

JAN M.H. HENDRICKX, Ph.D., Ir.

Professor of Hydrology
Department of Earth & Environmental Science,
New Mexico Institute of Mining and Technology, Socorro, NM 87801
Phone: 505 835 5892; fax: 505 835 6436; email: hendrick@nmt.edu

INTERESTS

The processes of water, solutes, and heat movement through the Earth's Critical Zone using field observations, laboratory experiments, and mathematical models. The Earth's Critical Zone includes the land surface, vegetation, and water bodies, and extends through the soil, unsaturated vadose zone, and saturated groundwater zone; it is the most heterogeneous portion of the Earth. Current research is directed toward quantification of the components of the energy balance, actual evapotranspiration, root zone soil moisture, soil hydraulic properties, and surface temperatures at cm to km scale using optical remote sensing imagery, scintillometry, and thermal cameras.

EDUCATION

Ph.D., 1984, Soil Physics, New Mexico State University, Las Cruces, NM. Dissertation: Experimental Design and Results of Water Use Studies for Trickle-Irrigated Chile Pepper.

M.S., 1975, Civil Engineering & Irrigation, Agricultural University Wageningen, Netherlands

B.S., 1972, Civil Engineering & Irrigation, Agricultural University Wageningen, Netherlands

EXPERIENCE

2001 – present	Professor of Hydrology, New Mexico Tech
2003 – present	Adjunct Professor of Civil Engineering, New Mexico Tech
2004 – present	Senior Fellow of Ecology and Resource Management, Center of Development Research, Bonn University, Germany
1993 - 2001	Associate Professor of Hydrology, New Mexico Tech
1990 - 1993	Assistant Professor of Hydrology, New Mexico Tech
1988 - 1990	Research Leader and Agrohydrologist, International Institute for Land Reclamation and Improvement/ILRI, Wageningen, The Netherlands. (Stationed at the International Waterlogging and Salinity Research Institute, Lahore, Pakistan)
1985 - 1988	Head and Soil Hydrologist, Department of Soil Physics and Hydrology, Netherlands Soil Survey Institute, Wageningen, The Netherlands.
1984 - 1985	Research Agricultural Engineer and Post Doc, Department of Agricultural

Engineering, Texas A&M University, College Station, Texas.

- 1981 - 1984 Research Assistant of Soil Physics, New Mexico State University, Las Cruces, New Mexico.
- 1979 - 1981 Research Leader and Irrigation Engineer, Department of Civil Engineering and Irrigation, Agricultural University Wageningen, The Netherlands. (Stationed at the Office du Niger, Segou, Mali, West-Africa)
- 1978 - 1979 Irrigation and Drainage Engineer, Agrar und Hydrotechnik Gmbh, Essen, Germany.
- 1976 - 1978 Irrigation Engineer and OXFAM Volunteer, Program for the Application of Appropriate Technology – OXFAM, Campina Grande, Paraiba, Brazil.
- 1975 - 1976 Instructor, Department of Civil Engineering and Irrigation, Agricultural University Wageningen, The Netherlands.
- 1973 Research Assistant, Institute for Land and Water Management, Wageningen, The Netherlands.
- 1972 Research Assistant, Agricultural Experiment Station, Paramaribo, Suriname (South America).

PROFESSIONAL SERVICES

Memberships: American Geophysical Union
Soil Science Society of America
National Ground Water Association
American Society of Agricultural Engineers
Asociación Latinoamericana de Hidrología Subterránea para el Desarrollo
International Soil Science Society
Royal Society of Agricultural Science of The Netherlands
Gamma Sigma Delta, Phi Kappa Phi

Offices:

- Associate Editor Soil Science Society of America Journal, Div. Soil Physics. 1993-1999.
- Adjunct Professor Faculty of Engineering, Autonomous University of Chihuahua, Chih., Mexico. 1993-1995.
- Adjunct Professor Department of Agronomy and Horticulture, New Mexico State University, Las Cruces. 1992-1994.
- Participant: Binational Committee for the Investigation of the Future of the

- Aquifer of Mexico City. 1992-1993.
- Member: UNESCO/IAH Project "Aquifer recharge in semi-arid areas". 1992-1996.
- Member: Task group 'Soils' of Dutch National Council for Agricultural Research 1986-1989
- Member: Dutch National Coordination Committee for Research on Water Resources Management. 1986-1988
- Member: Education Board of the Department of Civil Engineering and Irrigation, Agricultural University Wageningen. 1973-1976
- Treasurer: Agricultural Student Association of Wageningen. 1968-1969

HONORS

- 2002 Fellow of the Soil Science Society of America
 2000 Fulbright Scholar

LANGUAGES

- Speaking: Dutch, English, Spanish, German, French, Portuguese
 Reading: Dutch, English, Spanish, French, German, Portuguese
 Writing: Dutch, English, Spanish, French, German

SELECTED PUBLICATIONS

(out of over 100 total peer reviewed publications)

- Saddiq, M.H., P.J. Wierenga, J.M.H. Hendrickx, and M.Y. Hussain. 1985. Spatial variability of soil water tension in an irrigated soil. *Soil Sci.* 140:126-132.
- Wierenga, P.J., and J.M.H. Hendrickx. 1985. Yield and quality of drip irrigated chile peppers. *Agric. Water Manage.* 9:339-356.
- Hendrickx, J.M.H., N.H. Vink, and T. Fayinke. 1986. Water requirement for irrigated rice in a semi-arid region in West Africa. *Agric. Water Manage.* 11:75-90.
- Hendrickx, J.M.H., P.J. Wierenga, M.S. Nash, and D.R. Nielsen. 1986. Boundary location from texture, soil moisture, and infiltration data. *Soil Sci. Soc. Am. J.* 50:1515-1520.
- Wierenga, P.J., J.M.H. Hendrickx, M.H. Nash, L. Daugherty, and J. Ludwig. 1987. Variation of soil and vegetation with distance along a transect in the Chihuahuan desert. *J. of Arid Environm.* 13:53-63.
- Hendrickx, J.M.H., P.J. Wierenga, and N.S. Urquhart. 1988. Optimal design of field experiments for determination of production functions. *Soil Sci. Soc. Am. J.* 52:494-499.
- Bannink, M.H., J.M.H. Hendrickx, and B.J. Bles. 1988. Quantitative evaluation of large areas in respect of vulnerability to moisture deficit. *Soil Survey and Land Evaluation* 8:47-63.
- Hendrickx, J.M.H., L.W. Dekker, M.H. Bannink, and H.C. van Ommen. 1988. Significance of soil survey for agrohydrological studies. *Agric. Water Manage.* 14:195-208
- Van Ommen, H.C., R. Dijkma, J.M.H. Hendrickx, L.W. Dekker, J. Hulshof, and M. van den

- Heuvel. 1989. Experimental assessment of preferential flow paths in a field soil. *J. of Hydrology* 105:253-262.
- Bannink, M.H., L.W. Dekker, J.M.H. Hendrickx, and H.C. van Ommen. 1989. Seepage through moorland pool bottoms. A sensitivity analysis. *H₂O* 22:456-459,464. (in Dutch).
- Hendrickx, J.M.H., and P.J. Wierenga. 1990. Variability of soil water tension in a trickle-irrigated chile pepper field. *Irr. Science* 11:23-30.
- Hendrickx, J.M.H., P.J. Wierenga, and M.S. Nash. 1990. Variability of soil water tension and soil water content. *Agric. Water Managem.* 18:135-148.
- Hendrickx, J.M.H., M. Akram Chaudhry, J.W. Kijne, M. Sadiq, and Iqbal Raza. 1990. Soil physical measurements for drainage design in arid regions. Symposium on Land Drainage for Salinity Control in Arid and Semi-Arid Regions, Febr. 25-March 2, Cairo, Egypt. Vol. 2:124-134.
- Hendrickx, J.M.H. 1990. Determination of hydraulic soil properties. In: M.G. Anderson and T.P. Burt (eds.), *Process studies in hillslope hydrology*, chapter 3. John Wiley and Sons. pp. 42-93.
- Van Dam, J.C., J.M.H. Hendrickx, H.C. van Ommen, M.H. Bannink, M.Th. van Genuchten, and L.W. Dekker. 1990. Water and solute movement in a coarse-textured water-repellent field soil. *J. of Hydrology*, 120:359-379
- Hendrickx, J.M.H., S. Khan, M.H. Bannink, D. Birch, and C. Kidd. 1991. Numerical analysis of groundwater recharge through stony soils using limited data. *J. of Hydrology* 127:173-192.
- Hendrickx, J.M.H., and L.W. Dekker. 1991. Experimental evidence of unstable wetting fronts in homogeneous non-layered soils. In: T.J. Gish and A. Shiromohammadi (eds.) *Proc. of ASAE National Symposium on Preferential Flow*. Chicago IL. December 1991. pp. 22-31.
- Hendrickx, J.M.H. 1992. Book Review of *Groundwater Recharge. A guide to understanding and estimating natural recharge* by David N. Lerner, Arie S. Issar, and Ian Simmers. *J. of Environmental Quality* 21:512.
- Hendrickx, J.M.H., B. Baerends, Z.I. Raza, M. Sadiq, and M. Akram Chaudhry. 1992. Soil salinity assessment by electromagnetic induction on irrigated land. *Soil Sci. Soc. Am. J.* 56:1933-1941
- Beekma, J., J.M.H. Hendrickx, M. Sadiq, M. Akram Chaudry, M. Akram. 1992. Variability of capillary rise within a drainage unit. *Proceedings of 5th International Drainage Workshop, Lahore-Pakistan, ICID, Vol. II:109-119.*
- Hendrickx, J.M.H., L.W. Dekker, and O.H. Boersma. 1993. Unstable wetting fronts in water repellent field soils. *J. of Environmental Quality* 22:109-118
- Ritsema, C.J., L.W. Dekker, J.M.H. Hendrickx, and W. Hamminga. 1993. Preferential flow mechanism in a water repellent sandy soil. *Water Resources Research.* 29:2183-2194.
- Hendrickx, J.M.H., J.L. Nieber, and P. Siccama. 1994. Effect of tensiometer cup size on soil water tension variability. *Soil Science Society of America Journal* 58:309-315.
- Hendrickx, J.M.H., and F.M. Phillips. 1994. Book Review of *Water Resources in the Arid Realm* by Clive Agnew and Ewan Anderson. *Journal of Geological Education* 42:294-295.
- Sheets, K.R., J.P. Taylor, and J.M.H. Hendrickx. 1994. Rapid salinity mapping by electromagnetic induction for determining riparian restoration potential. *Restoration Ecology* 2:242-246.
- Hendrickx, J.M.H., C.D. Grande, B.A. Buchanan, and R.E. Bretz. 1994. Electromagnetic induction for restoration of saline environments in New Mexico. Chapter 13 in: *ECM*

- Series on Environmental Management & Intelligent Manufacturing. *Editors* Rohinton K. Bhada, Abbas Ghassemi, Timothy J. Ward, Mohammad Jamshidi, and Mohsen Shahinpoor. Volume No. 1 "Waste-management: From Risk to Remediation" ECM Press, Albuquerque, New Mexico. pp. 247-265.
- Sheets, K.R., and J.M.H. Hendrickx. 1995. Non-invasive soil water content measurement using electromagnetic induction. *Water Resources Research* 31:2401-2409.
- Yao, T., and J.M.H. Hendrickx. 1996. Stability of wetting fronts in homogeneous soils under low infiltration rates. *Soil Science Society of America Journal* 60:20-28.
- Hendrickx, J.M.H. and T. Yao. 1996. Prediction of wetting front stability in dry field soils using soil and precipitation data. *Geoderma* 70:265-280.
- Mohanty, B.P., R.S. Bowman, J.M.H. Hendrickx, and M.T. van Genuchten. 1997. New piecewise-continuous hydraulic functions for modeling preferential flow in an intermittent-flood irrigated field. *Water Resources Research* 33:2049-2064.
- Borchers, B., T. Uram, and J.M.H. Hendrickx. 1997. Tikhonov regularization for determination of depth profiles of electrical conductivity using non-invasive electromagnetic induction measurements. *Soil Science Society of America Journal* 61:1004-1009.
- Hendrickx, J.M.H. and G. Walker. 1997. Recharge from precipitation. Chapter 2. *In*. I. Simmers (ed.), *Recharge of phreatic aquifers in (semi)-arid areas*. Balkema, Rotterdam, The Netherlands.
- Mohanty, B.P., R.S. Bowman, J.M.H. Hendrickx, J. Simunek, and M.Th. van Genuchten. 1998. Preferential transport of nitrate to a tile drain in an intermittent_flood_irrigated field: model development and experimental evaluation. *Water Resour. Res.* 34:1061-1076.
- Hopmans, J.W., J.M.H. Hendrickx, and J.S. Selker. 1999. Emerging measurement techniques for vadose zone characterization. *In*: Marc B. Parlange and Jan W. Hopmans (eds.), *Vadose Zone Hydrology: cutting across disciplines*, Oxford University Press. pp 279-317.
- Jaramillo, D.F., L.W. Dekker, C.J. Ritsema, and J.M.H. Hendrickx. 2000. Occurrence of soil water repellency in arid and humid climates. *J. of Hydrology* 231/232:105-114.
- Hendrickx, J.M.H. and M. Flury. 2001. Uniform and preferential flow mechanisms in the vadose zone. Contribution to the Workshop "Conceptual models of flow and transport in the fractured vadose zone", U.S. National Committee for Rock Mechanics, National Academy of Sciences/National Research Council, National Academy of Sciences, Irvine, California, March 18-19, 1999. pp. 149-188.
- Du, X.H. T. Yao, W.D. Stone and J.M.H. Hendrickx. 2001. Stability analysis of the unsaturated water flow equation: 1. Mathematical derivation. *Water Resources Research*, 37:1869-1875.
- Yao, T. and J.M.H. Hendrickx. 2001. Stability analysis of the unsaturated water flow equation: 2. Experimental Verification. *Water Resources Research*, 37:1875-1881.
- Das, B.S., J.M.H. Hendrickx, and B. Borchers. 2001. Modeling transient water distributions around landmines in bare soils. *Soil Science* 166(3):163-173.
- Caplan T., Musslewhite, B.D., Buchanan, B.A. and J.M.H. Hendrickx. 2001. Reclaiming Sodic Soils Following Saltcedar Removal on the Pueblo of Santa Ana, New Mexico. *Proceedings from the Association of Surface Mining and Reclamation Conference*, Albuquerque, NM. June 2001. Volume 2:332-344.
- Hendrickx, J.M.H., B. Borchers, D.L. Corwin, S.M. Lesch, A.C. Hilgendorf, and J. Schlue. 2002. Inversion of soil conductivity profiles from electromagnetic induction measurements: theory and experimental verification. *Soil Science Society of America Journal* 66:673-685.

- Kachanoski, R.G., E. de Jong, and J.M.H. Hendrickx. 2002. Nonintrusive water content measurement in the field. Section 3.1.3.2 *In*: J.H. Dane and G.C. Topp (eds.) *Methods of soil analysis. Part 4. Physical Methods*. Soil Science Society of America, Madison, Wisconsin. pp. 497-501.
- Hendrickx, J.M.H., J. Wraith, R.G. Kachanoski, and D.L. Corwin. 2002. Solute content and concentration. Section 6.1 *In*: J.H. Dane and G.C. Topp (eds.) *Methods of soil analysis. Part 4. Physical Methods*. Soil Science Society of America, Madison, Wisconsin. pp. 1253-1322.
- Hendrickx, J.M.H., F.M. Phillips, and J.B.J. Harrison. 2003. Chapter 5. Water flow processes in arid and semi-arid vadose zones. *In*: I. Simmers (Editor), *Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones*, International Association of Hydrogeologists, *International Contributions to Hydrogeology, Volume 23:151-210*. A.A. Balkema Publishers, Lisse, The Netherlands.
- Rodríguez-Marín, G., J.B.J. Harrison, J. Simunek, and J.M.H. Hendrickx. 2003. Simulation of water flow through indurated calcic horizons. *In*: I. Simmers (Editor), *Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones*, International Association of Hydrogeologists, *International Contributions to Hydrogeology, Volume 23:182-188*. A.A. Balkema Publishers, Lisse, The Netherlands.
- Moayyad, B., S.A. Bawazir, J.P. King, S. Hong, and J.M.H. Hendrickx. 2003. Groundwater depth and arid zone riparian evapotranspiration. *In*: I. Simmers (Editor), *Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones*, International Association of Hydrogeologists, *International Contributions to Hydrogeology, Volume 23:188-195*. A.A. Balkema Publishers, Lisse, The Netherlands.
- Hendrickx, J.M.H., R.L. van Dam, B. Borchers, J. Curtis, H.A. Lensen, and R.S. Harmon. 2003. Worldwide distribution of soil dielectric and thermal properties. *In* *Detection and Remediation Technologies for Mines and Minelike Targets VIII*, R.S. Harmon, J.H. Hollloway, Jr., and J.T. Broach, editors, *Proceedings of the SPIE 5089:1158-1168*.
- Hendrickx, J.M.H., S.H. Hong, T.W. Miller, B. Borchers and J.B. Rhebergen. 2003. Soil effects of ground penetrating Radar Detection of buried nonmetallic mines. *In*: C.S. Bristow & H.M. Jol (Eds.), *Ground penetrating radar: applications in sedimentology*, Geological Society, London, *Special Publications*, 211:191-198.
- Miller, T.W., J.M.H. Hendrickx, and B. Borchers. 2004. Radar detection of buried landmines in field soils. *Vadose Zone J* 3:1116-1127.
- Zhou, X., H. Xie, and J.M.H. Hendrickx. 2004. Statistical evaluation of remotely sensed snow-cover products with constraints from streamflow and SNOTEL measurements. *Remote Sensing of Environment* 94:214-231.
- Hall, L.M., J.R. Brainard, R.S. Bowman, and J.M.H. Hendrickx. 2004. Determination of Solute Distributions in the Vadose Zone Using Downhole Electromagnetic Induction. *Vadose Zone Journal*. 3:1207-1214.
- Hendrickx, J.M.H., and S.-h. Hong. 2005. Mapping sensible and latent heat fluxes in arid areas using optical imagery. *Proc. International Society for Optical Engineering, SPIE* 5811:138-146.
- Hendrickx, J.M.H., G. Rodríguez-Marín, R.T. Hicks, and J. Simunek. 2005a. Modeling study of produced water release scenarios American Petroleum Institute Publishing Services.
- Hendrickx, J.M.H., W.G.M. Bastiaanssen, E.J.M. Noordman, S. Hong, and L.E. Calvo Gobbeti. 2005b. Estimation of regional actual evapotranspiration in the Panama Canal watershed, p. 315-324, *In* R. S. Harmon, ed. *The Rio Chagres: A multidisciplinary profile of a*

- tropical watershed, Vol. 52. Springer, Dordrecht, The Netherlands.
- Fleming, K., J.M.H. Hendrickx, and S.-h. Hong. 2005. Regional mapping of root zone soil moisture using optical satellite imagery. *Proc. International Society for Optical Engineering*, SPIE 5811:159-170.
- Van Dam, R.L., B. Borchers, and J.M.H. Hendrickx. 2005. Strength of landmine signatures under different soil conditions: implications for sensor fusion. *International Journal of Systems Science* 36:573-588 DOI: 10.1080/00207720500147800
- Xie, H., X. Zhou, E.R. Vivoni, J.M.H. Hendrickx, and E.E. Small. 2005. GIS-based NEXRAD Stage III precipitation database: automated approaches for data processing and visualization. *Computers & Geosciences* 31:65-76.
- Hong, S.-h., J.M.H. Hendrickx, and B. Borchers. 2005. Effect of scaling transfer between evapotranspiration maps derived from LandSat 7 and MODIS images. *Proc. International Society for Optical Engineering*, SPIE 5811:147-158.
- Hendrickx, J.M.H., S.-h. Hong, J. Friesen, H. Compaore, N.C. van de Giesen, C. Rodgers, and P.L.G. Vlek. 2006b. Mapping energy balance fluxes and root zone soil moisture in the White Volta Basin using optical imagery. *Proc. International Society for Optical Engineering*, SPIE 6239:238-249.
- Xie, H., X. Zhou, J.M.H. Hendrickx, E. Vivoni, H. Guan, Y. Tian, and E. Small. 2006. Evaluation of NEXRAD Stage III precipitation data over a semiarid region. *Journal of the American Water Resources Association* 42:1-20.
- Hendrickx, J.M.H., J. Kleissl, J.D. Gómez-Vélez, S.-h. Hong, J.R. Fábrega-Duque, D. Vega, H.A. Moreno-Ramírez, and F.L. Ogden. 2007. Scintillometer networks for calibration and validation of energy balance and soil moisture remote sensing algorithms. *Proc. International Society for Optical Engineering*, SPIE 6565:65650W.
- Kleissl, J., H. Moreno, J.M.H. Hendrickx, and J. Simunek. 2007. HYDRUS simulations of soil surface temperatures. *Proc. International Society for Optical Engineering*, SPIE 6553:65530W 1-12.
- Hogan, J.F., F.M. Phillips, S.K. Mills, J.M.H. Hendrickx, J. Ruiz, J.T. Chesley, and Y. Asmerom. 2007. Geologic origins of salinization in a semi-arid river: the role of sedimentary basin brines. *Geology* 35:1063-1066 doi: 10.1130/G23976A.1.
- Akramkhanov, A., R. Sommer, C. Martius, J.M.H. Hendrickx, and P.L.G. Vlek. 2008. Comparison and sensitivity of measurement techniques for spatial distribution of soil salinity. *Irrigation and Drainage Systems*:in press.
- Allen, R.G., J.M.H. Hendrickx, D. Toll, M. Anderson, W. Kustas, and J. Kleissl. 2008. From high overhead: ET measurement from remote sensing. *Southwest Hydrology* 7:30-32.
- Compaoré, H., J.M.H. Hendrickx, S.-h. Hong, J. Friesen, N.C. van de Giesen, C. Rodgers, J. Szarzynski, and P.L.G. Vlek. 2008. Evaporation mapping at two scales using optical imagery in the White Volta Basin, Upper East Ghana *Physics and Chemistry of the Earth, Parts A/B/C* 33:127-140, doi:10.1016/j.pce.2007.04.021.
- Friesen, J., C. Rodgers, P.G. Oguntunde, J.M.H. Hendrickx, and N.v.d. Giesen. 2008. Hydrotope-based protocol to determine average soil moisture over large areas for satellite calibration and validation - With results from an observation campaign in the Volta Basin, West Africa. *IEEE Transactions on Geoscience and Remote Sensing*:in press.
- Gomez, J.D., J. Kleissl, J.M.H. Hendrickx, and O.K. Hartogensis. 2008. Large aperture scintillometers for hydrology. *Water Res. Res.*:submitted.
- Hendrickx, J.M.H., H. Xie, J.B.J. Harrison, B. Borchers, and J. Simunek. 2008. Global prediction of thermal soil regimes. *Proc. International Society for Optical Engineering*,

SPIE 6953:in press.

- Hong, S.-h., J.M.H. Hendrickx, and B. Borchers. 2008a. Up-scaling of SEBAL derived evapotranspiration map from Landsat to MODIS scale. *Journal of Hydrol.*:submitted.
- Hong, S.-h., J. Kleissl, J.M.H. Hendrickx, R.G. Allen, W.G.M. Bastiaanssen, R.L. Scott, and A.L. Steinwand. 2008b. Validation of SEBAL for mapping sensible and latent heat fluxes in arid riparian areas from remotely sensed optical imagery. . *Water Res. Res.* submitted
- Kleissl, J., S.-h. Hong, J.D. Gómez, and J.M.H. Hendrickx. 2008a. New Mexico scintillometer network in support of remote sensing, and hydrologic and meteorological models. *Bulletin American Meteorological Society*:in press.
- Kleissl, J., J. Gomez, S.-H. Hong, J.M.H. Hendrickx, T. Rahn, and W.L. Defoor. 2008b. Large aperture scintillometer intercomparison study. *Boundary Layer Meteorol.* 128:133–150, DOI 10.1007/s10546-008-9274-1.

RELEVANT REPORTS

- Hendrickx, J.M.H., and K.T. Lenselink. 1972. Design of a water use experiment for vegetables under sprinkler irrigation. Report 311, Agric. Expt. Stat., Paramaribo, Suriname. pp. 24 (in Dutch).
- Hendrickx, J.M.H. 1974. Design of the flood and border irrigation system of the Kadawa Pilot Scheme in Nigeria. Thesis, Dept. Civil Eng. and Irr., Agric. Univ. Wageningen, The Netherlands. pp. 32 (in Dutch).
- Hendrickx, J.M.H. 1975. Literature study on farm irrigation efficiency. Thesis, Dept. Civil Eng. and Irr., Agric. Univ. Wageningen, The Netherlands. pp. 40.
- Hendrickx, J.M.H. 1975. The simulation of the energy balance of a ridge shaped soil surface. Thesis, Dept. Soil Phys., Agric. Univ. Wageningen, The Netherlands. pp. 45 (in Dutch).
- Hendrickx, J.M.H. 1978. Trickle irrigation systems with low pressure for small farmers. Programa da aplicacao de Technica Adaptada nas Comunidades/OXFAM. Campina Grande, PB, Brazil. pp. 18.
- Hendrickx, J.M.H. 1979. Development of Kitivo irrigation area, flood protection and main drainage. *Agrar und Hydro-Technik*, Essen, West Germany. pp. 60.
- Hendrickx, J.M.H., J. Kroon, and C. van der Linden. 1980. An analysis of maximum precipitation in Niono and Kogoni for drainage design criteria of rice fields. Note 5, Project BEAU, office du Niger, Segou, Mali. pp. 30 (in French).
- Hendrickx, J.M.H., W. Genet, and N. Vink. 1981. Water requirements for rice and sugarcane. Dept. Civil Eng. and Irr., Agric. Univ. Wageningen, The Netherlands. pp. 146 (in French).
- Stuyt, L.C.P.M. and J.M.H. Hendrickx. 1986. Drainage of heavy clay soils in the Netherlands. EEC Expert Meeting, Limerick, Ireland. 22/23 April. pp. 11.
- Van Aart, R., M.G. Bos, and J.M.H. Hendrickx. 1988. Research Program on waterlogging and salinity control IWASRI-LOWOO. ILRI, Wageningen, The Netherlands. pp. 30.
- Hendrickx, J.M.H. 1988. Soil Physical aspects of groundwater recharge in Quetta valley (Pakistan). Halcrow ULG, Technical Assistance Team, Quetta, Pakistan. pp. 60.
- Spijkers, T., J.M.H. Hendrickx, M. Ashraf, J. Van Hoorn, F.A. Zuberi. 1991. Determination of optimal groundwater depths for drainage design. ASAE Summer Meeting Paper 91-2121. Albuquerque NM. June 1991.
- Kearns, A.K. and J.M.H. Hendrickx. 1998. Temporal variability of diffuse ground water recharge in New Mexico. Report No. 309, New Mexico Water Resources Research Institute.

MAJOR SERVICES PROVIDED SINCE 1993

- 2008 SEBAL/METRIC Training to the Center for Development Research
Project Description: Train personnel of the Center for Development Research in the use of SEBAL and METRIC in the Volta Basin (West Africa).
Client: University of Bonn, Germany.
- 2008 SEBAL/METRIC Training to the Wyoming GIS Center
Project Description: Train personnel of the Wyoming GIS Center in the use of SEBAL and METRIC in the Green River Basin.
Client: University of Wyoming, Laramie, WY.
- 2007 A Technical Analysis of Sites in Honduras and Panama For Tropical Testing of Army Materiel, Equipment and Systems
Project Description: Soil hydrology member of a U.S. Army science panel to develop a suite of sites to support its tropical testing mission.
Client: U.S. Army Research Office, Research Triangle Park, NC.
- 2007 Independent Review of Simulation of Net Infiltration for Present-Day and Potential Future Climates at the Yucca Mountain Project
Project Description: Member of a science panel to provide an independent expert review of the infiltration model and prediction results for net infiltration of water into the unsaturated zone at Yucca Mountain.
Client: U.S. Department of Energy, Las Vegas, Nevada
- 2006 Mapping of Actual Evapotranspiration in the Volta Basin, Ghana, West Africa
Project Description: Use the Surface Energy Balance Algorithms for Land (SEBAL^{NM}) to map regional distributions of actual evapotranspiration in the Volta Basin at the start and at the end of the dry season using Landsat and MODIS images.
Client: University of Bonn, Bonn, Germany
- 2006 Chloride Mass Balance Method for Prediction of Ground Water Recharge in Southeast New Mexico
Project Description: Use of chloride measurements in soil samples from 30 m deep drillings for determination of ground water recharge rates in the oilfields of southeastern New Mexico.
Client: R.T. Hicks Consulting, Ltd., Albuquerque, New Mexico
- 2005 Evaluation of Vadose Zone Treatment Technologies to Immobilize Technetium-99
Project Description: Member of scientific panel to review treatment technologies for immobilization of high level radioactive Technetium-99 in the vadose zone.
Client: U.S. Department of Energy, Hanford Site, Richland, Washington

- 2005 Simulation of Optimal Remediation Strategy at the B.C. Dickinson A-1 Former Tank Battery Site
Project Description: Field sampling and simulations with model HYDRUS2D for the development of an optimal restoration strategy for the site in order to minimize risk for ground water contamination with chloride and BTEX.
Client: Whole Earth Environmental, Inc., Houston, Texas
- 2005 Modeling Study of Produced Water Release Scenarios
Project Description: Computer simulation study with model HYDRUS1D to provide a scientific basis for operators, regulators and landowners to determine if assessment or remediation of produced water releases will provide a meaningful environmental benefit. [API Publication Number 4734, January 2005].
Client: Regulatory Analysis and Scientific Affairs Department, American Petroleum Institute, Washington, D.C.
- 2004 Simulation of Remediation Strategies for the January 2004 Brine Release at Eidson Station
Project Description: Computer simulations with HYDRUS2D for evaluation of different remediation scenarios to optimize its final remediation plan.
Client: Whole Earth Environmental, Inc., Houston, Texas
- 2003 Regional Distribution of Soil Thermal Properties and Soil Temperature Parameters in East Africa and Asia
Project Description: Regional distribution of soil thermal conductivity, soil volumetric heat capacity, and soil thermal diffusivity at different soil field soil moisture conditions. Pedotransfer functions have been used to derive soil thermal properties from the FAO Digital World Soil Map and the WISE soil data base. Fifty maps of the region have been prepared with thermal properties of the top soil and sub soil under five different field soil moisture conditions. Model HYDRUS2D is used to analyze the effect of the depth and the strength of buried heat sources on maximum soil temperatures around the heat source.
Client: HARRIS CORPORATION, Government Communications Systems Division (GCSD), Palm Bay, Florida
- 2003 Validation of SEBAL^{NM} for Mapping Actual Evapotranspiration in the Owens River Valley
Project Description: The Surface Energy Balance Algorithms for Land (SEBAL^{NM}) have been validated by comparison with ground measurements of evapotranspiration in the Owens Valley. SEBAL^{NM} is used for the preparation of maps of regional evapotranspiration that inform water resource managers about water losses.
Client: Inyo County Water Department, Bishop, California

- 2003 Electromagnetic induction for delineation of brine affected soil volumes
Project Description: Develop field procedures for the use of electromagnetic induction measurements for determination of soil volume affected by brine contamination after leaks in pipes or operation facilities.
Client: Rice Operating Company, Hobbs, New Mexico
- 2003 Soil Salinity Survey of the Zuni River Corridor
Project Description: Soil salinity survey and soil moisture sampling to locate optimal sites for Saltcedar removal and revegetation with Cottonwoods along the Zuni River.
Client: Fish and Wildlife Department, Riparian Restoration Project, Zuni, New Mexico
- 2002 Verification of Model HYDRUS1D for Prediction of Chloride Fate after Brine Releases in the Region around Hobbs, New Mexico
Project Description: Use field data obtained by Rice Operating Company for the validation of model HYDRUS1 for the prediction of chloride movement after brine leaks and for the evaluation of risk for groundwater contamination.
Client: Rice Operating Company, Hobbs, New Mexico
- 2002 Electromagnetic Induction Soil Survey for Albuquerque Biological Park Wetland Restoration Project
Project Description: Salinity survey and analysis of revegetation potential. Evaluation of future salinization risk using the computer model HYDRUS.
Client: US Army Corps of Engineers, Albuquerque District, New Mexico
- 2001 Soil Salinity in the Travis Harris Drip Irrigation Project
Project Description: Monitor soil salinity on experimental drip irrigated field to show farmers that the efficient drip irrigation method does not increase soil salinity.
Client: Soil & Water Conservation District, Socorro, New Mexico
- 2000 The Santa Ana Floodplain Bosque Restoration Project
Project Description: Soil salinity survey using electromagnetic induction. Soil survey, sampling, and measurement of hydraulic soil properties. Determination of future risk for soil salinization using model HYDRUS1D. Soil improvement plan to reduce salinity and alkalinity.
Client: Department of Natural Resources, Pueblo of Santa Ana, New Mexico

- 1999 Water Quality Changes along the Mesquite/East Drain
Project Description: Water quality survey during the low flow season in the Mesquite/East Drain. The measurements along the Mesquite/East Drain demonstrate two important features of salinity dynamics: i. The locations of water quality deterioration along the drain during the low flow season appear to be consistent from one year to another; ii. The water quality changes are strongly correlated with the salinity of the soil-aquifer system measured with the electrical apparent ground conductivity using electromagnetic induction. Our novel approach of simultaneous water quality measurements in the drain and apparent electrical conductivity measurements of the soil-aquifer system detects in a cost effective manner salt sources in the Mesilla Valley.
Client: El Paso Field Division, U.S. Bureau of Reclamation, El Paso, Texas
- 1998 Electromagnetic Induction Survey at the Yucca Mountain High-Level Radioactive Waste Depository
Project Description: Conduct an electromagnetic induction survey to characterize subsurface water flow paths originating from a infiltration experiment on the mountain.
Client: U.S. Geologic Survey, Las Vegas, Nevada
- 1997 Water Quality Protection for El Paso County Water Improvement District No. 1
Project Description: Evaluation of salt sources that affect water quality in the Rio Grande at El Paso. Development of a water quality protection plan for the District.
Client: El Paso County Water Improvement District No. 1, El Paso, Texas
- 1996 Salinity Survey of Bernardo Waterfowl Management Area
Project Description: Salinity survey and analysis of revegetation potential in the Bernardo Waterfowl Area.
Client: New Mexico Game and Fish, Bernardo, New Mexico
- 1995 Electromagnetic Induction Survey at the Socorro Mission near El Paso, Texas
Project Description: Detection of old graves at the historical Socorro Mission. Several anomalies were detected but none were old graves.
Client: Office of Contract Archeology, University of New Mexico, Albuquerque, New Mexico
- 1995 Electromagnetic Induction Survey for Detection of Floating Gasoline
Project Description: Evaluate potential of electromagnetic induction for detection of floating gasoline in urban environment. Electromagnetic induction measurements clearly delineate subsurface gasoline distribution at ESSO Station in Downtown Bogota.
Client: HIDROGEOCOL Ltda., Bogota, Colombia

- 1994 Salinity Surveys for Revegetation in the Pueblo of Laguna
Project Description: Salinity survey and analysis of revegetation potential in the Pueblo of Laguna.
Client: Pueblo of Laguna, Laguna, New Mexico
- 1994 Salinity Surveys for Revegetation in the Albuquerque Bosque using Electromagnetic Induction
Project Description: Salinity survey and analysis of revegetation potential in the Bosque along the Rio Grande.
Client: US Army Corps of Engineers, Albuquerque District, New Mexico
- 1994 Electromagnetic Induction for Non-Intrusive Monitoring of Surface Barriers for Radioactive Waste
Project Description: Evaluation of electromagnetic induction measurements for non-intrusive monitoring of surface barriers for radioactive waste materials. The electromagnetic induction technique is suitable for non-intrusive monitoring of surface barriers for radioactive waste in order to detect large increases of water content in the barrier and the occurrence of cracks, cavities or other irregularities that may weaken the barrier.
Client: Battelle Pacific Northwest Laboratories, Richland, Washington
- 1993 Water and nitrogen management plan for DeRuyter's Dairy
Project Description: Preparation of management plan for use of dairy waste water for irrigation while minimizing nitrate contamination of shallow aquifer.
Client: DeRuyter's Dairy, Mesquite, New Mexico
- 1993 Salinity Surveys on Mine Spoils at the Navajo Coal Mine using Electromagnetic Induction
Project Description: Evaluation of electromagnetic induction measurements on mine spoils. Electromagnetic induction has great potential for inexpensive salinity surveys on mine spoils and will considerably reduce expensive field sampling.
Client: Buchanan Environmental Consulting, Farmington, New Mexico
- 1993 Selection of Tree Planting Sites using Electromagnetic Induction
Project Description: Use electromagnetic induction and visual observations to select optimal salt free tree planting sites along freeway I-25.
Client: City of Socorro, New Mexico