

Niall P. HANAN

Plant and Environmental Sciences (PES) & Jornada Basin LTER
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EDUCATION

Ph.D. 1990 **Queen Mary University, London, Biology**
B.S. 1985 **Liverpool Polytechnic-John Moore's University, Biology**

PROFESSIONAL EXPERIENCE

September 2022 – present: **Interim Department Head**, Plant and Environmental Sciences & Extension Plant Sciences, New Mexico State University, Las Cruces, New Mexico
March 2021 – present: **PI**, Jornada Basin Long Term Ecological Research (LTER) Program
September 2019 – present: **Associate Department Head**, Plant and Environmental Sciences, New Mexico State University, Las Cruces, New Mexico
January 2017 – present: **Professor**, Plant and Environmental Sciences, New Mexico State University, Las Cruces, New Mexico and **Co-PI**, Jornada Basin LTER
January 2017 – March 2021: **Co-PI**, Jornada Basin Long Term Ecological Research (LTER) Program.
January 2017 – present: **Professor**, Plant and Environmental Sciences, New Mexico State University
January 2011-December 2016: **Senior Scientist & Professor**, Geospatial Sciences Center of Excellence (GSCE), South Dakota State University, Brookings, South Dakota.
September 2007-July 2008: **Fulbright Research and Teaching Scholar**, Université de Bamako, Mali and Institut Polytechnique Rural de Katibougou, Koulikoro, Mali
July 2007 – December 2010: **Research Professor**, Natural Resource Ecology Laboratory, Colorado State University
February 2001 – June 2007: **Research Associate Professor**, Natural Resource Ecology Laboratory, CSU
July 1998 – January 2001: **Research Assistant Professor**, Natural Resource Ecology Laboratory, CSU

PROFESSIONAL HIGHLIGHTS

- PI, NSF funded Jornada Basin LTER (2021-present)
- NASA ICESat-2 Mission Science Team Member
- NASA GEDI Mission Science Team Member
- Editor *Frontiers in Environmental Sciences-Drylands*

PUBLICATIONS (since 2018) (led by *graduate student, †post-doc)

*Brianna M. Lind, Paul Eggleton, Vivienne Uys, **Niall P. Hanan**, 2022, Precipitation mediates termite functional diversity and dominance in southern Africa, *Bothalia: African Biodiversity and Conservation*, 52, 1, a3 (DOI: 10.38201/btha.abc.v52.i1.3).
Hanan, N. P. and Swemmer, A. M., 2022, Savannahs store carbon despite frequent fires, *Nature*, 603 (17 March 2022): 395-396. (DOI: 10.1038/d41586-022-00689-0, *Nature* SharedIt Link: <https://rdcu.be/cJh7o>).
Hanan, N. P., Milne, E., Aynekulu, E., Yu, Q. and Anchang, J, Y., 2021, A role for drylands in a carbon neutral world? *Frontiers in Environmental Sciences – Drylands*, 9, Article 786087 (DOI: 10.3389/fenvs.2021.786087).

- [†]Qiuyan Yu, Wenjie Ji, Lara Prihodko, C. Wade Ross, Julius Y. Anchang, **Niall P. Hanan**, 2021, Study becomes insight: ecological learning from machine learning, *Methods in Ecology and Evolution*, **12**, Article 13686 (DOI: 10.1111/2041-210X.13686).
- Cunliffe, A., et al (50 authors, including **Hanan, N. P.**, [†]Ji, W. and ^{*}Wojcikiewicz, R.), 2021, Drone-derived canopy height predicts aboveground biomass in non-forest ecosystems across the globe, *Remote Sensing in Ecology and Conservation* (in press).
- Iwaniec, D. M., Gooseff, M., ..., **Hanan, N. P.**, et al., 2021, Connectivity: insights from the U.S. Long Term Ecological Research Network *Ecosphere* **12**, 5:e03432. (DOI: 10.1002/ecs2.3432).
- [†]Ross, C. W., **Niall P. Hanan**, Lara Prihodko, Julius Anchang, Wenjie Ji, Qiuyan Yu. 2021, Woody-biomass projections and drivers of change in sub-Saharan Africa, *Nature Climate Change*, **11**: 449-455 (DOI: 10.1038/s41558-021-01034-5).
- Hanan, N. P.**, Limaye, A. S. and Irwin, D. E., 2020, Use of Earth observations for actionable decision making in the developing world, *Frontiers in Environmental Science*, **8**: 601340 (DOI: 10.3389/fenvs.2020.601340).
- Hanan, N. P.** and Anchang, J., 2020, Satellites could soon map every tree on earth, *Nature* **587**, (5 November 2020), 42-43. (DOI: 10.1038/d41586-020-02830-3).
- [†]Kumar, S. S., Prihodko, L., Lind, B. M., Anchang, J. Y., Ji, W., Ross, C. W., Kahiu, N., Velpuri, N., and **Niall P. Hanan**, 2020, Remotely sensed thermal decay rate: an index for vegetation monitoring, *Scientific Reports*, **10**, 9812 (DOI: 10.1038/s41598-020-66193-5).
- ^{*}Samasse, K., **Hanan, N. P.**, Anchang, J., and Diallo, Y., 2020. A high-resolution cropland map for the West African Sahel based on high-density training data, Google Earth Engine, and locally optimized machine learning. *Remote Sensing*, **12**, (9) 1436 (DOI: 10.3390/rs12091436).
- [†]Anchang, J. Y., Prihodko, L., Ji, W., Kumar, S. S., Ross, C. W., Yu, Q., Lind, B. M., Sarr, M. A., Diouf, A. A. and **Hanan, N. P.**, 2020, Towards operational mapping of woody canopy cover in tropical savannas using Google Earth Engine, *Frontiers in Environmental Science*, **8**, 4 (DOI: 10.3389/fenvs.2020.00004).
- ^{*}Brennan, J., Johnson, P., and **Hanan, N. P.**, 2020, Comparing stability in random forest models to map northern Great Plains plant communities in pastures occupied by prairie dogs using Pleiades imagery, *Biogeosciences*, **17**, 1281-1292 (DOI: 10.5194/bg-17-1281-2020).
- [†]Kumar, S. S., **Hanan, N. P.**, Prihodko, L., Anchang, J. Y., Ross, C. W., Ji, W., Lind, B. M., 2019, Alternative vegetation states in tropical savannas: the search for consistent signals in diverse remote sensing data, *Remote Sensing*, **11**, (7) 815 (DOI: 10.3390/rs11070815).
- [†]Anchang, J. Y., Prihodko, L., Kaptué, A. T., Ross, C. W., Ji, W., Kumar, S. S., Lind, B. M., Sarr, M. A., Diouf, A. A. and **Hanan, N. P.**, 2019, Trends in woody and herbaceous vegetation in the savannas of West Africa, *Remote Sensing*, **11**, (5) 576 (DOI:10.3390/rs11050576).
- [†]Ji, W., **Hanan, N. P.**, Browning, D. M., Monger, H. C., Peters, D. P. C., Bestelmeyer, B. T., Archer, S. R., Ross, C. W., Lind, B. M., Anchang, J., Kumar, S. S., Prihodko, L., 2019, Constraints on shrub cover and shrub-shrub competition in a U.S. southwestern desert, *Ecosphere* **10**, 2, e02590 (DOI: 10.1002/ecs2.2590).
- ^{*}Lind, B. M., **Hanan, N. P.**, Gigliotti, L. C., Allen, R. L. McHenry, A., and Gardiner, A., 2019, Termite diversity along a catena in southern Kruger Park, South Africa, *African J. Ecology*, **57**, 160-165 (DOI: 10.1111/aje.12569).
- ^{*}Samasse, K., **Hanan, N. P.**, Tappan, G., Diallo, Y., 2018, Assessing cropland area in West Africa for agricultural yield analysis, *Remote Sensing*, **10**, 1785 (DOI: 10.3390/rs10111785).
- Koerner, S.E., M.D. Smith, D.E. Burkepile, **N.P. Hanan**, M.L. Avolio, S.L. Collins, A.K. Knapp, N.P. et al., 2018, Resolving variation in herbivore effects on plant biodiversity – change in dominance as a global mechanism, *Nature Ecology and Evolution*, **2**, 12, 1925-1932. (DOI: 10.1038/s41559-018-0696-y; *Nature* SharedIt Link: <https://rdcu.be/bajCn>).
- Peters, D. Burruss, N., ..., **Hanan, N. P.**, et al., 2018, An integrated view of complex landscapes: a big data-model integration approach to trans-disciplinary research, *BioScience*, **68**, 653-669 (DOI: 10.1093/biosci/biy069).

Hanan, N. P., 2018, Agroforestry in the Sahel, *Nature Geoscience*, **11**, 296-297 (DOI: 10.1038/s41561-018-0112-x; *Nature* SharedIt Link: <https://rdcu.be/LGq4>).

+Ross, C.W., L. Prihodko, J. Anchang, S. Kumar, W. Ji, and **N. P. Hanan**. 2018. Global Hydrologic Soil Groups (HYSOGs250m) for Curve Number-Based Runoff Modeling, *Scientific Data*, **5**, 180091 (DOI: 10.1038/sdata.2018.91; www.nature.com/articles/sdata201891.pdf).

*Kahiu, M. N. and **Hanan, N. P.**, 2018, Fire in Sub-Saharan Africa: the fuel, cure and connectivity hypothesis, *Global Ecology and Biogeography*, **27**, (7) 946-957 (DOI: 10.1111/geb.12753).

*Axelsson, C. R. and **Hanan, N. P.**, 2018, Rates of woody encroachment in African savannas reflect water constraints and fire disturbance, *Journal of Biogeography*, **45**, (6) 1209-1218 (DOI: 10.1111/jbi.13221).

*Kahiu, M. N. and **Hanan, N. P.**, 2018, Estimation of woody and herbaceous leaf area index in Sub-Saharan Africa using MODIS data, *JGR-Biogeosciences*, **123** (1) 3-17 (DOI: 10.1002/2017JG004105).

PUBLISHED DATASETS (since 2010) (led by * graduate student, + post-doc)

+Ross, C. W., **Niall P. Hanan**, Lara Prihodko, Julius Anchang, Wenjie Ji, Qiuyan Yu. 2021, Prediction Maps: Woody-biomass projections and drivers of change in sub-Saharan Africa, https://figshare.com/articles/dataset/Biomass_prediction_maps/14150210/2

Hanan, N.P., L. Prihodko, C.W. Ross, G. Bucini, and A.T. Tredennick. 2020. Gridded Estimates of Woody Cover and Biomass across Sub-Saharan Africa, 2000-2004. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1777>.

*Samasse, K., Hanan, N. P., Anchang, J., and Diallo, Y. (2020). High-Resolution Cropland Map for the West African Sahel. Google Earth Engine Visualization, <https://savannalabnmsu.users.earthengine.app/view/wa-cropmap-30m>.

+Anchang, J.Y., L. Prihodko, A.T. Kaptue, C.W. Ross, W. Ji, S.S. Kumar, B. Lind, M.A. Sarr, A.A. Diouf, and N.P. Hanan. 2020. Woody and Herbaceous Vegetation Change across the Savannas of West Africa, 1982-2013. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1738>. Google Earth Engine Visualization, <https://savannalabnmsu.users.earthengine.app/view/wavetrends>.

+Ji, W. and Hanan N.P., 2019, High resolution shrub cover raster maps of the Jornada Basin LTER, including JER and CDRRC (2011), Environmental Data Initiative, DOI: <https://doi.org/10.6073/pasta/2bbee949ad08c7feb1d5cec6570b65b8>.

*Axelsson, C. and Hanan N.P., 2018, Supplementary materials from: Rates of woody encroachment in African savannas reflect water constraints and fire disturbance, *J. Biogeography*, DOI: 10.1111/jbi.13221.

+Ross, C.W., L. Prihodko, J. Anchang, S. Kumar, W. Ji, and N.P. Hanan. 2018. Global Hydrologic Soil Groups (HYSOGs250m) for Curve Number-Based Runoff Modeling. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1566>.

*Kahiu, M. N. and Hanan, N. P., 2017, Data from: Estimation of woody and herbaceous leaf area index in Sub-Saharan Africa using MODIS data, Dryad Digital Repository, <http://doi.org/10.5061/dryad.v5s0j>.

*Axelsson, C. and Hanan N.P., 2017, Supplementary Information from: Patterns in woody vegetation structure across African savannas, *Biogeosciences*, DOI: 10.5194/bg-14-3239-2017.

+Kaptue, A.T., N.P. Hanan, L. Prihodko, and J.A. Ramirez. 2015. Spatio-temporal Characteristics of Rainfall in Africa, 0.25 degrees, from 1998-2012. Data set. Available on-line from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. <http://dx.doi.org/10.3334/ORNLDAAC/1263>.

+Kaptue, A. T., Hanan, N. P., and Prihodko, L., 2015, Location and permanency of water bodies in the African Sahel region from 2003-2011. Data set. Available on-line from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. <http://dx.doi.org/10.3334/ORNLDAAC/1269>.

*Tredennick AT, Hanan NP, Martinez K, Keita L, 2014, Data from: Effects of tree harvest on the stable-state dynamics of savanna and forest. Dryad Digital Repository. <http://dx.doi.org/10.5061/dryad.vg121>

Caroline E. R. Lehmann, C. E. R. Anderson, M. T., Sankaran, M., Higgins, S. I., Archibald, S., Hoffmann, W. A., Hanan, N. P., et al., 2014, Savanna Vegetation-Fire-Climate Relationships Differ Among Continents, *Science* **343**, 548-552 Supplementary Information available on-line <http://www.sciencemag.org/content/343/6170/548/suppl/DC1>, DOI: 10.1126/science.1247355.

RESEARCH SUPPORT (Active projects)

Supporting index-based livestock insurance initiatives (IBLI) in East and Southern Africa through Earth Observation for forage biomass and associated risk factors, PI J Anchang, Co-Investigators, NP Hanan, MN Kahiu, 1/1/2023-12/31/2025, NASA SERVIR Applied Sciences Team (\$660,360)

Patterns and drivers of tree height and biomass in water limited (tropical and temperate) ecosystems, PI Q Yu, Co-Investigators, NP Hanan, W Ji, JY Anchang, L Prihodko, MG Ryan and R. St. Hilaire, 12/1/2020-11/30/2023, NASA GEDI Science Team (\$499,566)

ILTER: Long-term research at the Jornada Basin (ILTER VII), PI NP Hanan, Co-Investigators O Sala, B Bestelmeyer and 11 others, 11/1/2020-10/31/2024, National Science Foundation, LTER Program (\$4,508,000)

Improving estimates of vegetation structure in global savannas and drylands with ICESat-2, PI NP Hanan, Co-Investigators, L Prihodko, J Anchang, W Ji, CW Ross, Q Yu, 6/1/2020-5/31/2023, NASA ICESat-2 Science Team (\$617,500)

Range monitoring for decision support, pastoral livelihoods and food security in arid and semi-arid East and Southern Africa, PI NP Hanan, Co-Investigator J. Anchang, 11/1/19-8/31/23, NASA-SERVIR Applied Sciences Team (\$646,871)

GRADUATE STUDENT ADVISEES & GRADUATE COMMITTEES (Degree, Program, Year Graduated, Role)

Christoffer Axelsson (PhD, GSE-SDSU, 2018, Chair), Jameson Brennan (PhD, NRM-SDSU, 2019, Member), Gabriela Bucini (PhD, GDPE-CSU, 2010, Chair), Dylan Burruss (PhD, PES-NMSU, ongoing, Chair), Kurt Chowanski (PhD, NRM-SDSU, 2016, Member), Kathy Corbin (MSc, Atmos-CSU, 2005, Member), Amadou Dieye (PhD, GSE-SDSU, 2013, Member), Justin Dohn (MSc, GDPE-CSU, 2015, Chair), Rissa Garcia-Prudencio (MSc, PES-NMSU, ongoing, Member), Melakeneh Gedefaw (PhD, ANRS-NMSU, 2021, Member), Mikaela Hoellrich (PhD, PES-NMSU, 2021, Member), Njoki Kahiu (PhD, GSE-SDSU, 2018, Chair), David Kimiti (PhD, Range Science-NMSU, 2017, Member), Steven Lee (PhD, Biology-NMSU, ongoing, Member), Zhengpeng Li (PhD, GSE-SDSU, 2016, Member), Brianna Lind (MSc, Biology-SDSU, 2015, Chair & PhD, PES-NMSU, 2022, Chair), William Sean Mason (MSc, EE-NMSU, 2017, Member), Seth Munson (PhD, GDPE-CSU, 2008, Member), Abid Nazir (PhD, PES-NMSU, ongoing, Chair), Nick Parazoo (MSc, Atmos-CSU, 2006, Member), Andrew Philpott (MSc, Atmos-CSU, 2006, Member), Trevor Roberts (MSc, PES-NMSU, ongoing, Chair), Kaboro Samasse (PhD, GSE-SDSU, 2020, Chair), William Sea (PhD, GDPE-CSU, 2007, Chair), Andrew Schuh (PhD, Atmos-CSU, 2008, Member), Mandira Sigdel-Phuyal (MSc, Geography-SDSU, 2016, Chair), Sanath Sathyachandran (PhD, GSE-SDSU, 2014, Member), Andrew Tredennick (PhD, GDPE-CSU, 2014, Chair), Tony Swemmer (PhD, Biology-CSU, 2006, Member), Caroline Toth (MSc, PES-NMSU, 2021, Chair), Tyler Turk (PhD, ANRS-NMSU, 2021, Member), Emma White (PhD, GSE-SDSU, 2014, Member), Hunter Winsor (PhD, PES-NMSU, 2023, Member), Robert Wojcikiewicz (MSc, PES-NMSU, 2022, Chair).

POSTDOCTORAL ADVISEES

Dr. Julius Anchang (2017-2020), Dr. Bok-Haeng Baek (2004), Dr. Cameron Duquette (2021-2022), Dr. Wenjie Ji (2017-2021), Dr. Njoki Kahiu (2022-present), Dr. Armel Kaptué (2011-2015), Dr. Sanath Sathyachandran Kumar (2017-2018), Dr. Mahesh Sankaran (2002-2006), Dr. Jayashree Ratnam (2002-2006), Dr. C. Wade Ross (2017-2021), Dr. Christopher Williams (2004-2007), Dr. Qiuyan Yu (2018-2022).