**Araya Alemie Berhe**

Research Associate (Crop Modeling and Irrigation Management)

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**EDUCATIONAL BACKGROUND**

Ph.D., 2011 Wageningen University, Netherlands, Production Ecology and Resources Conservation

M.Sc., 2005 University of Zimbabwe, Zimbabwe, Agro-Meteorology

B.Sc., 1995 Alemaya University, Ethiopia, Agriculture

**EMPLOYMENT**

Jul. 2018 to Present: Research Associate, Kansas State University, Department of Agronomy.

Aug. 2015 to Jun. 2018: Research Associate, Kansas State University, Biological and Agricultural Engineering Department/Southwest Research-Extension Center.

Dec. 2014 to Mar. 2015: Visiting Scientist/Postdoctoral Researcher, Embrapa, Eastern Amazon, Belem, Brazil and University of Pará – UEPA, Tv. Eneas Pinheiro, 2626, Marco, Belém-PA, CEP: 66095-100.

Jan. 2011 to Nov. 2014: Assistant Professor (Associate professor, 2016) and Project Leader, Mekelle

University, Ethiopia.

Nov. 2006 to Nov. 2007, Lecturer, Vice Dean and Project Leader, Mekelle University Ethiopia.

Jul. 2005 to Oct. 2006, Lecturer, Mekelle University Ethiopia.

Dec. 1995 to Dec. 2002: Agronomy, Soils and Agro-Meteorology Expert, Bureau of Water Resources and Commission for Sustainable Agriculture and Environmental Rehabilitation in Tigray, Ethiopia.

**SCIENTIFIC /PEER REVIWED/ PUBLICATIONS**

Rouhi, R.M**, Araya** A, Zambreski, Z., 2020. Downside risk of Aquifer depletion. Irrig. Sci. https://doi.org/10.1007/s00271-020-00688-x.

**Araya, A**., Prasad, P.V.V., Zambreski, Z., Gowda, P. H., Ciampitti, I.A., Assefa, Y., Girma, A., 2020. Spatial analysis of the impact of climate change factors and adaptation strategies on productivity of wheat in Ethiopia. Sci. Total Environ. 139094. https://doi.org/10.1016/j.scitotenv.2020.139094.

Rouhi, R.M., Haacker, E.H., Sharda, V., Nozari, S., Xiang, Z., **Araya, A**., 2020. MOD$$AT: A hydro-economic modeling framework for aquifer management in irrigated agricultural regions. Agric. Water Manage. 238, 106 - 194

**Araya** **A**, Prasad PVV, Gowda PH, Djanaguiraman M, Kassa AH. 2020. Potential impacts of climate change factors and agronomic adaptation strategies on wheat yields in central highlands of Ethiopia. Climatic Change https://doi.org/10.1007/s10584-019-02627-y

**Araya A**, Habtu SM, Aklilu M, Kiros MH, Foster AJ, Lucieta GM. 2019. Climate smart water and nitrogen management for local teff (*Eragrostis tef*) in northern Ethiopia. In: Climate-smart agriculture: Enhancing resilient agricultural systems, landscapes and livelihoods in Ethiopia and beyond. World Agroforestry (ICRAF), Nairobi, Kenya.

**Araya A,** Prasad PVV, Gowda PH, Kisekka I, Foster AJ. 2019. Yield and water productivity of winter wheat under various irrigation capacities. Journal of the American Water Resources Association 1–14: <https://doi.org/10.1111/1752-1688.12721>.

**Araya A**, Kisekka I, Gowda PH, Prasad PVV. 2019. Grain sorghum production functions under different irrigation capacities for the High Plains. Agriculture Water Management 203: 261–271.

**Araya A**, Gowda PH, Golden B, Foster AJ, Aguilar J, Currie R, Ciampitti IA, Prasad PVV. 2019. Economic value and water productivity of major irrigated crops in the Ogallala aquifer region. Agricultural Water Management 214: 55–63.

**Araya A**, Prasad PVV, Gowda PH, Afewerk A, Abadid B, Foster AJ. 2019. Modeling irrigation and nitrogen management of wheat in northern Ethiopia. Agriculture Water Management 216: 264–272.

Abraham, T, Ge H, Tigabie A, **Araya A**. 2018. Study on farmers land consolidation adaptation intention: A structural equation modeling approach. The case of Sichuan province. China Agricultural Economic Review [https://doi.org/10.1108/CAER -09-2016-0142.](https://doi.org/10.1108/CAER-09-2016-0142)

**Araya A**, Kisekka I, Holman J, Foster A. J. 2017. Assessing wheat yield, biomass, and water productivity response to growth stage based irrigation water allocation. Journal of American Society of Agricultural and Biological Engineers. Vol. 60(1) ISSN 2151-0032 DOI 10.13031/trans.11883.

**Araya A**, Kisekka I, Girma A, Hadgu KM, Beltrao NES, Ferreira H, Afewerk A, Birhane A, Tsehaye Y, Martorano LG. 2017. The challenges and opportunities for wheat production under future climate in Northern Ethiopia. **Cambridge Agricultural Sciences** 155: 379-393.

**Araya A**, Kisekka I, Prasad PVV, Gowda PH. 2017. Evaluating optimum limited irrigation management strategies for corn production in the Ogallala aquifer region. Irrigation and Drainage Engineering 143(10): 04017041.

**Araya A**, Kisekka I, Lin X, Prasad PVV, Gowda PH, Rice C, Andales A. 2017. Evaluating the impact of future climate change on irrigated corn production in Kansas. Climate Risk Management 17: 139–154.

**Araya A**, Kisekka I, Gowda PH, Prasad PVV. 2017. Evaluation of water-limited cropping systems in a semi-arid climate using DSSAT-CSM. Agricultural Systems 150: 86–98.

Wibowo RP, Hendricks NP, Kisekka I, **Araya A**. 2017. Using a crop simulation model to understand the impact of risk aversion on optimal irrigation management. Transactions of the American Society of Agricultural and Biological Engineers 60 (6): 2111-2122.

**Araya A**, Kisekka I, Holman J. 2016. Evaluating yield and water productivity of grain sorghum using AquaCrop model. Irrigation Science DOI 10.1007/s00271-016-0515-7.

HaileselassieH**, Araya A**, Habtu SM, Gebretsadik K, Girma A, Kisikka I, Hadgu KM, Foster AJ. 2016. Exploring optimal farm resources management strategy for *Quncho*-teff (*Eragrostis tef (Zucc.)* Trotter) using AquaCrop model. Agriculture Water Management 178: 148–158.

Gebru A, **Araya** **A**, Habtu S, Wolde-Georgis T, Teka D, Martorano LG. 2016. Evaluating water productivity of tomato, pepper and Swiss chard under clay pot and furrow irrigation technologies in semi-arid areas of northern Ethiopia. International Journal of Water 12(1): 55-65.

# Araya A, Hoogenboom G, Luedeling E, Hadgue KM, Kisekka I, Martorano LG. 2015. Assessment of maize growth and yield using crop models under present and future climate in southwestern Ethiopia. Agriculture and Forest Meteorology 214–215: 252–265.

**Araya A,** Girma A, Demelash T, Martorano LG, Haileselassie H, Abraha AZ. 2015. Assessing impacts of climate change on tef (*Eragrostis tef*) productivity in Debrezeit area, Ethiopia. International Journal of Agricultural Science Research 4(3): 039-048.

**Araya A**, Stroosnijder L, Habtu S, Keesstra SD, Berhe M, Hadgu KM. 2012. Risk assessment by sowing date for barley (*Hordeum vulgare*) in northern Ethiopia Agriculture and Forest Meteorology 154– 155: 30–37.

**Araya A**, Stroosnijder L, Girmay G, Keesstra SD. 2011. Crop coefficient, yield response to water stress and water productivity of teff (Eragrostis te (Zucc.). Agriculture Water Management. 98: 775 – 783.

**Araya A**, Stroosnijder L. 2011. Assesing drought risk and irrigation need in northern Ethiopia. Agriculture and Forest Meteorology 151: 425 – 436.

**Araya A**, Habtu S, Haile M, Fantahn S, Dejene T.2011. Determination of local barley (*Hordeum vulgare*) crop coefficient and comparative assessment of water productivity for crops grown under the present pond water in Tigray, Northern Ethiopia. Momona Ethiopia Journal of Science 3(1): 65 – 79.

**Araya A**, Keesstra SD, Stroosnijder L. 2010. Simulating yield response to water of teff (*Eragrostis tef*) with FAO’s AquaCrop Model. Field Crops Research 116: 196–204.

**Araya A**, Habtu S, Hadgu KM, Kebede A, Dejene T. 2010. Test of AquaCrop model in simulating biomass and yield of water deficient and irrigated barley (*Hordeum vulgare*). Agriculture Water Management 97: 1838–1846.

**Araya A**, Stroosnijder L. 2010. Effects of tied ridges and mulch on barley (*Hordeum vulgare*) rainwater use efficiency and production in Northern Ethiopia. Agriculture Water Management 97: 841-847.

**Araya A**, Keesstra SD, Stroosnijder L. 2010. A new agro-climatic classification for crop suitability zoning in northern semi-arid Ethiopia. Agriculture and Forest Meteorology 150: 1047-1064.

**Araya A.** 2011. Coping with drought for food security in Tigray, Ethiopia. PhD thesis. Wageningen University, the Netherlands. ISBN 978-90-8585-925-3.

**PAPERS SUBMITED/ UNDER REVISION**

**Araya** et al. Impact of future climate and adaptation options for Ethiopian maize. STOTEN. (Under review).

**Araya A**, Prasad PVV et al. Using crop simulation model as a tool to quantify effects of crop management practices and climate change scenarios on wheat yields in northern Ethiopia (ASA book). Under review.

**Araya A**, Prasad PVV, et al. Simulation of maize (Zea mays) yield as affected by irrigation frequency under variable plant allowable soil water irrigation triggers. Under review.

**Araya A**, Prasad PVV, et al. Evaluating optimal irrigation for potential yield and economic performance of major crops in southwestern Kansas. Under review.

**Araya** et al. Effect of tillage on soil water storage, corn yield and water productivity in southwestern

Kansas. Soil. Res.

**Araya** et al. Evaluating the quality and quantity of winter and spring triticale and forage sorghum

under double and single cropping systems in western Kansas. To be submitted to Crop

Sci.

**OPEN LOCAL/REGIONAL/EXTENSION/CONFERENCE/ PUBLICATIONS**

Martorano LG, **Araya A**, et al. 2018. Water Replenishment in Agricultural Soils: Dissemination of the IrrigaPot Technology Soil Moisture. Gabriela Civeira IntechOpen DOI: 10.5772/intechopen.80605.

Asaminew TG, **Araya A,** Atkilt G, Solomon H. 2017. Modelling the potential impact of climate change on cotton (*Gossypium hirsutum*) production in northeastern semi-arid Afar and western Tigray regions of Ethiopia. Journal of Earth Science Climate Chang 8: 390.

Gessesse AT, **Araya A**, 2016. Effect of In-situ Rainwater Conservations and Sowing Date on Barley Yield and Weed Infestation: A Case study at Maychew and Mekelle, Northern Ethiopia. [doi:10.7910/DVN/VMXVTV](http://dx.doi.org/10.7910/DVN/VMXVTV).

Gebrekiros G, **Araya A**,Yemane T.2016. Modeling Impact of Climate Change and Variability on Sorghum Production in Southern Zone of Tigray, Ethiopia. Journal of Earth Science Climate Change. Vol 7(2), 322.

**Lemma, MU, Araya A, Habtu S, Lemma C. 2016.** Analyzing the impacts of on onset, length of growing period and dry spell length on chickpea production in Adaa District (East Showa Zone) of Ethiopia. Journal of Earth Science Climate Change 7: 349.

Solomon E, Girmay G, Yemane T, **Araya A**. 2016. The benefits and productivity of cereal-legume intercropping with and without supplementary irrigation in the semi-arid highlands of Tigray, Ethiopia. Research Application Summary. *Fifth RUFORUM Biennial Regional Conference 17 - 21 October 2016, Cape Town, South Africa.* RUFORUM Working Document Series (ISSN 1607-9345) No 14 (1): 567-570.

Gebremedhin Y, **Araya A**, Nebiyu A. 2015. Performance of AquaCrop model in simulating tuber yield of Potato (*Solanum tuberosum* L.) under various water availability conditions in Mekelle area, northern Ethiopia. Journal of Environment and Earth Science 5: 123-30.

Niguse A, **Araya A**. 2015. Agro Climatic Characterization of the Western Zone of Tigray Region, Humera. Journal of Environment and Earth Science 5 (17): 24-26.

Mohammed S, Gilbert MMJ, **Araya A**, Zenebe A, Gathenya J. 2015. Modelling climate induced relative malaria incidence in the major sub climatic zones of Uganda. Global Journal of Environmental Science and Technology Vol. 2(6): 339-348.

Tezera Y, Habtu S, **Araya A**. 2012. The effect of different In-situ conservation methods on yield of Teff in Tigray, Northern Ethiopia. Research Application Summary. Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) Third RUFORUM Biennial Meeting 24 - 28 September 2012 Entebbe Uganda.

Gessesse AT, **Araya A.** 2016. Effect of In-situ Rainwater Conservations and Sowing Date on Barley Yield and Weed Infestation: A Case study at Maychew and Mekelle Northern Ethiopia. [doi:10.7910/DVN/VMXVTV](http://dx.doi.org/10.7910/DVN/VMXVTV).

Tesfay G, Haile M, Gebresamuel G, Araya A, Teka T, Bihon W, Ashebr D, Assefa D. 2011. On farm water harvesting for rainfed agriculture development and food security in Tigray Northern Ethiopia. Drylands Coordination Group Report No 61: 07, 2011 Drylands Coordination Group Miljøhuset G9 Grensen 9B N-0159 Oslo Norway.

**Araya A,** Girma A, Getachew, F. 2015. Exploring Impacts of Climate Change on Maize Yield in Two Contrasting Agro-Ecologies of Ethiopia. Asian Journal of Applied Science and Engineering. 4, 27-37.

**Araya, A**., 2010. Participatory analysis of growing season: A key for understanding and copping drought risk in northern Ethiopia. Research Application Summary. *Second RUFORUM Biennial Meeting 20 - 24 September 2010, Entebbe, Uganda*

**Araya A,** Kebede K. 2010. Test of AquaCrop model in simulating biomass and yield of water deficient and irrigated barley. Research Application Summary *Second RUFORUM Biennial Meeting 20 - 24 September 2010 E*ntebe Uganda.

**Araya A** Keesstra SD, Stroosnijder L. 2011. Simple model for assessing climatic constraints under the past and present agriculture in the northern Ethiopia. Geophysical Research Abstracts Vol. 13: EGU2011-PREVIEW 2011.

**Araya A**, Teka D, Gebre A. 2006. Pond water productivity under the present use in Tigray region, Northern Ethiopia. Drylands Co-ordination Group (DCG) Mekelle University, Ethiopia.

**Araya A**. 2005. An agro-climatic characterization towards improving barley production in the Giba catchment, Northern Ethiopia. MSc Dissertation MAGM Program University of Zimbabwe Harare Zimbabwe.

**AWARDED GRANTS AND PROFESSIONAL LEADERSHIP ASSIGNMENTS**

**MEKELLE UNIVERSITY, ETHIOPIA**

PROJECT PI AND PROJECT LEADER

ROCKEFELLER FOUNDATION PROJECT (JAN. 2012 – JUL. 2015). **Area of research**: water management, drought management, climate change adaptation for food security.

Total amount of grant = $400, 000.

CO-PI AND ETHIOPIAN PORJECT LEADER

AFRICA-BRAZIL MARKETPLACE PRJECT (MAY 2014 – MAY 2015). **Area of research**: developing efficient and low cost clay pot irrigation technology; developing low costly evapotranspiration measuring technique, drought management and food security.

Total amount of grant = $87, 000.

CO-PI AND ETHIOPIAN PORJECT LEADER

BRAZIL CNPQ PROJECT (NOV. 2013 – OCT. 2018). **Area of research**: rainwater variability, climate change assessment and adaptation strategies; food security.

Total amount of grant = R$ 240, 721.

PROJECT PI

RUFORUM – PROJECT (2012 – 2013). **Area of research**: strengthening crop-livestock value chain research in Dry land Ecologies of Ethiopia and related Ecologies.

Total amount of grant = $68, 800

ETHIOPIAN PROJECT LEADER

AGRIULTURAL MODEL INTERCOMPARSON AND IMPROVEMENT PROJECT (AgMIP) (2012 – 2013). **Area of research**: Climate change assessment and adaptation strategies, model inter-comparison and improvement, evaluating irrigation and fertilizer interaction on food security.

As collaborator total amount of grant received. = $75, 000.

PROJECT PI AND LEADER

RUFORUM – PROJECT (2009 – 2011). **Area of research**: climate change adaptation and water management; enhancing barley for food security.

Total amount of grant = $28, 000

PROJECT PI

NUFIC PRJECT (JAN. 2008 – JUN. 2011). **Area of research**: Rainwater conservation, climate characterization, drought management; food security.

Total amount of gran = EURO 74, 000.

**RESEARCH PROJECT LEADERSHIP ASSIGNMENTS, MEKELLE UNIVERSITY (NOV. 2006 – NOV. 2007)**

PROJECT LEADER FOR NORAD II PROJECT AT THE FUCULTY OF AGRICULTURE LEVEL

(NOV. 2006 – NOV. 2007, 1 YEAR)

**Area of research**: Developing drought and water logging resistant BARLEY varieties; food security

DEPUTY PROJECT LEADER:

IUC MORE CROP PER DROP PROJECT (NOV. 2006 – NOV. 2007)

**Area of research**: Water management, deficit irrigation; water harvesting; climate variability, food security

ASSISTANT PROJECT MANAGER:

FOOD SECURITY PROJECT (NOV. 2006 – NOV. 2007)

**Area of research**: conservation agriculture, ecological restoration, water management, climate change and climate variability, crop selection for water stressed environment and food security

PROJECT LEADER:

DCG WATER HARVESTING PROJECT (NOV. 2006 – NOV. 2007)

**Area of research:** water management, pond water harvesting research, limitations, potentials,

**ADMINSTRATIVE ASSIGNMENTS**

**VICE DEAN OF FACULTY OF AGRUCYLTURE AND NATURAL RESOURCES, MEKELLE UNIVERSITY** (NOV. 2006 – NOV. 2007)

**Duties and Responsibilities:** Administration of the overall activities**;** Coordinating the five departments under the faculty**;** Linking the faculty services with the needs of the community and the university**;** Decision making on several student cases**;** Follow-up of course scheduling and human resources allocations.

**Professional and Academic Short Training**

* Simulation Models: APSIM crop model; Root Zone model; CropSyst model; DSSAT model; AquaCrop Crop model; EPIC (beginner); Python (beginner); Climate models; R statistics (trained); SAS JMP 13 software; SPSS statistical software; Mathematical modeling;