conservation Society Annual Meeting. Lombard, IL.
4. **Cruse, R.M.** February 4, 2015. Is soil and water degradation inevitable? Don’t bet your life on it! Ontario Soil and Crop Improvement Association Annual Meeting. London, Ontario, Canada.
5. **Cruse, R.M.** September 24, 2012. Agriculture and climate change. International Soil and Tillage Research Conference. Montevideo, Uruguay.

**International presentations (5 of 30)**

1. **Cruse, Rick.** November 23, 2021. Agricultural Policies and Soil Conservation: What has worked and what does the future hold – USA perspective? Sustainable Land Use Policies in Spain in relation to other EU countries and the world. Seville, Spain. (invited).
2. **Cruse, Rick,** Alexandr Tarariko and Lee Burrass. June 7, 2018. Effect of Landscape and Management on Sustaining Mollisol Ecology – Ukraine and Iowa, USA. International Workshop on Mollisol Ecology. Harbin, China. (invited)
3. **Cruse, R.M.** September 31, 2015. Daily Erosion Project. Instituto Nacional Investigacion Agropecuaria. Colonia, Uruguay. (invited)
4. **Cruse, Richard,** Scott Lee and Tim Sklenar. April 13, 2015. Topsoil Depth Effects on Crop Yields and Weather Impacts. European Geosciences Union. Vienna, Austria. (invited)
5. **Cruse, R.M.** July 15, 2014. Resource degradation, climate change and rising global demand. Research School for Socioeconomic and Natural Sciences of the Environment. Bonn, Germany. (Invited).

**Invited domestic presentations (5 of 97)**

1. **Rick Cruse**. 2023. Quantifying Soil Erosion: What does it mean? Are we running out of topsoil? Watershed Management Authority. Oakland, IA September 13, 2023.
2. **Rick Cruse** and Emily Zimmerman. 2023. Agricultural Conservation Planning Framework and endangered species. Presented at: Balancing Species Protection and Soybean Production: A Systems Approach to Endangered Species Pesticide Mitigations. Lincoln, NE. February 9-10, 2023
3. **Cruse, Rick** and the Daily Erosion Project Team. November 25, 2019. Iowa Smart Agriculture – Soil conservation viewed through a crystal ball. Iowa Smart Agriculture Forum. Des Moines, IA.
4. **Cruse, Rick.** December 13, 2016. Why sustaining soil and water resources is critical. Land O’Lakes SUSTAIN® Grower Recognition Meeting. Ft. Lauderdale, FL.
5. **Cruse, Rick.** March 9, 2016. Why Soil Health? Archers Daniel Midland. Ankeny, IA.

**Grants and contracts**

**Funded (since 2000),** listing only research grants and contracts for which Cruse is PI. Total since 2000 for which Cruse is PI is $6,280,679. *Prior to 2000 total external funding: $1,782,705.* As the Iowa Water Center Director Cruse has served as PI on an additional $1,948,271 received through the USGS. Below, 10 of these 23 awards are listed to exemplify grant and contract successes.

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| --- | --- | --- |
| **Dates of Project** | ***Title.* Funding Source. Cooperators** | **Grant Amount** |
| 9/29/2021-9/28/2024 | *Agricultural Conservation Planning Framework National Hub; NRCS;*  **Rick Cruse (PI),** Emily Zimmerman, Hanna Bates, Robin McNeely, Brian Gelder et al. | $1,499,931.00 |
| 3/1/2019- 2/28/2022 | *Prairie Strips for Healthy Soils and Thriving Farms.* Foundation for Food and Agricultural Research. **R.M. Cruse – PI.** Six Co-PIs | $746,204/$1,492,408 |
| 7/1/2015 – 6/30/2017 | *Stacked practice impacts on phosphorus loss and long-term corn yield* – Iowa Nutrient Research Center*;* ***R.M. Cruse &*** *Daily Erosion Project Team* | $75,497 |
| 2012-2014 | *Iowa Daily Erosion Project.* Iowa State University Department of Agronomy Endowment*.* **R.M. Cruse** (PI). | $252,160 |
| 2012-2016 | *An Integrated Approach to Precision Conservation Planning in the South Fork Watershed*. National Institute for Food and Agriculture. USDA. **R.M. Cruse** (PI).  | $620,898 |
| 2009-2010 | *Environmental trading programs: A tutorial*. USDA-NRCS. **R.M. Cruse** (PI) | $193,239 |
| 2008-2009 | *Agriculture and greenhouse gas emission reporting: A tutorial*. USDA-NRCS. **R.M. Cruse** (PI) | $172,028 |
| 2008-2009 | *Biofuel feedstock landscape coverage and ecoservice implications for various biofuel industry scenarios*. Environmental Protection Agency. **R.M. Cruse** (PI) | $100,000 |
| 2003-2004 | *Conservation tillage management, effects on corn production and soil erosion.* Iowa Department of Agriculture and Land Stewardship. **R.M. Cruse**  (PI) | $23,632 |
| 1999-2001 | *An assessment, management plan and evaluation of the water quality impacts of switchgrass production for biomass for the Rathbun Lake Watershed.* Chariton Valley Resource Conservation and Development.**R.M. Cruse (**PI), J. Opsomer, and T. Isenhart. | $113,000 |

**Professional service**

Honorary and professional society membership

American Society of Agronomy

Gamma Sigma Delta

Practical Farmers of Iowa

Sigma Xi

Soil Science Society of America

Soil and Water Conservation Society of America

Participation and offices held

10/09/2019 Facilitator – Watershed Planning Advisory Council annual meeting, Des Moines, IA

11/14/2019 Facilitator - Des Moines Water Works Citizen Water Academy. Des Moines, IA.

5/15/2019 Theme Chair and Technical Session Chair; Food and Agriculture Organization of the United Nations Global Sympossium on Soil Erosion. Rome, Italy.

5/16/2019 Theme Chair and Technical Session Chair; Food and Agriculture Organization of the United Nations Global Sympossium on Soil Erosion. Rome, Italy.

2019 Scientific Committee for International Sympossium on Gully Erosion; July 21 – 27. CSIRO. Austrialia

2015-2016 President, National Institute for Water Resources

2008-2010 Member, Iowa Climate Change Advisory Council, appointed by Governor’s office.

2007-2009 Advisor, National Advisory Council for Environmental Policy and Technology: U.S. Environmental Protection Agency Administrator – Biofuels

**Advising**

**Previous graduate students (13 PhD, 26 MS and 8 MS in Agronomy)**

**EXTENSION and SERVICE**

**Presentations (5 of 66 since 2009)**

1. Rick Cruse. 2023. CRP and Pollinators. Hertz Farm Management Staff Seminar. Ankeny, IA June 15, 2023.
2. Rick Cruse. June 21, 2023. Where we've been, where we are, and where we need to go with reducing soil erosion - A story not previously told. CCA Training. Crawfordsville, IA.
3. Rick Cruse. January 12, 2022. Changing precipitation pattern effects on soil erosion: Management considerations. Certified Crop Advisors. Ankeny, IA.
4. Rick Cruse, Brian Gelder, David James, and Daryl Herzmann. November 26, 2019. Daily Erosion Project. Presented to representatives of Iowa Soybean Association, NRCS, IDALS, Iowa Farm Bureau, and CORTIVA. ISA Headquarters, Ankeny, IA.

1. Cruse, Rick. August 16, 2019. Water quality. Practical Farmers of Iowa Field Day. Harlan, Iowa.

**INSTITUTIONAL SERVICE**

**Agronomy Department**

2018 – 2019 Chair, Promotion and Tenure Committee, Department of Agronomy

2017 – 2022 Coordinator for Soil Science in Department of Agronomy

2017 – 2022 Soil Science DOGE

2015 –2019 Member Promotion and Tenure Commitee, Department of Agronomy

2015 – present Member Iowa Nutrient Reduction Strategy Science Team

1990 – present Co-advise Agronomy Graduate Club

1981 – present Advisor, Soil and Water Conservation Club