



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

## CAPACITY DEVELOPMENT WITHIN ILSSI



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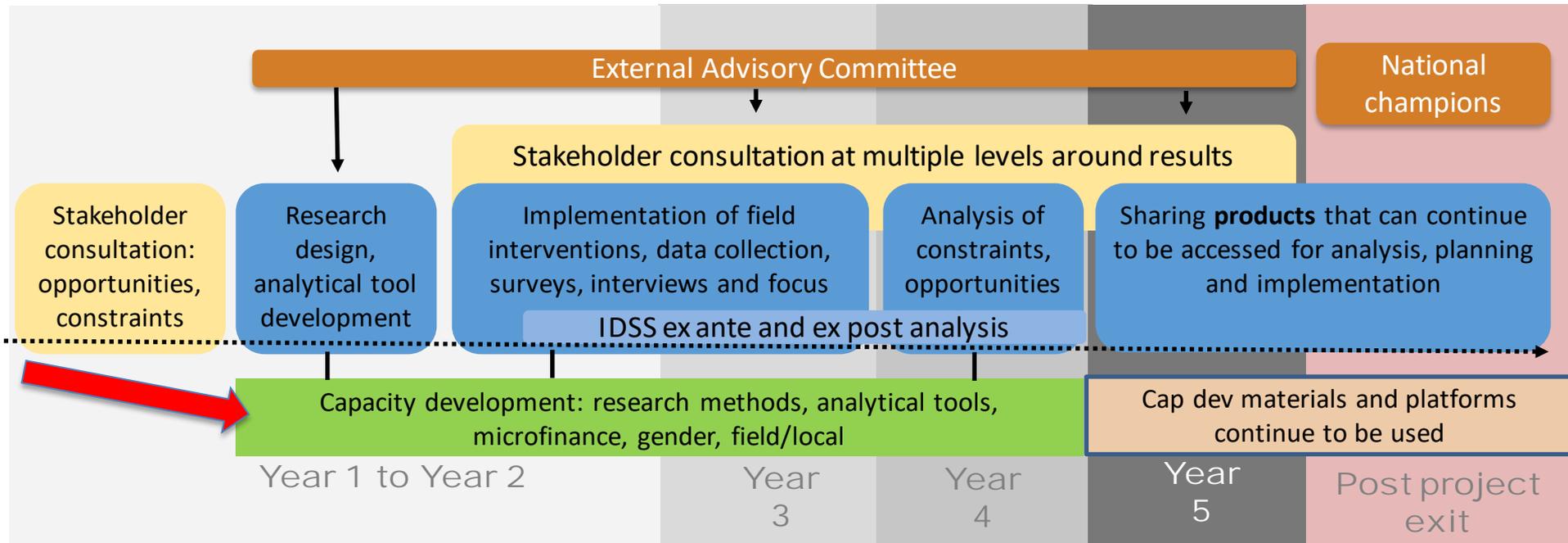
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## CONTRIBUTION OF CAPACITY DEVELOPMENT TO PROJECT IMPACT





## ILSSI APPROACH TO CAPACITY DEVELOPMENT

### Continuous

- Seasonal or bi-annual
- Repeated and cumulative

### Multiple levels

- Farm/Local
- National research institutes, university, planning

### Methods

- IDSS – SWAT, APEX, FARMSIM - Decision support tools and analysis
- Survey
- Field/action research

### Special subjects

- Gender
- FEAST
- Irrigated fodder, forages, including dairy cow health
- Irrigation scheduling and tools
- Conservation agriculture
- Microfinance for irrigation technologies



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## FARM/LOCAL TRAINEES – ALL COUNTRIES

Year	Producers	Civil servants	Private sector	Civil society	Male	Female
1	63	-	-	-	41	22
2	324	26	5	2	239	118
3	408	28	1	76	376	137
4	54	16	0	0	42	28
<b>ALL</b>	<b>849</b>	<b>70</b>	<b>6</b>	<b>78</b>	<b>698</b>	<b>305</b>



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## FARMER AND FIELD LEVEL

Subject	Target group(s)	Frequency	Countries
Water and soil management	Farmers, Extension	Each irrigation season	All
Irrigation scheduling	Farmers, Extension	Each irrigation season	Ethiopia, Ghana
Post-harvest handling and marketing	Farmers	Each irrigation season	Ghana
Farmer forums and exchanges – consolidate learning, build networks	Farmers	After each irrigation season	Ethiopia, Ghana
Conservation agriculture	Farmers, Extension	Start of irrigation season	All
Savings and credit trainings cooperatives	Farmers, Finance cooperative	Start of field trials	Ethiopia
Improved forage development, irrigation, dairy health	Farmers	Start of field trials and refresher trainings	All
Intercropping grasses, forage legumes under SSI, dairy cow management	Farmers, Extension, Subject experts	Start of field trials and refresher trainings	All





## STUDENT RESEARCH/MENTORING IN FIELD STUDIES

- Graduate students (26) and Honor's Undergraduate students (10)
- Capacity development and mentoring:
  - Matched with home university faculty and IWMI researcher
  - Mentored through proposal, research design, field work, data collection, analysis, writing and presenting
- Financial support for field work, data collection, lab analysis
- Results:
  - 22 theses papers (as at present)
  - 1 awarded outstanding thesis for MSc economics (Ethiopia)
  - 2 international conference papers accepted
  - Paper prep and submission with several students in progress
  - 14 students to complete theses in final project year



## GRADUATE STUDENT THESES – TO DATE

Student	M/F	Institution	Degree	Thesis/Dissertation
Misba Abdela	M	BDU	MS, Eng	Improving subsurface recharge through breaking restrictive layers by mechanical means (Robit)
Talake Asnakew	F	BDU	MS, Hydrology	Optimizing irrigation scheduling to improve onion production in Dangishta
Belainew Belete	M	BDU	MS, Economics	Impact of Small Scale Irrigation Technology on Farm Household Welfare In Amhara region: Evidence from Dangila an Bahir Dar Zuria Districts
Kassaw Beshaw	M	AMU	PhD, Eng	Spatio-temporal variability of rainfall in a small upland watershed in Southern Ethiopia
Mihret Dessie	M	BDU	Economics	Cost-Benefit Analysis of small scale irrigation technologies: In Bahir Dar Zuria and Dangel Experimental Projects
Tesfaye Ewnetie	M	BDU	Msc	Assessing the performance of manual water lifting technologies and irrigation scheduling based on measured soil moisture and farmers practice on irrigated tomato production, and comparing soil moisture measuring and estimation methods (Western Amhara)
Tariku Yadeta Fufa	M	AMU	MS, Economics	Socio-economic analysis of the impact of small-scale irrigation (Rift Valley)
Tamrat Getachew	M	BDU	Msc, Eng	Evaluation of full nutrient balance for garlic & inter cropped Napier grass under different water management during the dry season (Robit)
Muluye Gedifew	M	BDU	MS, Hydrology	Partial Nutrient Balance at Farm Plot level under Different Irrigation Water Management for Tomato Production
Misba Hussen	M	BDU	MSc, Eng	Improving Subsurface Recharge By Breaking Hardpans Through Mechanical Means
Debebe Lijalem	M	BDU	PhD, Eng	Optimizing use of groundwater for irrigation in the dry season in the Robit-Bata watershed located in the Lake Tana basin (Robit)
Habtmu Mesche	M	BDU	Msc, Eng	Hydrological and agronomic impacts of Berken and deep tillage systems through hardpan disruption, Upper Blue Nile, Ethiopia
Hannibal Mulugeta	M	BDU		Development of crop coefficients and evaluating the productivity and water use for Napier grass under small-scale irrigation (Robit)
Teshager Assefa Sisha	M	BDU		Analysis of Technical Efficiency of Small Scale Irrigation Technologies (Robit and Dangeshta)
Desalegn Tegegne Mengistu	M	AMU		Evaluation Of Wetting Front Detector To Determine Water Demand, Water And Crop Productivity Of Selected Fodder Varieties Under Supplemental Irrigation (Case Studies In Lemo And Angacha Areas Of SNNP Region)
Menehahel Zegeye Tesefaye	M	AMU		Farmers willingness to pay and choice of smallholder water lifting technologies: Evidence from Adami Tulu, Lemo, Dangila and Bahir Dar Zuria woredas, Ethiopia
Melaku Tesema Alemu	M	BDU		Evaluating Simple Irrigation Technologies to Improve Crop and Water Productivity of Onion in Dangishta Watershed
Tigist Tesfaye	F	BDU	Msc, Economics	Determinants of access to credit among small scale irrigation technology users in Dangila woreda
Adisu Wondimu	M	BDU	MS, Eng	Assessment of Pesticide residual contamination of soil and water resources: Case of Robit Bata



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## FODDER/FORAGES UNDER IRRIGATION

Site	Dates	Content	No.	Trainees	Organizations participants represented	Training facilitator partner
<b>Robit Bata, Ethiopia</b>	January 2015	1. Irrigated fodder agronomics 2. Irrigation scheduling (wetting front detector)	23	Farmers	Farmer organization	IWMI
<b>Tanzania</b>	March 2015	Project introduction FEAST	64	Farmers	Farmer organization	ILRI-led
<b>Tanzania</b>	October – November 2015	FEAST Tool	52	Farmers	Farmer organization	ILRI-led
<b>Lemo/Angacha, Ethiopia</b>	March 2016	1.Improved forage development 2.Dairy health management 3.Small scale irrigation	50	Farmers	Farmer organization	SARI: Southern Agricultural Research Institute
<b>Robit Bata, Ethiopia</b>	March 2016	1.Intercropping grasses with forage legumes 2.Crop water requirement 3.Improved dairy cow management	33	Farmers, Extension workers and experts	Farmer organization, District Agricultural office	ARARI: Amhara Agricultural Research Institute



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## GENDER AND IRRIGATION TRAININGS

- **Three gender and irrigation trainings** were organized in April-March 2016 with IWMI and national partners in Ethiopia, Ghana, and Tanzania
  - [Ethiopia](#): Gender directorates of the Agricultural Transformation Agency, Ministry of Agriculture and Natural Resources ([agenda](#))
  - [Ghana](#): Ghana Irrigation Development Authority ([agenda](#))
  - [Tanzania](#): Sokoine University of Agriculture and Platform for Agricultural Policy Analysis and Coordination ([agenda](#))
- Over 150 participants from government, research organizations, NGOs, and donors
- Interactive presentations from researchers, policymakers, and practitioners. Participants “workshopped” irrigation projects to improve gender equitable outcomes
- Videos available [online](#).

# OUTCOME OF GENDER TRAINING WORKSHOPS

- Participants learned about and gave feedback on [a gender and irrigation diagnostic tool](#), to guide practice on integrating gender into irrigation projects
- [ILSSI Project Note 1: Promoting Gender Equality in Irrigation](#), based on workshop discussions and co-authored by workshop organizers, identifies key concepts, opportunities, and constraints related to gender and irrigation
- Ethiopia expressed interest in revising gender mainstreaming guidelines of the Ministry of Agriculture and Natural Resources to include gender
- Gender-irrigation tool as a qualitative protocol is now being piloted in Ethiopia
- Tanzania is reviewing their National Irrigation Policy and expressed interest to revise with gender equality objectives in mind.
- Tool used as basis for advising on gender strategy for WARIDI (USAID integrated water resources project in Tanzania) and Oxford University's REACH Consortium on Water Security (modified tool available [here](#))
- Participants contributed to online debate with blogs on gender and irrigation on [WLE Thrive](#)



## Outline of capacity development from IDSS

- Graduate (MSc and Ph.D. students in U.S. Institutions) professional training (2-3 years)
- Extended training for graduate students from project countries (90-day)
- Regular workshops (far exceeding the expectations of the project goals) (5-day)
- Advanced Clinics (2-3 day)
- Institutionalization of IDSS (long term commitment)
- Continued support to stakeholders, graduate students, and CG systems (long term commitment)

## IDSS TRAININGS: Demand driven and source of input to ILSSI

- All IDSS training participants cover their cost of living and accommodation. This helped to identify candidates who have a genuine interest to attend IDSS training.
- Local dataset was used for every IDSS training,
- The IDSS training was used as a venue to collect local information for ex-ante, ex-post and upscaling for the ILSSI project,
- The IDSS team shared data and knowledge with all participants, and
- The ILSSI project outcomes were discussed and findings were validated at the beginning and closing days of the training.



## IDSS TRAININGS: Demand driven and source of input to ILSSI

- Based on user-driven demand, the content of the training have been updated and additional workshop packages have been included, e.g.
  - IDSS-clinic,
  - Advanced SWAT Training,
  - Ethiopian Agricultural Transformation Agency (ATA) has requested the IDSS team to provide them ATA-tailored IDSS training for their day-to-day analysis for irrigation planning.



## Graduate professional training funded by ILSSI



### Sintayehu Alemayehu

- MSc. student at Texas A&M University
- Formerly worked at Mercy Corps and International Livestock Research Institute (ILRI)
- ***MSc. Title: exploring fodder market potential in Ethiopian regions***

### Outcome

Earning graduate degree from US universities, Sintayehu is interested to work with institutions that specialize on development and poverty reduction



## Graduate professional training funded by ILSSI



Tewodros (Tedy) Assefa

- Ph.D. student at North Carolina State A&T State University
- Formerly lecturer at Bahir Dar University
- ***Ph.D. research title: Evaluating the effects of soil-water-crop management practices in commercial vegetable home gardens (CVHGs): An experiment and modeling in sub-Saharan Africa***

### Outcome

- Earning graduate degree from US universities
- Tedy will join Bahir Dar University, and
- Together with his colleagues, he will teach ID at BDU



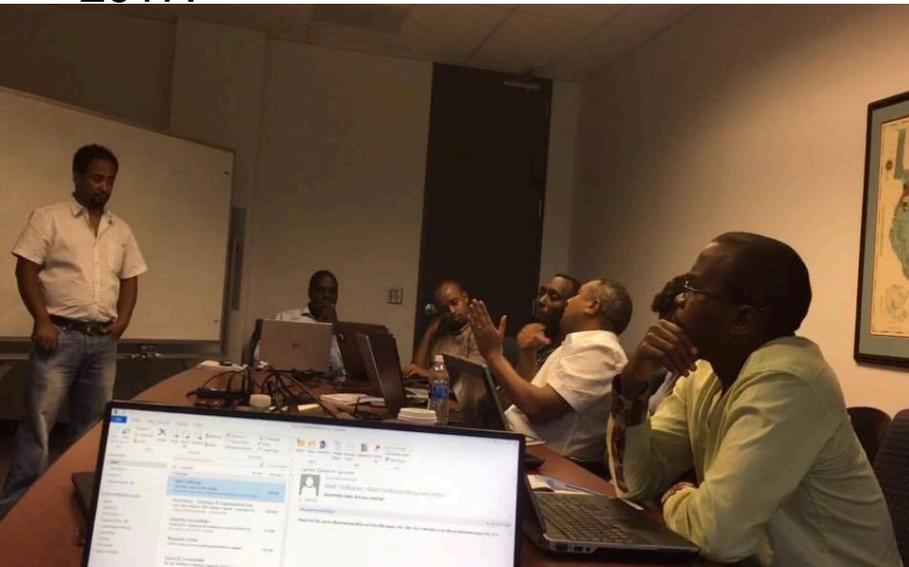


## Extended IDSS training

- Duration of the training – 90 days (June – August 2016)
- Participants were:
  - Two lecturers from **Bahir Dar University** and one from **Sokoine University of Agriculture** teaching **hydrology, water management and GIS and Remote Sensing**,
  - One lecturer each Bahir Dar University and Sokoine University of Agriculture teaching econometrics and statistics,
- Seven more participants specializing in **integrated water management, Ag and biological engineering, Soil/Water & Plant Biophysical** will come in December 2017.

### Outcome

- The training helped to institutionalize the IDSS at Bahir Dar University and Sokoine University of Agriculture,
- SWAT, APEX, and FARMSIM are taught to graduate students and used as the research tool in their home universities.





## Extended IDSS training

- Duration of the training – 6 months (June-November, 2015),
- Ph.D. student at the Universite D'abomey Calavi, Department of Hydrology, Benin
- Formerly expert at **National Disaster Management Organization**, Western Region, Ghana
- Trained and supported using the SWAT Model.



Fati Aziz

### Outcome

- Writing her Ph.D. thesis using the SWAT model on understanding the impact of land use change on water resources in the Upper Ghana,
- Fati is keen to join IWMI as a hydrologist



# LEARNING FROM CAPACITY DEVELOPMENT AT PROJECT LEVEL

- Supports adoption, sustainability of SSI technologies, practices and tools - increases positive impacts of technologies
- Necessary for effective and continued use of research and data collection at different levels
- Enables sustained use of decision-support tools in national research and planning institutions





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## Morning of 1<sup>st</sup> Day activities

## EXAMPLE IDSS WORKSHOP AGENDA

Activity
Introduction to ILSSI and IDSS
Local Case study on IDSS
SWAT overview
APEX overview
FarmSIM overview

## Afternoon of 1<sup>st</sup> day to afternoon of 4<sup>th</sup> day activities

Activity	Responsible person
Individual Workshops SWAT/APEX/FARMSIM	Three parallel training sessions for each group of (engineers, agronomists, economists, etc) with local datasets from the respective country.

## Fifth day activities

Activity
Revisiting IDSS application using case example in the country
Demo SWAT hands-on
Demo APEX hands-on
Demo APEX hands-on
Participants hands-on group exercise on IDSS



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## IDSS WORKSHOPS – TO DATE

Location	National Partner	Date
<b>Ethiopia:</b> ILRI Campus, Addis Ababa		June 9-13, 2014
<b>Ethiopia:</b> Bahir Dar University, Bahir Dar	Bahir Dar University	Feb 2-6, 2015
<b>Tanzania:</b> Sokoine University of Agriculture, Morogoro	Sokoine University of Agriculture	July 27-31, 2015
<b>Ghana:</b> Council for Scientific and Industrial Research, Accra	Water Research Institute	Feb 1-5, 2016
<b>Ethiopia:</b> ILRI Campus, Addis Ababa		Feb 8-12, 2016
<b>Tanzania:</b> Nelson Mandela African Institute of Science and Technology, Arusha	Nelson Mandela African Institute of Science and Technology	June 6-10, 2016
<b>Tanzania:</b> University of Dar es Salaam, Dar es Salaam	University of Dar es Salaam	Jan 18-27, 2017
<b>Ethiopia:</b> Addis Ababa University, Addis Ababa	Addis Ababa University	Jan 30-Feb 3, 2017
<b>Ghana:</b> Kwame Nkrumah University of Science & Technology (KNUST), Kumasi	Kwame Nkrumah University of Science & Technology	Upcoming - July 24-28, 2017

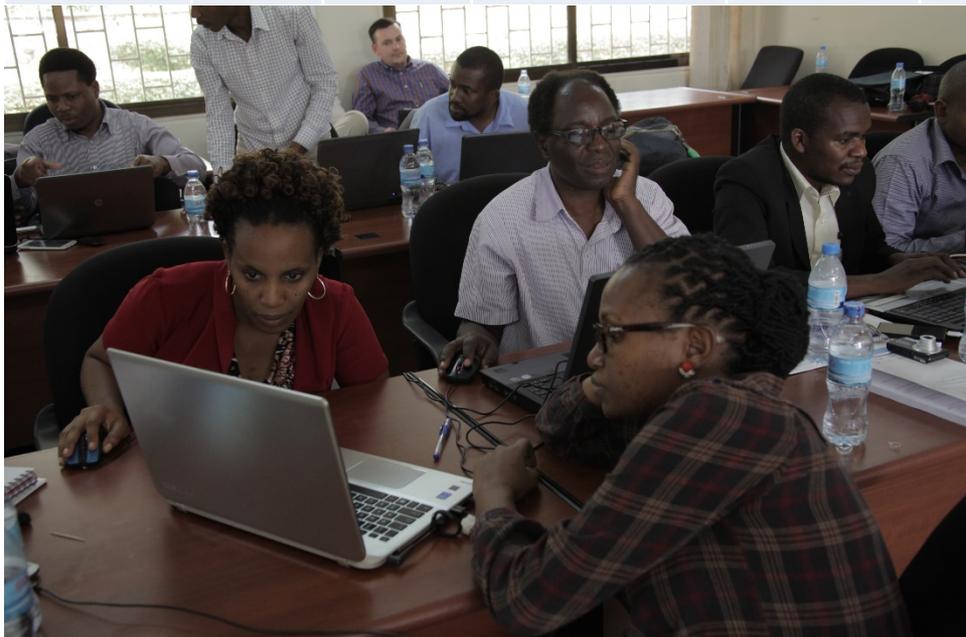


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## IDSS Training in Ethiopia

ILRI Campus		Bahir Dar University		ILRI Campus		Addis Ababa University		Total
June 9-13, 2014		Feb 2-6, 2015		Feb 8-12, 2016		Jan 30 - Feb 3		
M	F	M	F	M	F	M	F	
69	9	73	9	85	9	48	11	313



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IWMI  
International  
Water Management  
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## IDSS Training in Tanzania

Sokoine University of Agriculture		NMAIST		University of Dar Es Salaam		Total
July 27-31, 2015		June 6-10, 2016		Feb 8-12, 2016		
M	F	M	F	M	F	
42	9	33	13	53	20	170



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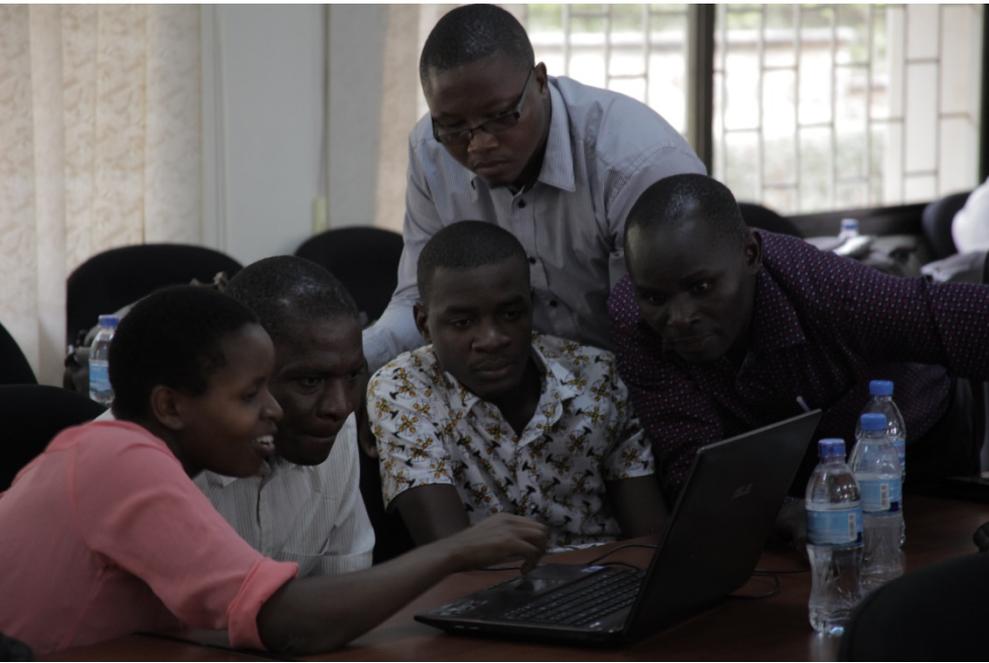


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## IDSS Training in Ghana

Water Research Center		<b>KUNST</b>		
Feb 1-5, 2016		<b>July 24-28, 2017</b>		
<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	
40	10	60	20	130



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## All IDSS Training

Ethiopia		Tanzania		Ghana		Total		Grand Total
M	F	M	F	M	F	M	F	
275	38	128	42	10	0	503	110	613





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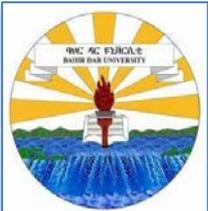
## Institutionalizing IDSS: selected universities offer IDSS as a course with support from ILSSI team



Addis Ababa University



Sokoine University of Agriculture



Bahir Dar University



UNIVERSITY OF DAR ES SALAAM



Nelson Mandela African Institute of Science and Technology



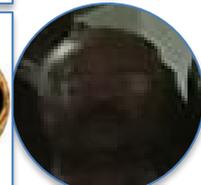
## Institutionalizing IDSS: selected Institutions that apply IDSS for different research Activities with support of ILSSI team



Blue Nile Basin Authority



THE UNIVERSITY OF DAR ES SALAAM



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## Institutionalizing IDSS

- **Universities** include IDSS tools in Hydrology, Watershed Simulation, GIS and Remote Sensing, and Agricultural Economics Curricula:
  - Addis Ababa University and Bahir Dar University, Ethiopia
  - Sokoine University of Agriculture, University of Dar es Salaam, and Nelson Mandela African Institute of Science and Technology, Tanzania
- **Government Institutions use IDSS** for planning and evaluation of government initiatives to increase agricultural production, and household income and nutrition
  - Ethiopian Agricultural Transformation Agency (ATA),
  - Abay (Blue Nile Basin Authority) – Ethiopia,
  - Water Research Institute, Ghana
- **CGIAR centers, NGOs and Private sector** for environmental analysis and engineering design
  - CIAT, IWMI and various private agencies

## IDSS Training: example success stories

Institutional affiliation	Objective of the research
Water and Land Resources Center, Ethiopia (1 person)	Studying impacts of land management practices on the Grand Ethiopian Renaissance Dam (GERD)
Addis Ababa University, Ethiopia (4 persons)	<ul style="list-style-type: none"> <li>▪ Studying climate change, land use/land cover change, and land management change,</li> </ul>
Bahir Dar University, Ethiopia (4 persons)	<ul style="list-style-type: none"> <li>▪ Understanding watershed behavior,</li> <li>▪ Studying the effect of conservation agriculture,</li> <li>▪ Gulley mapping using multi-criteria and satellite data</li> </ul>
Hawassa University, Ethiopia (1 person)	Studying impact of climate change
Dar es Salaam University, Tanzania (2 persons)	<ul style="list-style-type: none"> <li>▪ Studying impacts of small scale irrigation interventions</li> <li>▪ Studying impacts of climate change</li> </ul>
Nelson Mandela African Institution of Science and Technology, Tanzania (1 person)	Studying impacts of land use change on stream flow
Sokoine University of Agriculture, Tanzania (3 persons)	<ul style="list-style-type: none"> <li>▪ Economic viability of newly introduced tropical adapted and improved chicken ecotypes at village Level</li> <li>▪ Safeguarding food and nutrition security for the local population</li> <li>▪ Application of FarmSIM on agribusiness</li> </ul>
Universite D'abomey Calavi, Benin (1 person)	Studying impact of land use/land cover change
Water Research Institute, Ghana (1 person)	Studying impact of land use/land cover change



## Institutions Participated in the IDSS Training

Ethiopia	Tanzania	Ghana
Bahir Dar University	Sokoine University of Agriculture	University of Ghana
Arba Minch University	University of Dar es Salaam	KNUST – Kwame Nkrumah University of Science and Technology
Jimma University	Neelson Mandela African Institution for Science and Technology	University of Cape Coast
Harmaya University	World Vision	University of Development Studies
Tana Subbasin Office	AO - Mzinga Corporation	Central University College
Mekele University	WAMI-RUVU River Basin Authority	Institute of Local Government Studies
Amhara Design Enterprise	Green Agriculture & Environment	Council for Scientific and Industrial Research/Water Research Institute
Addis Ababa University	iWASH	International Water Management Institute
Amhara Regional Agricultural Research Institute	Chunya Mbeya	University of Abuja
Southern Agricultural Research Institute	Vrije Universiteit Brussel, Brussels Belgium.	United Nations University Institute for Natural Resources in Africa
ICARDA	Ministry of Water and Environment, Directorate of Water Resources Management, Uganda	IWMI Ghana
Arsi University	Kigoma-NMTC	University of Education (UEW)
Ministry of Water, Irrigation and Electricity	Ministry of Water and Irrigation, Wami/Ruvu Basin Water Board, Tropical Pesticides Research Institute (TPRI), IITA-Arusha, Vegetable Center	Ministry of Food and Agriculture (MoFA)
Hawassa University		Self Help International
Oromia Water Works Design and Supervision Enterprise	Pangani Basin Water Board	Ghana Irrigation Development Authority (GIDA)
AFX Water Resources	The Institute of Marine Sciences (IMS) Zanzibar	Abomey Calavi University, Benin
Private	Water Development and Management Institute(WDMI)	Cross River University
CIAT (International Center for Tropical Agriculture)	MTL Consulting Co Ltd	UNICEF
Abbay (Nile) Basin Authority	Tsinghua University	Ghana Atomic Energy Commission
Wollo University	Pwani Regional Commissioner's Office	Pan African University
AAWSA (Addis Ababa Water and Sewerage Authority)	Busitema University; Uganda	
Wollega University	Water and Waste Water Quality Manager, Dar Es Salaam Water and Sewerage Authority (DAWASCO).	
WWDSE (Water Works Design and Supervision Enterprise)	Tanzania Water Partnership	
Amhara Design and Supervision works Enterprise	Sebastian Kolowa Memorial University, Lushoto-Tanga	
Adama Science and Technology University		
IWMI		



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## Summary: Institutions Participated in the IDSS Training

- From more than 30 Universities,
- Government Ministries and Agencies,
- Government Research Institutions,
- CGIAR centers, UN agencies, and other NGOs,
- Private sector



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# Thank you! & Questions?



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