

Thomas A. Cochrane

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Education

Doctor of Philosophy from Purdue University. December 1999. Agricultural Engineering. Research conducted on watershed modeling with geographic information systems and digital elevation models.

Graduate of the Applied Management Principles Program for Purdue Science and Engineering Doctoral Students. This program is described as a "mini-MBA" which is funded through the Sloan and National Science Foundations. May 1998.

Master of Science in Agricultural Engineering from Purdue University. December 1995. Construction of experimental hydraulic flume with a data acquisition system and diverse sensors to conduct research on water erosion.

Bachelor of Science in Agricultural Engineering from Purdue University. May 1993.
Licenciado en Ingeniería Agrícola. Título en Provisión Nacional otorgado por el Comité Ejecutivo de la Universidad Boliviana.

Work Experience

Museo de Historia Natural Noel Kempff Mercado, Conservation International, Transredes, GasTransBoliviano - "Gas - Water model for Agricultural Production in Santa Cruz, Bolivia." (August, 2003-present)

Agricultural Engineering Consultant. Short term consultancy to study the feasibility of using natural gas or LPG as an energy source alternative for irrigation of crops using water from deep aquifers in Santa Cruz, Bolivia.

Itaipu Binacional / IAPAR / Pedotechnologies - "Monitoramento do aporte de sedimentos no lago de Itaipu e modelagem dos riscos de erosão na bacia do rio Paraná" (2000- August, 2003).

Soil and Water engineering Consultant. In charge of conducting a project for the Itaipu Hydroelectric Facility that consisted in monitoring the inflow of water and sediments to the Itaipu Reservoir and modeling the contributing watershed to identify high erosion risk areas using RUSLE. The modeling and monitoring results are used to recommend conservation practices to reduce sedimentation of the reservoir in order to avoid eutrophication, damage to the aquatic ecology, improve water quality, and reduce the threat to energy production.

Created working methodology manuals for river monitoring, watershed modeling, laboratory analyses, and implementation of conservation practices.

Designed and constructed structures for river monitoring and implemented the installation of newly developed turbidity sensors and water level meters to monitor hydrology and sediment concentration of river flows at 10 sites.

Conducted training of Itaipu and IAPAR personnel in monitoring and modeling.

Agrotecnologica S.A. (AGTECA), Santa Cruz, Bolivia (1999-present).

Land resources, water, and soil conservation consultant. Working on a Land Resources Geographic Information System for the Amazon basin using SOTER (World Soil and Terrain Digital database). Collaborative work with Conservation International and the Museo de Historia Natural Noel Kempff Mercado, Santa Cruz, Bolivia.

National Soil Erosion Research Laboratory (NSERL), West Lafayette, Indiana. USDA, Agricultural Research Service. (1993-1999)

Graduate Research Assistant. Research and development of GIS based watershed modeling for land management, fundamental erosion-mechanics, and modeling processes.

*Designed and constructed an indoor simulator apparatus to study erosion conditions in agricultural rills. This included setting up a data acquisition system with pressure sensors, flow sensors, LVDT's, step motors and the use of a laser scanner.

*Invented and applied for a patent for Low Density Abrasive Beads (P-98055.00.US).

*Worked on GIS modeling using the Water Erosion Prediction Project watershed model.

Leighton and Associates, Geotechnical consultants. (February and March 1999)

Short time consultancy work on erosion control for construction sites in Malibu, California.

DHV Consultants BV and Tecnosolo S.A. Rondônia Macro-Zoning Project sponsored by the World Bank and the State of Rondônia, Brazil. (August to December, 1996)

Worked in field crew conducting soil sampling and land resource surveys with GPS. Helped in the creation of the soil profile and terrain database and GIS for the State of Rondônia.

DHV Consultants BV/World Bank Bolivian Brazil-nut Project, Bolivia. (May to August, 1992)

Helped in the data gathering and production of a land resource and soils map of the northern amazon region of Bolivia. Digitized and analyzed maps using a geographic information system called IDRISI.

British Tropical Agricultural Mission, CIAT, Santa Cruz, Bolivia. (summer 1990)

Soils Laboratory. Worked as a laboratory assistant doing soil analysis.

Publications and presentations

Cochrane, T.A., D.L. Norton, C. Castro Filho, and J.H. Caviglione. 2004. Development of a River Sediment Transport Monitoring System for Large Reservoirs. Applied Agricultural Engineering (submitted).

Cochrane, T.T. and T.A. Cochrane. 2004. Diversity of the Land Resources in the Amazonian State of Rondônia, Brazil. Acta Amazonica (Submitted).

Cochrane, T.A., C. Castro Filho, J.H. Caviglione, D.L. Norton, and S. Frederigi Benassi. 2003. Identification of high risk erosion areas within the Itaipu basin by watershed modeling through RUSLE. II World Congress on Conservation Agriculture, Foz do Iguaçu, Brazil.

Cochrane, T.A. and D.C. Flanagan. 2003. Effects of Resolutions, Event Sizes, and application methods on WEPP watershed modeling with DEMs. Transactions of the ASAE (submitted).

Cochrane, T.A. and D.C. Flanagan. 2003. Representative Hillslope Methods for Applying the WEPP model with DEMs and GIS. Transactions of the ASAE 46:4.

Cochrane, T.A., C. Castro Filho, L.P. Johansson, L.D. Marena, J.H. Caviglione, D.L. Norton, P.H. Teixeira, and C.A. Limons. 2002. Reduction of Sediment Delivery to the Itaipu Reservoir: A new vision through the implementation of monitoring techniques and watershed management. International Commission on Large Dams. Symposium on Reservoir Management in Tropical and Sub-Tropical Regions, Sept., 2002, Iguassu, Brazil.

Castro Filho, C., T.A. Cochrane, J.H. Caviglione, L.D. Norton, and L.P. Johansson. 2002. Técnicas de Controle de Erosão e Conservação da Água. XIV Reunião Brasileira de Manejo e Conservação do Solo e da Água, 21 a 26 de julho de 2002, Cuiabá, Brazil.

Cochrane, T.A., T.T. Cochrane, and T. Killeen. 2002. The Digital Systems Survey of the Amazon. Congresso internacional de SELPER. Cochabamba, Bolivia.

Cochrane, T.A., C. Castro Filho, D.L. Norton, J.H. Caviglione, and L.P. Johansson. 2002. Monitoring soil loss in a watershed ecosystem to reduce the impact on hydroelectric energy production. Linkages between biodiversity, ecosystem health and human health. International Society of Ecosystem Health. June 6-11, 2002, Washington, D.C.

Cochrane, T.T., and T.A. Cochrane. 2001. The World Soils and Terrain Digital Database Applied to Amazonian Land Resource Studies. Journal of Natural Resources and Life Science Education, Volume 30, 2001.

Cochrane, T.T., and T.A. Cochrane, 2001. The digital land systems surveys for monitoring land quality change in the Amazon. In: 3rd International Conference on Land Degradation and Meeting of the IUSS Subcommittee C - Soil and Water Conservation, Rio de Janeiro, Brazil.

- Flanagan, D.C., C.S. Renschler, and T.A. Cochrane. 2000. Application of the WEPP model with digital geographic information. 4th International Conference on Integrating GIS and Environmental Modeling (GIS/EM4): Problems, Prospects and Research Needs. Banff, Alberta, Canada, September 2 - 8, 2000.
- Norton, L.D., C. Castro Filho, T.A. Cochrane, J.H. Caviglione, H.M. Fontes Jr., L.P. Johanson, and L.D. Marenha. 2001. Monitoring the Sediment Loading of Itaipu Lake and Modeling of Sheet and Rill Erosion Hazards in the Watershed of the Parana River: An Outline of the Project. *In*: D.E. Stott, R.H. Mohtar, and G.C. Steinhardt (eds.). Sustaining the Global Farm - Selected papers from the 10th International Soil Conservation Organization Meeting, May 24-29, 1999, West Lafayette, IN. International Soil Conservation Organization in cooperation with the USDA and Purdue University, West Lafayette, IN.
- Cochrane, T.A. and D.C. Flanagan. 1999. Assessing water erosion in small watersheds using WEPP with GIS and digital elevation models. *Journal of Soil and Water Conservation*, Vol. 54, No.4, pp. 678-685.
- Cochrane, T.A. and D.C. Flanagan. 1999. Small watershed modeling with WEPP using grid-based DEMs and GIS. ASAE Annual International Meeting, Sheraton Centre, Toronto, Ontario, Canada. No. 993089 ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659 USA.
- Cochrane, T.A. and D.C. Flanagan. 1999. Effects of DEM grid resolution on erosion modeling of small watersheds using a WEPP-GIS interface. *Proceedings for the 10th Meeting of the International Soil Conservation Organization.*
- Renschler, C.S., T.A. Cochrane, J. Harbor, B. Diekkruger. 2001. Regionalization methods for watershed management, hydrology, and soil erosion from point to regional scale. *In*: D.E. Stott, R.H. Mohtar and G.C. Steinhardt (Eds.) 2001. Sustaining the Global Farm. Selected Papers from the 10th International Soil Conservation Organization meeting held at Purdue University, USDA-NSERL. Pages 1062-1067.
- Cochrane, T.A. and D.C. Flanagan. 1997. Detachment in a Simulated Rill. *Transactions of the ASAE* 40(1):111-119.
- Cochrane, T.A., D.C. Flanagan, L.D. Norton, and B.A. Engel. 1997. WEPP Watershed Modeling Using Arc View 3.0 (GIS). Computer model presentation. American Society of Agronomy Annual Meeting, Anaheim, CA. October 26-30, 1997.
- Cochrane, T.T. and T.A. Cochrane. 1997. SIGTERON. Sistema de Informação Geográfica para os Terrenos e Solos do Estado de Rondônia, Brasil. Tecnosolo/DHV Consultants BV. Porto Velho, Rondônia, Brasil.
- Cochrane, T.T., S. Laguna, M.A. Beek, and T.A. Cochrane. 1994. SOTER methodology used for the evaluation of amazonian forest and savanna lands. *Proceedings of XV World Congress of Soil Science, ISSS, Acapulco, Mexico.*
- Castro Filho, C. and T.A. Cochrane. 2000. Caracterização Quali - Quantitativa da Produção de Sedimentos. Invited lecture: IV Encontro Nacional de Engenharia de Sedimentos, Santa Maria, RS, Brazil.
- Cochrane, T.A. 2000. Interfacing soil erosion models and GIS, WEPP for small watersheds. Invited short course lecturer, Universidad Federal de Queretaro, México.
- Cochrane, T.A. and D.C. Flanagan. 2001. Deposition Processes in a Simulated Rill. *In*: Soil Erosion Research for the 21st Century, Proc. Int. Symp. (3-5 January 2001, Honolulu, HI, USA) pp. 139-141, ASAE 701P0007.
- Cochrane, T.A., C. Castro Filho, D.L. Norton, J.H. Caviglione, and L.P. Johansson. 2001. Aporte de sedimentos e planejamento. XXVIII Congresso Brasileiro de Ciência do Solo, Londrina, PR, Brazil.
- Castro Filho, C., T.A. Cochrane, D.L. Norton, J.H. Caviglione, and L.P. Johansson. 2001. Land degradation assessment: techniques and tools for measuring sediment load. Keynote paper and speech: 3rd International Conference on Land Degradation and Meeting of the IUSS Subcommittee C - Soil and Water Conservation, Rio de Janeiro, Brazil.

Computer and Languages Skills and Personal Information.

Geographic Information Systems: Arc View, IDRISI, GRASS, and ARC/INFO.

Operating Systems: MS-DOS, Windows, and UNIX

Specialty programs: WEPP (Water Erosion Prediction Project), TOPAZ, MultiSpec, MS Frontpage

Knowledge of various word processors, spreadsheets, CAD programs, and multimedia programs.
Languages skills: Fluent in English, Spanish, and Portuguese.
Birth date: Sept. 25, 1971. Married.

Activities and Honors

General Activities: Consultant for Agrotecnologica Amazonica S.A., web site developer, private pilot.

Honors: Distinguished Student, Institute of International Education travel grant (Fulbright scholarship), Rex Hall Scholarship, and Elsie L. Gruel Scholarship.

Professional memberships: American Society of Agricultural Engineers, Soil and Water Conservation Society, Sociedad de Especialistas Latinoamericanos en Percepcion Remota (SELPER)

References

Dr. Darrell Norton. Director of the National Soil Erosion Research Laboratory, ARS-USDA, West Lafayette, IN, U.S.A. E-mail: norton@purdue.edu

Dr. Celso Castro Filho, Researcher - coordinator of Soils department in the Instituto Agronomico do Parana (IAPAR), Londrina, PR, Brazil. E-mail: ccaastrof@pr.gov.br

Dr. Dennis Flanagan. Agricultural Engineer and WEPP project leader, National Soil Erosion Research Laboratory, West Lafayette, IN, U.S.A. E-mail: flanagan@ecn.purdue.edu

Dr. Timothy Killeen. Conservation International. Museo Noel Kempff Mercado de Historia Natural, UAGRM, Santa Cruz, Bolivia. E-mail: t.killeen@conservation.org