

CURRICULUM VITAE

Navin Ramankutty

Assistant Professor and Tier II Canada Research Chair in Land-Use and Land-Cover Change
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Research Interests

Land Use and Land Cover Change, Earth System Science, Global Environmental Change, World Agricultural Geography, Ecosystem Goods and Services, Food and Freshwater Security, Human-Biosphere-Climate Interactions, Global Biogeochemical Cycles, Global Climate Change.

Education

- Ph.D., University of Wisconsin-Madison, WI, U.S.A.
Land Resources (Institute for Environmental Studies), May 2000, GPA: 4.0/4.0
Advisor: Prof. Jonathan A. Foley
- NASA Earth Science Summer School: *Processes of Global Change*, July 1995.
- M.S., University of Illinois at Urbana-Champaign, IL, U.S.A.
Atmospheric Sciences, May 1994, GPA: 3.67/4.0
Advisor: Prof. Michael E. Schlesinger
- B.E., P.S.G. College of Technology, India
Mechanical Engineering, Apr 1991, GPA: 84.74/100.00

Professional Experience

- *Assistant Professor, Dept. of Geography, McGill University, June 2006 - Present*
Research and teaching in Physical Geography and Earth System Science, specifically the interactions between human land-use activities and the global environment.
- *Assistant Scientist, Center for Sustainability and the Global Environment, University of Wisconsin, May 2000 – May 2006*
Evaluating ecosystem consequences of land use using numerical models and data sets. Projects included: Reconstruction of global land use and land cover data sets; impacts of land cover change on global and regional climate, carbon cycle, and freshwater; and analysis of regional food security.
- *Visitor, International Food Policy Research Institute (IFPRI), Washington D.C., May 7-20, 2002*
Initiated a new project, AgroMAPS, along with the Food and Agriculture Organization (FAO) and IFPRI to compile subnational agricultural production data from around the world. Tested new methods for reconciling land use census data and satellite data.
- *Graduate Research Fellow, Climate, People and Environment Program, University of Wisconsin, Sep 1994 – May 2000*
Reconstructed a spatially-explicit global data set of croplands from 1700 to 1992. Evaluated the consequence of cropland change for the global carbon cycle. Instrumental in the development of a dynamic global vegetation model.
- *Graduate Research Assistant, University of Illinois at Urbana-Champaign, Aug 1991 - May 1994*
Evaluated the combined influence of atmospheric CO₂ concentrations, sulphate aerosols, solar variability, and volcanic aerosols on hemispheric climate over the last century. Performed time-series analysis on global observed temperature data and discovered a 65-75-yr mode of fluctuation over the North Atlantic.

Honors and Awards

- 2007 Editors' Citation for Excellence in Refereeing for *Global Biogeochemical Cycles*.
- Contributing Author of chapter 2 (Changes in Atmospheric Constituents and in Radiative Forcing) of the IPCC Fourth Assessment Report; the IPCC won the 2007 Nobel Peace Prize for its efforts.
- Tier II Canada Research Chair in Land Use and Land Cover Change, 2006-2011
- NASA Earth System Science Fellowship (1997-2000)
- CPEP Interdisciplinary Research Fellowship (1994-1997)
- The study by Schlesinger and Ramankutty (1994) was reported in Discover magazine as one of "The Top 75 Science Stories" of 1994.
- Best Outgoing Student, Dept. of Mechanical Engineering, P.S.G. College of Technology, India (1991)

Outreach and Communication

- McGill press release on our work titled "Environmental researchers propose radical "human-centric" map of the world" was covered by Science magazine, Discovery Channel, Environmental Science and Technology, Der Spiegel, and various other news outlets and blogs.
- UW news release on our work titled "New maps reveal the human footprint on Earth" was picked up and covered by The Guardian, la Repubblica, National Geographic News, The Hindu, Taipei Times, Sydney Morning Herald, and various other news outlets.
- Contributed the global land use data set used in the pullout map indicating the "State of the Planet" in the September 2002 issue of National Geographic. The same map has been used in the 8th edition of the National Geographic Atlas of the World.
- Participant in the BIOME 300 project initiated by two IGBP (International Geosphere-Biosphere Programme) core projects -- PAGES (Past Global Changes) and LUCC (Land Use/Land Cover Change). As part of a fast-track initiative, produced a CD-ROM with historical land use database, and distributed this widely to 1000s of global change scientists around the world.
- Worked with University of Wisconsin Science Writer, Terry Devitt, to issue a news release entitled "World land database charts a troubling course" in July 2001. This was covered by many major news media.
- Collaborated in the AgroMAPS project, with the International Food Policy Research Institute (IFPRI) and the Food and Agriculture Organization (FAO), to compile and disseminate subnational agricultural land use statistics for the entire world (<http://www.fao.org/landandwater/agll/agromaps/>).
- Supervised a high school student working on summer research project, as part of the UW NASA Sharp PLUS enrichment program in 1998.

Graduate and Undergraduate Supervising

McGill

Graduate students: Elizabeth Barona (M.Sc.), Delphine Deryng (M.Sc.), Elizabeth (Eby) Heller (M.Sc.)

Undergraduate students: (Honors thesis) Philip Potter, Deborah Lightman, Zakir Jafry; (Research Assistants)

Laura Bryson, Katherine Elmore, Huanhuan Gu, Boon-Han Ooi, Kimberly Milligan, Heather Bremner

Research Associate: Amy Kimball

Wisconsin

Graduate students: Billie Leff, Chad Monfreda, and David Zaks (M.S.); Holly Gibbs (Ph.D.).

Undergraduate students: Hope Rutten, Alissa Naymark, Karin Swanson, Maija Swanson, Monika Zabko, Kristin Tenwinkel, Tristan Wagner, Lori Steckervetz.

Research Interns: Amato Evan, Nick Olejniczak, Seth Price, George Allez.

Postdoctoral fellows: Dr. Kaiyuan Li, Dr. Mustapha El Maayar.

Forthcoming Articles

Ramankutty, N., E. Heller, and J. Rhemtulla, Prevailing Myths about Agricultural Abandonment and Forest Regrowth in the United States, *Annals of the American Association of Geography*, Submitted.

Published Articles

Gibbs, H. K., M. Johnston, J. A. Foley, T. Holloway, C. Monfreda, N. Ramankutty & D. Zaks, Carbon payback times for crop-based biofuel expansion in the tropics: the effects of changing yield and technology. *Environ. Res. Lett.*, 3, 034001 (10pp) doi: 10.1088/1748-9326/3/3/034001, 2008

- Ellis, E. C., and N. Ramankutty, Putting people in the map: Anthropogenic biomes of the world, *Frontiers in Ecology and the Environment*, 6, 439-447, 2008.
- Monfreda, C., N. Ramankutty, and J. A. Foley, Farming the Planet. 2: The Geographic Distribution of Crop Areas, Yields, Physiological Types, and NPP in the Year 2000, *Glob. Biogeochem. Cycles*, 22, GB1022, doi:10.1029/2007GB002947, 2008.
- Ramankutty, N., A. Evan, C. Monfreda, and J. A. Foley, Farming the Planet. 1: The Geographic Distribution of Global Agricultural Lands in the Year 2000, *Glob. Biogeochem. Cycles*, 22, GB1003, doi:10.1029/2007GB002952, 2008.
- Ramankutty, N., T. Hertel, H.-L. Lee, and S. K. Rose, Global Agricultural Land Use Data for Integrated Assessment Modeling, in *Human-Induced Climate Change: An Interdisciplinary Assessment*, edited by M. Schlesinger, et al., pp. 252-265, Cambridge University Press, New York, NY, 2007.
- Foley, J.A., Ramankutty, N., Leff, B. and Gibbs, H.K., 2007. Global land use changes. In: M.D. King, C.L. Parkinson, K.C. Partington and R.G. Williams (Editors), *Our changing planet: The view from space*. Cambridge University Press, New York, pp. 262-265.
- Committee on Scientific Accomplishments of Earth Observations from Space, National Research Council, Earth Observations from Space: The First 50 Years of Scientific Achievements, The National Academies Press, 2008.
- Zaks, D. P. M., N. Ramankutty, C. C. Barford, and J. A. Foley, From Miami to Madison: Investigating the relationship between climate and terrestrial net primary production, *Glob. Biogeochem. Cycles*, 21, GB3004, doi:10.1029/2006GB002705, 2007.
- Narisma, G. T., J. A. Foley, R. Licker, and N. Ramankutty, Abrupt changes in rainfall during the twentieth century, *Geophysical Research Letters*, 34, L06710, doi:10.1029/2006GL028628, 2007.
- Li, K. Y., M.T. Coe, N. Ramankutty, and R. De Jong, Modeling the hydrological impact of land-use change in West Africa, *Journal of Hydrology*, 337, 258-268, doi:10.1016/j.jhydrol.2007.1001.1038, 2007
- Mahowald, N. M., J. A. Ballantine, J. Feddema, and N. Ramankutty, Global trends in visibility: implications for dust sources, *Atmospheric Chemistry and Physics Discussions*, 7, 3013-3071, 2007.
- Betts, R. A., P. D. Falloon, K. K. Goldewijk, and N. Ramankutty, Biogeophysical effects of land use on climate: Model simulations of radiative forcing and large-scale temperature change, *Agricultural and Forest Meteorology*, 142, 216-233, 2007.
- Foley, J.A., G.P. Asner, M.H. Costa, M.T. Coe, R. DeFries, H.K. Gibbs, E.A. Howard, S. Olson, J. Patz, N. Ramankutty, P. Snyder, Amazônia Revealed: forest degradation and losses of ecosystem goods and services in the Amazon Basin. *Frontiers in Ecology and the Environment*, 5, 25-32, 2007.
- Ramankutty, N., H. K. Gibbs, F. Achard, R. DeFries, J. A. Foley, and R. A. Houghton, Challenges to estimating carbon emissions from tropical deforestation, *Glob. Change Biol.*, 13, 51-66; doi: 10.1111/j.1365-2486.2006.01272.x, 2007.
- Ramankutty, N., C. Delire, and P. Snyder, Feedbacks between agriculture and climate: An illustration of the potential unintended consequences of human land use activities, *Global and Planetary Change*, 54, 79-93, 2006.
- Cassman, K.G., S. Wood, (and many others including N. Ramankutty), (2005) Cultivated Systems. In *Ecosystems and Human Well-being: Current State and Trends, Volume 1* (eds. Hassan, R., R. Scholes, and N. Ash), pp. 745-794. Island Press, Washington D.C.
- Ramankutty, N., L. Graumlich, F. Achard, D. Alves, A. Chhabra, R. DeFries, J. A. Foley, H. Geist, R. A. Houghton, K. Klein Goldewijk, E. F. Lambin, A. Millington, K. Rasmussen, R. S. Reid, and B.L. Turner II, Global Land Cover Change: Recent Progress, Remaining Challenges, in *Land Use and Land Cover Change: Local Processes, Global Impacts*, edited by E. F. Lambin and H. Geist, pp. 9-39, Springer Verlag, New York, 2006.
- Li, K.Y., R. De Jong, M.T. Coe, and N. Ramankutty, Root-water-uptake based upon a new water stress reduction- and asymptotic root distribution function, *Earth Interactions*, 10, 1-22, 2006.
- Brovkin, V., M. Claussen, E. Driesschaert, T. Fichefet, D. Kicklighter, M.F. Loutre, H.D. Matthews, N. Ramankutty, M. Schaeffer, and A. Sokolov, Biogeophysical effects of historical land cover changes simulated by six Earth system models of intermediate complexity, *Climate Dynamics*, 1-14; DOI: 10.1007/s00382-005-0092-6, 2006.
- El Maayar, M., N. Ramankutty, and C.J. Kucharik, Modeling Global and Regional Net Primary Production under Elevated Atmospheric CO₂: On a Potential Source of Uncertainty, *Earth Interactions*, 10, 1-20, 2005.
- Foley, J.A., R. DeFries, G.P. Asner, C. Barford, G. Bonan, S.R. Carpenter, F.S. Chapin, M.T. Coe, G.C. Daily, H.K. Gibbs, J.H. Helkowski, T. Holloway, E.A. Howard, C.J. Kucharik, C. Monfreda, J.A. Patz, I.C.

- Prentice, N. Ramankutty, and P.K. Snyder, Global Consequences of Land Use, *Science*, 309, 570-574, 2005.
- Li, K.Y., M.T. Coe, and N. Ramankutty, Investigation of Hydrological Variability in West Africa Using Land Surface Models, *J. Climate*, 18, 3173-3188, 2005.
- Lepers, E., E.F. Lambin, A.C. Janetos, R. DeFries, F. Achard, N. Ramankutty, and R.J. Scholes, A synthesis of information on rapid land-cover change for the period 1981-2000, *Bioscience*, 55 (2), 115-124, 2005.
- Kucharik, C.J., and N. Ramankutty, Trends and Variability in U.S. Corn Yields Over the 20th Century, *Earth Interactions*, 9, 1-29, 2005.
- Klein Goldewijk K and N. Ramankutty, Land cover change over the last three centuries due to human activities: The availability of new global data sets, *Geojournal*, 61, 335-344, 2004.
- Ramankutty, N., Croplands in West Africa: A Geographically-explicit Data Set For Use in Models, *Earth Interactions*, 8, 1-22, 2004.
- Leff, B., N. Ramankutty, and J. Foley, Geographic distribution of major crops across the world, *Global Biogeochemical Cycles*, 18, GB1009, doi:10.1029/2003GB002108, 2004.
- K. Klein Goldewijk and N. Ramankutty (2004) Land use changes during the past 300 years. In *Land Use, Land Cover and Soil Sciences*, In *Encyclopedia of Life Support Systems (EOLSS)* (ed Verheye WH). Developed under the Auspices of the UNESCO, EOLSS Publishers, Oxford, UK, [http://www.eolss.net].
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- Foley, J.A., M.H. Costa, C. Delire, N. Ramankutty, and P. Snyder, Green Surprise? How terrestrial ecosystems could affect the future of earth's climate, *Frontiers in Ecology and the Environment*, 1(1), 38-44, 2003.
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- Porter, W.P., J.L. Sabo, C.R. Tracy, O.J. Reichman, and N. Ramankutty, Physiology on a landscape scale: plant-animal interactions. *Integrative and Comparative Biology*, 42(3), 431-453, 2003.
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- Ramankutty, N., J.A. Foley, J. Norman, and K. McSweeney, The global distribution of cultivable lands: current patterns and sensitivity to possible climate change, *Global Ecology and Biogeography*, 11 (5), 377-392, 2002.
- Ramankutty, N., J.A. Foley, and N.J. Olejniczak, People on the land: Changes in Population and Global Croplands During the 20th Century, *Ambio*, 31 (3), 251-257, 2002.
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- Cramer, W., A. Bondeau, F.I. Woodward, I.C. Prentice, R.A. Betts, V. Brovkin, P.M. Cox, V. Fisher, J.A. Foley, A.D. Friend, C. Kucharik, M.R. Lomas, N. Ramankutty, S. Sitch, B. Smith, A. White, and C. Young-Molling, Dynamic responses of global terrestrial vegetation to changes in CO₂ and climate, *Global Change Biology*, 7, 357-373, 2001.
- McGuire, A.D., S. Sitch, R. Dargaville, G. Esser, J. Foley, M. Heimann, F. Joos, J. Kaplan, D.W. Kicklighter, R.A. Meier, J.M. Melillo, B.M. III, I.C. Prentice, N. Ramankutty, T. Reichenau, A. Schloss, H. Tian, and U. Wittenberg, The effects of CO₂, climate and land-use on terrestrial carbon balance, 1920-1992: An analysis with four process-based ecosystem models, *Global Biogeochemical Cycles*, 15, 183-206, 2001.
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- Porter, W.P., S. Budaraju, W.E. Stewart, and N. Ramankutty, Calculating climate effects on birds and mammals: Impacts on biodiversity, conservation, population parameters, and global community structure, *American Zoologist*, 40 (4), 597-630, 2000.
- Schlesinger, M.E., N. Ramankutty, and N. Andronova, Temperature Oscillations in the North Atlantic, *Science*, 289 (5479), 547-548, 2000.

- Ramankutty, N., and J. Foley, Estimating Historical Changes in Global Land Cover: Croplands from 1700 to 1992, *Global Biogeochemical Cycles*, 13, 997-1028, 1999.
- Ramankutty, N., and J. Foley, Estimating Historical Changes in Land Cover: North American Croplands from 1850 to 1992, *Global Ecology and Biogeography*, 8, 381-396, 1999.
- Ramankutty, N., and J. Foley, Characterizing Patterns of Global Land Use: An Analysis of Global Croplands Data, *Global Biogeochemical Cycles*, 12, 667-685, 1998.
- Schlesinger, M.E., N.G. Andronova, B. Entwistle, A. Ghanem, N. Ramankutty, W. Wang, and F. Yang, 1997: Modeling and Simulation of Climate and Climate Change. In *Proceedings of the International School of Physics "Enrico Fermi" Course CXXXIII*, Castagnoli G.C. and A. Provenzale (eds.), IOS Press, Amsterdam.
- Foley, J.A., I.C. Prentice, N. Ramankutty, S. Levis, D. Pollard, S. Sitch, and A. Haxeltine, An Integrated Biosphere Model of Land Surface Processes, Terrestrial Carbon Balance, and Vegetation Dynamics, *Global Biogeochemical Cycles*, 10, 603-628, 1996.
- Schlesinger, M.E., and N. Ramankutty, Is the Recently Reported 65-70 Year Surface-Temperature Oscillation the Result of Climatic Noise?, *Journal of Geophysical Research*, 100, 13,767-13,774, 1995.
- Schlesinger, M.E., and N. Ramankutty, 1995: A 65-70 Year Oscillation in Observed Surface Temperatures. In *Climate Sensitivity to Radiative Perturbations: Physical Mechanisms and Validation*, NATO ASI Series I, "Global Environmental Change", vol. 34, H. Le Treut (ed.), Springer-Verlag, Heidelberg, pp. 305-316.
- Schlesinger, M. E., and N. Ramankutty, 1994: Have Solar-Irradiance Variations Influenced Climate? In *The Solar Engine and its Influence on the Terrestrial Atmosphere and Climate*, E. Nemes-Ribes (ed.), Springer-Verlag, Heidelberg, pp. 493-506.
- Schlesinger, M.E., and N. Ramankutty, Low-frequency Oscillation. Reply. *Nature*, 372, 508-509, 1994.
- Schlesinger, M.E., and N. Ramankutty, An Oscillation in the Global Climate System of Period 65-70 Years. *Nature*, 367, 723-726, 1994.
- Schlesinger, M.E., and N. Ramankutty, Implications for Global Warming of Intercycle Solar-Irradiance Variations. *Nature*, 360, 328-330, 1992.

Professional Activities

- Invited member of the committee on *Scientific Accomplishments of Earth Observations from Space* of the National Research Council of the US National Academies for the period Oct 2006 – Sept 2007.
- Former Member, *Scientific Steering Committee, Land Use and Land Cover Change program (LUCC)*, a joint initiative of the International Geosphere Biosphere Programme (IGBP) and the International Human Dimensions Programme (IHDP).
- Former Member, *Global Land Project Transition Team, International Geosphere Biosphere Programme (IGBP)*.
- Member, The American Geophysical Union
- Member, Ecological Society of America
- Organized and chaired a session titled "Land use and land cover change: Observations and consequences" at the Fall Meeting of the American Geophysical Union in Dec 2001.
- Peer reviewer of manuscripts submitted to *Agronomie: Agriculture & Environment, Climatic Change, Earth Interactions, Ecological Applications, Frontiers in Ecology and the Environment, Geophysical Research Letters, Global and Planetary Change, Global Biogeochemical Cycles, Global Change Biology, Global Ecology and Biogeography, Journal of Climate, Journal of Geophysical Research – Atmospheres, Science, Science in China, Water Resources Research*.
- Peer reviewer of proposals submitted to NASA's *Carbon Cycle Science, EOS Recompetition, Earth System Science Fellowship (panel), Land Cover and Land Use Change, New Investigator*, and *REASON CAN Programs*, as well as NSF's *Biocomplexity in the Environment* and *Integrated Carbon Cycle Research Programs*.

Current Research Grants

- Natural Science and Engineering Research Council (NSERC) Discovery Grants, Canada, Principal Investigator on project titled "Observing and modelling land use change and its environmental consequences at global scales. CAD\$27,000/year from 2007-2012.
- McGill-India Strategic Research Initiative (Office of Vice Principal-Research), Co-Principal Investigator on project titled "Payment for environmental services (PES) in the Western Ghats: An exploration of the socio-economic, biophysical, and institutional issues at a watershed scale". CAD\$30,000 from VP-Research for 2007-08; Matching CAD\$10,000 from Faculty of Science.

- Canada Foundation for Innovation (CFI), Principal Investigator on project titled “Laboratory for observations and modeling of land use in an Earth system framework”. CAD\$149,564 total, including in-kind (amount received = \$119,652) for Dec 2006-Mar.
- World Bank Trust Funds, Co-Investigator on project titled “Climate Volatility and the Poor in Southern and Eastern Africa”. US\$500,000 for 2009-2011; McGill subaward via Purdue University of US\$60,000 for 3 years.
- U.S. Environmental Protection Agency, Co-Investigator on project titled “Dynamic Global Economic Modeling of Greenhouse Gas Emissions and Mitigation from Land-use Activities”. US\$850,000 for 2005-2010; McGill subaward via Purdue University from 2007-2010 of US\$188,224.
- National Aeronautics and Space Administration, Co-Investigator on project titled “Against the Grain: The Effects of Widespread, Intensifying Agriculture on the Biosphere and Climate System”. US\$1,066,080 from 2007-2009, No direct sub-award to McGill (NASA rules prohibit it), therefore Wisconsin pays scientist/lab manager who works at McGill.

Teaching at McGill University

- GEOG 540 - Global Land and Water Resources (Fall)
- GEOG 523 Advanced Climatology (Fall)
- ESYS 500 Earth System Applications (Fall)
- ESYS 301 Earth System Modeling (Winter)
- GEOG 205 Global Change: Past, present, and future (Winter)

Selected Conference Participation (20 selected)

- Annual Meeting of the Ecological Society of America, San Jose, Aug 2007. (Invited Talk: Feedbacks between agriculture and climate: An Illustration of the potential unintended consequences of human land-use activities)
- Fall Meeting of the American Geophysical Union, San Francisco, Dec 2007. (Invited Talk: Lessons from historical land-use change: What does the future hold?)
- 2nd National Conference of BIOCAP Canada, Ottawa, Ontario, Oct 31-Nov 1, 2006. (Invited talk: Global Land-Use Change: Assessing trade-offs of ecosystem services)
- International Conference on “Impacts of changes in land use and management on carbon stocks and turn over in the tropics”, Institute of Geography, University of Copenhagen, Denmark, 23-25 Aug 2004 (Invited Keynote presentation: Estimating carbon emissions from global land use change).
- American Geophysical Union Chapman conference on “Ecosystem interactions with land use change”, Santa Fe, New Mexico, 14-18 June 2003. (Talk: How do croplands influence climate and vice versa?).
- IGBP Open Science Conference, Amsterdam, July 2001. (Two invited talks: (1) The Effects of Historical Changes in Global Agricultural Land on the Terrestrial Carbon Cycle; (2) Land cover change over the last 3 centuries due to human activities: the availability of new global datasets).
- ECLAT-2 workshop on ‘Climate scenarios for agricultural, ecosystem and biological impacts’, Potsdam, Germany, October 1999. (Keynote presentation: Integrated Modeling of the Earth System: bidirectional atmosphere-biosphere interactions)
- PAGES-LUCC-DIS Joint Workshop on Historical Land Use/Land Cover Change and LUCC Data Gathering and Compilation Workshop, Barcelona, November 1998. (Poster and talk: Reconstructing Historical Changes in Global Croplands.)
- GCTE-LUCC Open Science Conference on Global Change, Barcelona, March 1998. (Poster and talk: Evaluating the Role of Land Use in the Terrestrial Biosphere over the Last Century.)
- Fall Meeting of the American Geophysical Union, San Francisco, December 1994. (Poster: Intercomparison of the AVHRR and SAGE II Satellite Observations of Aerosol Optical Depth.)