

Curriculum Vitae

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PROFILE

I am a Visiting Assistant Professor at the Patel College of Global Sustainability at the University of South Florida. I have ten years of experience in integrated systems approach to planning, designing, and managing sustainable and resilient infrastructure systems and their interactions. At USF, I have led the development of the curriculum and content for more than four new graduate courses. I am the director of Climate Change and Sustainability Concentration. I manage the Academic and Administrative Assessment, and Accreditation Process for the Patel College of Global Sustainability. In the past three years, I have secured an amount of \$890,000 research grants (as PI/Co-PI) from different funding organizations such as the World Bank, Global Water Partnership, US Forest Service, and African Development Bank.

ACADEMIC QUALIFICATION

- 2013 **PhD** in Civil and Environmental Engineering, USF
- 2008 **M.Sc** in Integrated Urban Engineering, UNESCO-IHE, Netherland.
- 2004 **B.Sc.** in Civil Engineering, Addis Ababa University, Ethiopia.

CERTIFICATION/ TRAINING

- 2012 PowerSim, System Dynamics Simulation, University of South Florida.
- 2006 ArcView GIS, Bahir Dar University with Technische Fachhochschule, Berlin.
- 2005 AutoCAD, Institute of Technology, Bahir Dar University, Ethiopia.
- 2005 Registered Engineer, Ministry of Water, Irrigation and Energy.

EMPLOYMENT RECORD

- 2013 to present Visiting Assistant Professor, Patel College of Global Sustainability, USF
- 2010 - 2013 Research Fellow, Patel College of Global Sustainability, USF
- 2009 - 2010 Postgraduate Assistant, School of Civil Engineering, University of Birmingham, UK
- 2009 Research Associate, SWITCH Project, Loughborough University, UK
- 2008 - 2009 Lecturer, Civil and Water Resources Engineering, Institute of Technology, Ethiopia
- 2005 - 2006 Assistant Lecturer, Civil Engineering, Bahir Dar University, Ethiopia
- 2004 - 2005 Graduate Assistant II, Civil Engineering, Bahir Dar University, Ethiopia

WORK EXPERIENCE

University of South Florida, USA (Aug 2010 – Present)

Position: Visiting Assistant Professor at the Patel College of Global of Sustainability (Sept 2013- Present)

- Develops and teaches graduate course (*online and in-class*): Concept and Principles of Sustainability, Systems Thinking, Climate Change Adaptation and Mitigation, and Water Sensitive Urban Design.
- Develops an Integrated and Comprehensive Water and Sanitation Master Plan for Seychelles
- Direct the Climate Change and Sustainability Concentration of Patel's College MA in Global Sustainability Program.
- Manages and executes research projects: PI for Global Water Partnership funded projects (\$270,000) on 'Integrated Urban Water Management Toolkit'; PI for US Forest Services funded project (\$300,000) on 'Decision Support Tools for Transitioning from Gray to Green Infrastructure Systems'
- Coordinates and monitors the Academic Programs and Administrative Assessment and Accreditation process of the Patel College of Global Sustainability.
- Develops an Agent Based Model for social systems (modeling coupled human and natural systems, and information diffusion)
- Member of the 'Resilient Tampa Bay' initiative to envision and design a vibrant economic future for Tampa Bay by becoming more resilient to present and future threats (resource depletion, urban flooding, and sea level rise)
- Develops a GIS based 'City Diagnostic Tool' to analyze the opportunities and capacities of cities to reduce the environmental impacts and to adapt to the future change and uncertainties
- Supervises graduate research projects and international internships. Recent projects include: Comparison of water resource management strategies, Vitoria-Gasteiz, Spain and Tampa, United States; integrated water and sanitation management in Ethiopia; water sustainability and blue design: the Alhambra Palace, Granada, Spain; low impact development best management practices; the use of multifunctional space for combining traffic space and temporary storage of stormwater in response to global climate change, Karlsruhe, Germany; transformations towards climate resilient and sustainable infrastructures, Rotterdam, The Netherlands
- Publishes peer reviewed journal and conference papers

Position: Research Fellow at the Patel College of Global Sustainability (May 2013 - Sept 2013)

- Led World Bank funded project (\$250k) titled: 'Integrated Urban Water Management for African Cities.'
- Delivered lectures on ground water hydrology, integrated resource management, adaptation to climate change, and green infrastructures for urban stormwater management
- Develops integrated systems dynamics model to analyze the interaction between potable water, wastewater and stormwater in urban setting
- Designed projects to assist the University of South Florida in lowering greenhouse gas emissions. Such as smart parking guidance, smart bike program, and LED lighting retrofit.
- Developed a clustering tool for decentralization of cities to improve resource use efficiency (considers reuse/recycling of wastewater, stormwater use, energy harvesting and nutrient recover)
- Published peer reviewed journal and conference papers

Position: Graduate Research Assistant, Patel College of Global Sustainability (Aug 2010 - April 2013)

- Ph.D Dissertation on "Flexible/Adaptive Urban Water Systems", Civil and Environmental Engineering Department, University of South Florida. This involves uncertainty and vulnerability associated with climate impacts on water systems.

- Served as a member of ‘Tampa Bay Clean Cities Coalition’ to advance the energy, economic, and environmental security of USA through reduction in petroleum use
- Conducted research on framework for designing flexible urban water systems that can adapt to the future global change and associated uncertainties
- Developed a Genetic Algorithm optimization model for adaptive water supply systems
- Published peer reviewed journal and conference papers

University of Birmingham, UK (April 2009 – Aug 2010)

Position: Postgraduate Assistant in School of Civil Engineering.

- Conducted part of my PhD research on decision making under uncertainty and adaptation to future change
- Taught Civil Engineering students: Urban Hydrology, Advanced Hydrologic Models, 2D Flood Modeling, Environmental Management, Remote Sensing for Urban Water Management,
- Supervised UNESCO-IHE MSc projects on Agent Based Modeling for Storm Water Management project
- Published peer reviewed journal and book chapters

Loughborough University, UK, EU funded SWITCH Project (June 2009 – Sep 2009)

Position: Research Associate

- Developed framework for simulating the dynamic interaction between consumers, suppliers and regulators (human-environment system model)
- Developed an Agent Based Model for capturing the residential water consumption behaviour and exploring an optimum resource management strategy (SWITCH project WP3.1, grants \$1.6M)

School of Civil and Water Resource Engineering, Bahir Dar, Ethiopia (April 2008 – April 2009)

Position: Lecturer in School of Civil and Water Resources Engineering

- Developed research strategy and implementation plans
- Developed an integrated model for Bahir Dar Water Supply System
- Developed and taught course: Environmental Management, GIS in Water Resources Development
- Supervised graduate students final project

UNESCO-IHE Institute for Water Education, The Netherlands (Oct 2006 – April 2008)

Position: M.Sc. Candidate

- Led an integrated infrastructure planning project for St. Martin Island
- Developed 2D flood model and coupled it with existing Stormwater Management Model (SWIMM)
- Developed GIS based flood damage estimation and flood management option (BMP) model
- Published peer reviewed journal

Bahir Dar University, Ethiopia (July 2004 – Oct 2006)

Positions: Assistant Lecture (2004); Graduate Assistant (2005) in Civil Engineering Department

- Developed and taught undergraduate students: Water Resources, Hydrologic Models, Open Channel Hydraulics, and Ground Water Hydrology
- Conducted research and consultancy works: Water quality zoning for Bahir Dar city water supply system

- Led laboratory classes on Water Quality Monitoring, Sediment Transport Mechanisms and Erosion in Watersheds
- Supervised undergraduate students final project

RESEARCH GRANT AWARDS

Current and past research grants: **\$890,000** (PI/ Co-PI and Project leader).

- *'From Gray to Green: Tools for Transitioning to Vegetation-Based Stormwater Management'*. The project provides civil and environmental engineers, and urban planners with a set of decision-support tools to aid the strategic planning process for transitioning to green cities to reduce the impact of stormwater runoff and pollution load. This project is funded by US Forest Service, National Urban and Community Forestry Challenge Program, September 2014 – September 2017.
 - Amount: **\$300,000 (USF)**
- *'An Integrated and Comprehensive Water and Sanitation Master Plan for Seychelles'*, funded by African Water Facility, African Development Bank, January 2016 - July 2016.
 - Amount: **\$70,000 (USF)**
 - Role: **IUWM Expert**
- *'Integrated Urban Water Management Toolkit for Sustainable Water Resources Management'*. The toolkit involves tools and frameworks for stakeholder engagement, institutional mapping, city diagnosis, technology section, and economics and finance. The project provides civil and environmental engineers, and urban planners with a set of decision-support tools to identifying infrastructure interventions to address the current and future challenges in water resources management. This project is also funded by the Global Water Partnership (GWP). Project duration: April 2014- December 2015.
 - Amount: **\$270,000 (USF)**
 - Role: **PI**
- *'Integrated Urban Water Management for Mbale (Uganda), Arua (Uganda), Nairobi (Kenya) and Douala (Cameroon)*, lead for the Integrated Urban Water Cycle Modeling of Mbale and Arua, funded by the World Bank, 2012.
 - Amount: **\$250,000 (USF)**
 - Role: **Project leader**
- *'Agent Based Model for simulating the dynamic interaction between suppliers, consumers, and regulator: Exploring an optimum demand side resource management strategy'*, funded by EU 6th Framework Program, SWITCH WP3.1, 2009- 2010.
 - Amount: **\$1.6M/ (Loughborough University, UK)**
 - Role: **Research Associate**

RESEARCH PUBLICATIONS

Journal Papers and Book Chapters

- Tsegaye, S., Vairavamoorthy, K., Eckart, J., (2016) *A Decentralized Approach to Urban Water Infrastructure Systems- An Optimization Model for Clustering Urban Water Systems*. Manuscript in preparation.
- Vairavamoorthy, K., Eckart, J., Tsegaye, S., Ghebremichael, K., & Khatri, K. (2015). A Paradigm Shift in Urban Water Management: An Imperative to Achieve Sustainability. *Sustainability of Integrated Water Resources Management*, 51.
- Vairavamoorthy, K., Eckart, J., Philippidis, G., Tsegaye, S. (2014) Energy and Water: The Vital Link for a Sustainable Future: *Water and Energy in the Urban Setting*, Nr. 33. SIWI, Stockholm.
- Vairavamoorthy, K. Tsegaye, S., Eckart, J., (2012) *Integrated Urban Water Frameworks for Emerging Cities in Sub-Saharan Africa*, UNESCO, Free Flow.
- Tsegaye, S., Eckart, J., Vairavamoorthy, K. (2012) *Urban Water Management in the Cities of the Future - Emerging Areas in Developing Countries: On the Water Front*, Volume 3, 2012 pp. 42-48.
- Vairavamoorthy, K., Ghebremichael, K., Eckart, J., Tsegaye, S., and Khatri, K. (2012) An Integrated Perspective for Urban Water, Management, *The Future of Water in African Cities: Why Waste Water?*, World Bank Publications.
- Tsegaye, S., and Vairavamoorthy, K. (2011) *Water Distribution Systems: Design of Water Distribution Systems*, ICE Publishing, Thomas Telford, UK.
- Tsegaye, S., and Vairavamoorthy, K. (2011) *Water Demand management in the City of the Future: Agent Based Modelling for Demand Side Water Management Strategies*, Water, Engineering and Development Center, Loughborough University, UK.
- Pathirana, A., Tsegaye, S., Gersonius, B., and Vairavamoorthy, K. (2008) A Simple 2-D Inundation Model for Incorporating Flood Damage in Urban Drainage Planning *Journal of Hydrology and Earth System Sciences*, **5**, 3061–3097.

Conference Proceedings

- Tsegaye, S., (2016) *Transition to Water Sensitive Urban Cities*, Urban Forestry Institute Workshop on “Green Infrastructure and the Urban Forest”, Tampa, Florida, May 26th, 2016
- Vairavamoorthy, K., Eckart, J., Tsegaye, S., Ghebremichael, K. (2014) *Enabling Urban Water Management Through Systems Thinking*, U.S. Water Partnership, ‘Partnership for the Management of Global Water Systems’, at NEXUS 2014: Water, Food, Climate and Energy Conference March 5-8, 2014, University of North Carolina at Chapel Hill.
- Tsegaye, S., Eckart, J., and Vairavamoorthy, K. (2013), Flexible Urban Water Systems for the Adaptation of Campuses to Future Change Drivers, AASHE.
- Tsegaye, S., and Vairavamoorthy, K. (2012) Water for Cities of the Future - Coping with Future Change and Uncertainties. *American Water Resources Association* St. Petersburg, FL.
- Tsegaye, S., Ahmed, S., Vairavamoorthy, K. (2011) The Concept of Water Footprint for Water Utilities: Where is the Gap? Singapore International Water Week, *Sustainable Water Solutions for a Changing Urban Environment*, July 4th -8th, Singapore.
- Tsegaye, S., Eckart, J., and Vairavamoorthy, K. (2011) Decision Support Framework for Design of Flexible Urban Water Distribution Systems. *The Future of Urban Water: Solutions for Livable and Resilient Cities*, January 24th – 26th, Paris.
- Eckart, J., Tsegaye, S., and Vairavamoorthy, K. (2011) Measuring the flexibility of urban drainage systems. *The Future of Urban Water: Solutions for Livable and Resilient Cities*, January 24th – 26th, Paris.
- Huang, D., Vairavamoorthy, K. and Tsegaye, S. (2010). “Flexible Design of Urban Water Distribution Networks.” World Environmental & Water Resources Congress, Providence, RI, USA.

PRESENTATIONS

- Transitioning Towards Integrated Urban Infrastructure Systems, *Speaker on Habitat III United Nations Conference on Housing and Sustainable Urban Development*, Quito, Ecuador, October 20th, 2016 (Upcoming)
- Coping With a Changing Climate: Adaptation Measures in the Water Sector, *Keynote Speaker*- the City of Tampa Executive Leadership Meeting, Tampa, Florida, September 20th, 2016
- From Gray to Green: Tools for Transitioning to Vegetation-Based Stormwater Management, *Keynote Speaker*- GWP PANASIA Workshop, Innovative Urban Water Management in Asia, Singapore, July 14th – 15th, 2016.
- Principles of Integrated Urban Water Management, *Keynote Speaker*- GWP PANASIA Workshop, Innovative Urban Water Management in Asia, Singapore, July 14th – 15th, 2016
- From Gray to Green: Tools for Transitioning to Vegetation-Based Stormwater Management, *Florida Stormwater Association 2016 Annual Conference*, Sanibel, Florida, June 15th -17th, 2016
- Achieving Universal Access to Urban Sanitation Services, Bill and Melinda Gates Foundation Workshop, Atlanta, June 7th – 8th, 2016
- Transition to Water Sensitive Urban Cities, Urban Forestry Institute Workshop on “Green Infrastructure and the Urban Forest”, Tampa, Florida, May 26th, 2016
- Integrated Urban Water Management for (IUWM), *Keynote Speaker -IUWM Workshop, World Bank Water Week*, Washington DC, May 4th – 8th, 2016
- Cities of the Future: Towards Sustainable Urban Water Management, *Environmental and Water Resources Engineering (EWRE) Seminar Series*, Tampa, Florida, March 25th, 2016.
- Integrated Urban Water Management for (IUWM), *Speaker -IUWM Workshop, African Development Bank*, Abidjan, Cote d’Ivoire, January 25th – 28th, 2016
- Integrated Urban Water Management (IUWM), *High Level Awareness Raising Event on IUWM*, Ulaanbaatar, Mongolia, September 28 – November 2, 2015.
- Integrated Urban Water Management in Africa: Reality or Pipedream, *Seminar Speaker at Addis Ababa Institute of Technology, School of Civil and Environmental Engineering*, Addis Ababa, Ethiopia, July 22nd, 2015.
- Wastewater as a Resource, 5th *Africa Water Week (AWW)*, *Placing Water at the Heart of the Post 2015 Development Agenda*, Dakar, Senegal, May 26th - 31st, 2014.
- Enabling Urban Water Management Through Systems Thinking, U.S. Water Partnership, ‘*Partnership for the Management of Global Water Systems*’, at *NEXUS 2014: Water, Food, Climate and Energy Conference*, University of North Carolina at Chapel Hill, March 5-8, 2014.
- Integrated Urban Water Management Today, 17th *African Water Association (AfWA) World Congress on Water Resources*, Abidjan, Côte d’Ivoire, February 17th – 20th, 2014.
- Green Infrastructure for Integrated Urban Water Management, ‘*Green Infrastructure & Water Management in Growing Metropolitan Areas*’ *Conference*, Tampa, Florida, January 14th, 2014.
- Flexible Urban Water Systems for the Adaptation of Campuses to Future Change Drivers, *Association for the Advancement of Sustainability in Higher Conference*, Nashville Tennessee, October 6th – 9th, 2013.
- Development of an Atlas and Toolkit for Integrated Urban Water Management, *AfricanGIS 2013, Global Geospatial Conference*, UNECA Conference Centre, Addis Ababa, Ethiopia, November 4th – 8th, 2013.
- Water for Cities of the Future - Coping with Future Change and Uncertainties. *American Water Resources Association Meeting*, St. Petersburg, Florida, July 26th – 27th, 2012.
- Decision Support for Flexible Design of Urban Water Distribution Systems, *Environmental and Water Resources Engineering (EWRE) Seminar Series*, Tampa, Florida, February 14th, 2011.
- The Concept of Water Footprint for Water Utilities: Where is the Gap? Singapore International Water Week, *Sustainable Water Solutions for a Changing Urban Environment*, Singapore, July 4th -8th, 2011.

Decision Support Framework for Design of Flexible Urban Water Distribution Systems. *The Future of Urban Water: Solutions for Livable and Resilient Cities, UNESCO IHP Conference*, Paris, January 24th – 26th, 2011.

Measuring the flexibility of urban drainage systems. *The Future of Urban Water: Solutions for Livable and Resilient Cities, SWITCH / UNESCO IHP Conference*, Paris, January 24th – 26th, 2011.

Agent Based Modelling for Demand Side Water Management Strategies, *Water, Engineering and Development Center SWITCH Project Meeting*, Loughborough University, UK, August 20th, 2009.

MODELING TOOLS [Developed]

- Clustering model for climate adaptation. Tool to develop a decentralization urban infrastructure system for efficient resource use, reuse and recovery.
- Integrated urban water management toolkit (that includes tools for stakeholder engagement, institutional mapping, city diagnostic, and economics and finance)
- GIS based decision support tool for transitioning from gray to green infrastructure systems
- Optimization model for adaptive water supply systems (Genetic Algorithm)
- Agent based model (ABM) for social-technical systems and information diffusion
- A 2-D flood model for incorporating flood damage into urban drainage planning
- City diagnostic tool analyze cities capacity to reduce the environmental impacts and to adapt to the future change and uncertainties