

## **HAIMANTOE K. BAYABIL**

Ph.D. Candidate

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### **(i) Education**

Ph.D.	Cornell University Biological and Environmental Engineering, USA	exp. May 2015
M.S.	Cornell University Environmental Engineering, USA	Aug. 2009
B.S.	Alemaya University Plant Science, Ethiopia	July. 2003

### **(ii) Selected Honors and Awards**

- May, 2013, Cornell University Richard Bradfield Research Award
- September, 2011, Norman Borlaug LEAP Fellow
- April, 2010, Cornell University African Fellowship Award
- May, 2008, International Water Management Institute (IWMI) Field Research Award

### **(iii) Research Experience**

**Doctoral Research:** Biological and Environmental Engineering, Cornell University, 2015 (research advisor, Prof. Tammo S. Steenhuis)

- Assessing potentials of biochar-charcoal and deep-rooted biofuel crops to improve water use efficiency of degraded soils.
- Modeling spatial and temporal hillslope runoff and erosion processes in sub-humid watersheds
- Assessing risks of ground water contamination by glyphosate in Upstate New York
- Greenhouse gas emission from agricultural fields in sub-humid climates

**Master's Research:** Environmental Engineering, Cornell University, 2009 (research advisor, Prof. Tammo S. Steenhuis)

- Modeling rainfall-runoff relationship and assessing impacts of soil and water conservation interventions on soil physical and chemical properties in the Ethiopian highlands

**Undergraduate Research:** Plant Science, Alemaya University, 2003 (research mentor, Dr. Nigussie Dechassa)

- Assessing nematode problem on potato fields in Dire Dawa area, Ethiopia

### **(iv) Modeling and Programming Skills**

- Hydrological and geospatial modeling tools (ArcGIS, SWAT, ArCAPEX, EPIC, CROPWAT)
- Statistical programming languages (R and Matlab)

### **(v) Research Interests**

- Effects of organic and inorganic amendments on soil physical and hydraulic properties
- Improving agriculture water uses and irrigation efficiencies
- Modeling ecosystem dynamics using geospatial and ecological models
- Modeling runoff and erosion processes and nutrient transport in managed ecosystems
- Greenhouse gas emissions

## **(vi) Appointments and Responsibilities**

**January 2015-present**

**Graduate research assistant, Cornell University**

- Conduct research in the areas of soil health, soil geochemistry, rainfall-runoff-erosion modeling, pesticide leaching, and greenhouse gas emission

**August 2014-December 2014**

**Teaching assistant, Cornell University**

- Teaching assistant for the course "Water Measurement and Analysis Methods (BEE 4270)". The course has strong laboratory and field components that focuses on surface and subsurface water measurements, water sampling methodology, and equipment and protocols used for these purposes. The course provides a basic understanding of how engineering and science are integrated to quantify, analyze, and characterize water resources to facilitate watershed management decision making.

**August 2010-July 2014**

**Graduate research assistant, Cornell University**

- Conduct research in the areas of integrated soil & water management, rainfall-runoff-erosion modeling, pesticide leaching, nutrient transport, and greenhouse gas emission

**September 2009- July 2010**

**Irrigated Agriculture Advisor, Sustainable Water Harvesting and Institutional Strengthening in Amhara (SWISHA), a project funded by Canadian International Development Association (CIDA).**

- Contribute to the enhancement of human capacity of the center associated with water and irrigation management research activities
- Develop viable options for improved irrigated agricultural systems to sustainably maximize water productivity
- Oversee and execute irrigation research to promote the optimal use of rainfall and other water resources in full and supplemental irrigation and water harvesting systems
- Design and implement field experiments with primary focus on irrigation agronomy research programs at Srinika research center, Kobo sub center and other collaborative sites in Ethiopia
- Coordinate and manage all irrigation research field activities, data collection and analysis and interpretation of results
- Prepare monthly and quarterly progress report and submit to SWHISA and partner institutes: Sirinka Agricultural Research Center and of Amhara Regional Agricultural Research Institute

**May 2004-October 2007**

**Plantation Section Manager, Finchaa Sugar Factory, Ethiopia**

- Manage a farm of 1300 ha with 36 permanent and 150 seasonal working staffs.
- Assess irrigation (sprinkler and furrow irrigation systems) water requirement and determine water distribution to fields.
- Plan and follow up the implementation of all field activities (tillage, planting, weeding, fertilizer, and herbicide spraying)
- Develop viable farm management strategies to improve sugar cane production
- Execute and follow up weekly, monthly, and yearly field activities
- Prepare monthly and quarterly progress report and submit to plantation department of Fichaa sugar factory
- Prepare annual budget for the section and follow up its approval

## (vii) Refereed Journal Publications

- Bayabil, H.K.**, Stoof, C.R., Lehmann, J.C., Yitaferu, B., Steenhuis, T.S., 2015. Assessing the potential of biochar and charcoal to improve soil hydraulic properties in the humid Ethiopian Highlands: The Anjeni watershed. *Geoderma* 243-244, 115–123. doi:10.1016/j.geoderma.2014.12.015
- Bayabil, H. K.**, Tilahun S., Collick S.A. Yitaferu B., Steenhuis T. (2010). Are Runoff Processes Ecologically or Topographically Driven in the (Sub) Humid Ethiopian Highlands? The Case of the Maybar Watershed. *Ecohydrology*. 3: 457-466. DOI: 10.1002/eco.170
- Steenhuis, T.S., A.S. Collick, Z.M. Easton, E.S. Leggesse, **H.K. Bayabil**, E.D. White, S.B. Awulachew, E. Adgo, and A.A. Ahmed. 2009. Predicting discharge and erosion for the Abay (Blue Nile) with a simple model. *Hydrol. Proc.* 23: 3728-3737. doi: 10.1.1002/hyp.751

## Journal Publications in Preparation or Review

- Bayabil, H.K.**, Tigist Y. Tebebu, C. Stoof, Birru Yitaferu, and T. S. Steenhuis. (2015). Spatial and temporal runoff processes in the degraded Ethiopian Highlands. *J. Hydrology and Earth System Sciences*, in review
- Bayabil, H.K.** and T. S. Steenhuis. (2015). Hillslope Erosion Processes and Scaling Issues in the Upper Blue Nile Basin: The Anjeni Watershed, in preparation
- Bayabil, H.K.**, C. Stoof, and T. S. Steenhuis. (2015). Assessment of methane and nitrous oxide emission from cultivated fields in the Ethiopian Highlands, in preparation
- Tebebu Y.T, Steenhuis T.S., Dagneu C.D., Guzman C.D, **Bayabil H.K**, Zegeye A.D., Collick A.S, Langan S., McAllister C., Langendoen E.J. Tilahun S.A. (2015) Improving efficacy of landscape interventions in the (sub)humid Ethiopian highlands. *Hypothesis & Theory, Frontiers in Earth Science. Hydrosphere*, in review
- Steenhuis, T.S., Elkamil, M., Asmare, D., Guzman, C., Tebebu, T.Y., **Bayabil, H.K.**, Atanaw, F., Tilahun, S.A., Yitaferu, B., MacAlister, C., Rientjes, T.H.M., Baker, T., Langan, S. (2015). Discharge and Sediment Trends at Three Scales in the (Semi) Humid Blue Nile Basin. *Hydrol. Process*, in review

## Book Contributions

- Engda, T.A., **H.K. Bayabil**, E.S. Legesse, E. K. Ayana, S.A. Tilahun, A.S. Collick, Z.M. Easton, A. Rimmer, S.B. Awulachew, and T.S. Steenhuis. (2011). Watershed hydrology of the (semi) humid Ethiopian Highlands. In *Nile River: Hydrology, Climate and Land Use*. 145-162. A. Melesse, ed. New York, NY: Springer Science

## Proceedings papers

- Steenhuis Tamm, T.Y. Tebebu, G.K. Ayale, C.Guzman, **H.K. Bayabil**, A. Zegeye, M. Mogus, D. Chanie, C. Stoof, and S. A. Tilahun. (2014). Prioritizing landscape interventions in the Ethiopian highlands. *EGU General Assembly 2014*. Vol. 16, EGU2014-16338
- Steenhuis, T.S., **H.K. Bayabil**., Ashagrie T., Sime E., Brook B., Collick A.S., Awulachew S.B., Selassie Y.G., Ahmed A., and Easton Z.M. (2009). Modeling Discharge Erosion and Sedimentation in the Upper Blue Nile. *International water management institute (IWMI) upstream downstream workshop*, February 5-6, 2009. Addis Ababa
- Bayabil, H.K.**, J.C. Lehmann, B. Yitaferu, C. Stoof, and T. S. Steenhuis. (2013). Spatial Variability of Soil Physical and Hydraulic Properties Affecting Runoff and Moisture Retention Characteristics of Tropical Soils: The Case of Anjeni Watershed *in proceedings of Science and Technology*

towards the Development of East Africa. May 17 and 18, 2013. Bahir Dar University Institute of Technology, Bahir Dar, Ethiopia.

**Bayabil, H.K.,** Lehmann, J.C., Yitaferu, B., Stoof, C. and Steenhuis, T.S. Hydraulic properties of clay soils as affected by biochar and charcoal amendments. In: Wolde Mekuria. (ed). (2013). Rainwater management for resilient livelihoods in Ethiopia: Proceedings of the Nile Basin Development Challenge science meeting, Addis Ababa, 9–10 July 2013. NBDC Technical Report 5. Nairobi, Kenya: International Livestock Research Institute.

#### **(viii) Oral Presentation**

2015 Understanding Hillslope Hydrology for Planning Effective Landscape Interventions in the Ethiopia Highlands. Soil and Water Lab Seminar Series, Cornell University, February 2, Ithaca, NY USA

2013 Spatial Variability of Soil Physical and Hydraulic Properties Affecting Runoff and Moisture Retention Characteristics of Tropical Soils: The Case of Anjeni Watershed. Science and Technology towards the Development of East Africa conference. May 17 -18, 2013, Bahir Dar Ethiopia

2013 Effects of biochar and charcoal on soil-hydraulic properties. International Water Management Institute Nile Basin Development Challenge Science Meeting. July 9-10, 2013, Addis Ababa, Ethiopia

2010 Leaching of N and P from agricultural and forest fields. Crop and soil science class presentation. December 2010, Cornell University

2010 Characterizing Rainfall-runoff Relationships in the Maybar Watershed. Soil & water lab seminar series, October 12, 2010. Cornell University, Ithaca NY

#### **(ix) Poster Presentation**

2015 Hillslope erosion processes and scaling issues in the Ethiopian highlands, 7<sup>th</sup> Annual Biological and Environmental Engineering Research Symposium, February 6, 2015, Cornell University, Ithaca New York

2014 Can Charcoal Improve Green Water Use in Ethiopia? World Food Prize Symposium, October 15-17, Des Moines, IA USA.

2009 Modeling rainfall and runoff relationships at Maybar watershed. International water management institute (IWMI) upstream downstream workshop, February 5-6, 2009. Addis Ababa, Ethiopia.

#### **(x) Teaching Experience**

- Teaching assistant for the course Water Measurement and Analysis Methods (BEE 4270), Cornell University
- Taught graduate level statistical data analysis techniques using R, at Bahir Dar University, Ethiopia, Fall 2014
- Co-taught advanced research methods for first year Ph.D. students, at Bahir Dar University, Ethiopia, Spring 2013

#### **(xi) Extension and Outreach Services (September 2009- July 2010)**

As an "Irrigated Agriculture Adviser", the last position I held, I had the opportunity to work with different stakeholders (eg. farmers, NGO's, politicians, and scientists) in the area of irrigated agriculture and environmental conservation. Responsibilities included:

- Teach farmers (communities) in the Kobo area on irrigation efficiencies and cropping sequencing.

- Communicate with local and regional politicians to plan and discuss viable and effective water distribution strategies
- Arrange farm days and demonstration site visits for farmers

**(xii) Graduate and Professional Service**

- Member of the Imaging and Geospatial Information society of America (2010-Present)
- Member of Alpha Epsilon: Honor Society of Agricultural, Food, and Biological Engineering (2011-Present)