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CRS Farmer to Farmer Program

Volunteer Assignment Scope of Work

Summary Information	
Assignment code	ET219
Country	Ethiopia
Country Project	Livestock
Host Organization	Salale University, College of Agriculture and Natural Resource
Assignment Title	Hydrological Modeling
Assignment Preferred Dates	June 2019
Assignment Objectives	▪ Provide training on Hydrological modeling for SLU, college of agriculture and Natural Resource staff and selected staff from water sector ▪ Practice the set-up of hydrological modelling software's, Criteria for model performance evaluation, model calibration and validation
Desired Volunteer' Skill/Expertise	▪ Advanced university degree in hydrological modelling or related area. Extensive Experience using hydrological models and software's in simulating hydrological processes especially surface water modelling, groundwater modelling and interactions between surface water and groundwater.
Type of Volunteer Assistance	Technology Transfer = T
Type of Value Chain Activity	Information and Input Support Services (S)
PERSUAP Classification	Type III

A. BACKGROUND

CRS Farmer -to-Farmer program (F2F) is a USAID funded program that will be implemented for five years (2019- 2023) with a primary goal of reducing hunger, malnutrition, and poverty across six countries: Benin, East Timor, Ethiopia, Nepal, Rwanda and Uganda. The program aims at achieving this goal through advancing inclusive and sustainable agriculture led growth aimed at generating sustainable, broad-based economic growth in the agricultural sector. The program's secondary goal is to increase US public understanding of international development issues and programs and share the knowledge back in the US. To achieve its goals, F2F program provides

volunteer technical assistance to farmers and farmer groups (associations and cooperatives), private agribusinesses, agriculture education institutions in developing countries like Ethiopia to address host identified technical needs in selected agricultural value chains. F2F volunteers are pooled from abroad range of US agricultural expertise, from private farmers with varied experience, University professors, bankers/certified accountants, animal health and nutrition specialists, soil scientists, agronomists who support local host organizations. F2F program introduces innovation and develops local organizations capacity for more productive, profitable, sustainable and equitable agricultural systems while providing an opportunity for people- to-people interactions within the agricultural sector. In Ethiopia, F2F program focuses technical interventions in the livestock and grain value chains.

Ethiopia has diverse climate and altitude conditions which are conducive to various agricultural and water resource management activities. It is highly dynamic as there are many socio-economic and environmental drivers at play, including climate change. The impacts of these changes challenge the resilience of natural and human capacities and environments in the country. Recent indications like erratic rainfall, drought occurrence in different region of the country, Ellion effect and others have shown that the country depend on its water supply and ecosystem services are particularly vulnerable to climate change. Current and future water-related challenges are location and time specific and can vary from impact of economic and population growth, floods or extended and more prolonged droughts, amongst others. It is well-known that the number and diversity of these water-related challenges are large and are expected to increase in the future. Hydrological models are required to understand hydrologic processes and exploring different scenarios for decision making, for example possible effects of changes in population and climate on the water cycle, the contributing roles of Evaporation, Transpiration, precipitation and groundwater to the total water resources, and how these roles might change in the future.

B. ISSUE DESCRIPTION

Salale university is located in Fiche town in central Ethiopia. The town of Fitche is located about 114KM from the capital Addis Ababa towards the north along Addis Ababa to Bahir dar road. Fitche is situated in the highland, an elevation between 2,738 and 2,782 meters above sea level and latitude and longitude of 9°48′N 38°44′E respectively. Due to this elevation, the climate tends to be more temperate. The university is relatively new and started its operation in 2017. It has 5 colleges with 30 undergraduate programs. One of the largest colleges in this university is the College of Agriculture and Natural Resource. This college has seven departments; Horticulture, Plant science, Animal science, Agricultural Economics, Natural resource

management, Water resource and irrigation management and Rural development and agricultural extension.

In response to current and anticipated future water management related challenges, Salale university has Initiated a training course on hydrological modeling. The aim is to equip young professionals and other stakeholders in the water sector with knowledge and skills to analyze, understand, and explore solutions for sustainable agricultural and water resource management. The course specifically targets physically-based hydrological models and the methods used by these models to simulate the behavior of distinct hydrological phenomena that is important for water allocation, catchment processing simulation, surface water quality simulation among others. Currently key university staff and instructors lack adequate knowledge and skills to effectively train these future agricultural and water managers in the subject. In addition, as a center of excellence, it has limited capacity to effectively give technical support to other stakeholders in the water sector. This has led to limited capacity of the university to contribute to developing required human resources in the subject matter and to take it position as a thought leader in the subject matter. To effectively develop new knowledge in hydrological modelling through research and develop high skilled professionals in the subject the university requires good professional human resource, with adequate knowledge and skills in hydrological modeling. It is anticipated that this volunteer technical support will contribute towards these efforts and result into longer term collaboration between Salale University and other universities in developing the University Capacity in training and research in hydrological modelling.

C. OBJECTIVES OF THE ASSIGNMENT

The main objective of this assignment is to give hydrological modeling short course to a total of 17 selected University staffs from College of agriculture and Natural Resource and two experts each from zonal and district Irrigation Authority offices to enable them to.

- Classify and evaluate hydrological models (both surface water and groundwater)
- Process and prepare data files for different models
- Solve groundwater flow equations analytically and numerically
- Use well-known models (e.g. HBV, WASMOD, MODFLOW, etc) in water resources assessment, in impact estimation of climate change and land-use change, and in solving groundwater related problems
- Interpret, analyses and understand the model outputs
- Practice the set-up of hydrological modelling software's, Criteria for model performance evaluation, model calibration and validation

In collaboration with the Salale University college of Agriculture and natural resource, the volunteer will provide technical assistance through the training of the trainer (TtT) Model. The major topics going to be covered in line with the objectives of the course include:

- Introduction to hydrological modeling
- Components of hydrological models and commonly used methods and software
- Defining model structure, schematization and boundary conditions.
- Setting up of Selected Modeling (E.g WEAP, SWAT, IHACRES, MODFLOW, DUFLOW Mike-SHE model and others) for different uses
- Catchment and river modeling
- Physically-based and conceptual models distributed, semi-distributed and lumped models.
- Criteria for model performance evaluation
- Model Validation and Calibration

Generally, the course may cover these major topics and provide study guide covering a wide range of standard modeling approaches and classifications, system concept for watershed modeling, overall description of different hydrologic processes, modeling of rainfall, runoff process, subsurface flows and groundwater flow.

D. ANTICIPATED RESULTS FROM THE ASSIGNMENT

It is anticipated that through F2F volunteer technical support, participants will be equipped with knowledge and skills to:

- Provide effective training coaching and mentorship on Hydrological modeling to students of SLU, college of agriculture and Natural Resource staffs
- Contribute to strengthening of the water sector by equipping participants from the water sector with required knowledge and skills for dynamic management of existing extensive water systems and related infrastructure that provide water for industry, agriculture, domestic supply, fishery and energy.

E. HOST CONTRIBUTION

The host has committed to mobilize the staff, stakeholders, students, and local farmers to receive the volunteer's technical and practical assistance. The host will also avail key personnel to work closely with the volunteer, assisting her/him during training and practical demonstration sessions, ensuring translation to the local language and advising on the culture of the area. CRS will cover lodging costs against receipts and other related costs. In coordination with the host and the volunteer, CRS will also arrange and pay for transport services for daily use to and from the University.

F. ASSIGNMENT DELIVERABLES

The major anticipated outputs of this assignment include, but not limited to:

- Work plan and training materials in appropriate formats in collaboration with the host and training participants

- Training lists with people trained and subject areas as per the training reporting formats
- Volunteer end of assignment report with recommendations to the host organization action plan and recommendations to CRS
- A bibliography or a list of key resources in the subject matter
- Conduct a final debriefing (PowerPoint presentation) with the host organization (plus key stakeholders) and CRS/USAID
- Conduct outreach events upon return to the US

G. SCHEDULE OF VOLUNTEER ACTIVITIES IN ETHIOPIA

Day	Activity
Day 1	Arrival in Addis at Bole Airport. The volunteer will be met by CRS's client hotel Eliana Hotel (https://www.booking.com/hotel/et/eliana.; Phone: +25111 126 2600).The volunteer will locate the hotel kiosk and use pre-arranged shuttle
Day 2	**Rest Day (Sunday)**
Day 3	• Take hotel shuttle to come to CRS office (CRS working days are Monday to Friday from 8:00AM to 5:00 PM East Africa Time) • Welcoming by CRS, and briefing meeting on security, general orientation, MEAL (attendance sheet, reporting and PPT templates), and logistic. • Discuss anticipated outcomes and work plan • Car travel to the assignment site (Fitche town, 114km outside of Addis Ababa). S/he will be introduced to the host and accommodated in Fitche town. • General orientation with the host, first-hand briefing on the main objectives and modality of the assignment and adjustment of the agenda for the coming days (work planning session).
Day 4	• Conduct further assessment of skills and knowledge gaps with training participants • Based on information gathered and gaps identified, enrich the prepared training materials incorporating hands-on practices. • Develop 10 days (2 weeks training) curriculum covering key knowledge and skills Gaps
Day 5-19	Train participants on appropriate subjects including • Introduction to hydrological modeling • Components of hydrological models and commonly used methods and software • Defining model structure, schematization and boundary conditions. • Setting up of Selected Modeling (E.g WEAP, SWAT, IHACRES, MODFLOW, DUFLOW Mike-SHE model and others) for different uses • Catchment and river modeling

Day	Activity
	• Physically-based and conceptual models distributed, semi-distributed and lumped models. • Criteria for model performance evaluation • Model Validation and Calibration
Day 20	• Briefing / exit meeting with the host in the presence of CRS staff • Volunteer travels back to Addis Ababa
Day 15	• Debriefing with CRS staff and/or USAID Mission • Finalize reimbursement expenditures and liquidations (if any) with finance. • Submit volunteer reports, training attendance sheet, assignment report, PPT presentation and any reference materials to CRS F2F team. • Depart for USA
TBD	Outreach event when back in the USA

H. DESIRABLE VOLUNTEER SKILLS

The volunteer will have the following skills, qualifications and competencies:

- Advanced university degree in hydrological modelling or related area (Preferably PHD).
- Extensive Experience using hydrological models and software's in simulating hydrological processes especially surface water modelling, groundwater modelling and interactions between surface water and groundwater.
- Experience in teaching students at a university level preferably Masters or PhD holders
- Skills and experience in TOT training in hydrological modelling or related subject
- Good communicator and interpersonal skills
- Willingness and flexibility to train and technically assist University staff whenever required
- Respect for the cultural and religious norms of the rural people.

I. ACCOMMODATION AND ANOTHER IN-COUNTRY LOGISTICS

- Before travelling to the assignment place, the volunteer will stay in Addis Ababa at one of the CRS's client hotels, Eliana or another hotel that will be booked and confirmed before the volunteer arrival date. The hotel will have rooms that include services such as airport pickup and drop-off, breakfast, wireless internet etc.
- The hotel or CRS will arrange a vehicle for short travel from the hotel to CRS and vice versa while in Addis Ababa.
- All required materials will be prepared ahead of time and provided to the volunteer. CRS Ethiopia will provide the volunteer with a laptop computer (if s/he needs), local internet dongle and mobile phone with a charged local SIM-card. Any other required logistics and facilities can also be requested by the volunteer during her/his stay in Addis Ababa.

- CRS will provide a vehicle and accompany the volunteer to the place of assignment.
- During the assignment period, the volunteer will stay at C-Lale Resort Hotel/Girum Hotel, Fitche town.
- CRS Ethiopia will arrange hotel accommodations and cover the lodging bills against receipts.
- CRS HQ will provide the volunteer with a per-diem advance to cater meals and incidentals.
- CRS Ethiopia will also reimburse the volunteer with laundry costs against receipts.
- For more information, please refer to country information that will be provided.

J. RECOMMENDED ASSIGNMENT PREPARATIONS

- Although CRS F2F has developed such hinting SOW, the volunteer can fine-tune through her/his professional qualifications to successfully carry out this assignment.
- Although the assignment place Fitche is a highland where malaria may not be a problem, the volunteer is advised to take pills or vaccination for malaria and (maybe also for cholera) as per medical recommendations by her/his doctors/health professionals in US before departing from US.
- Prior to travel, the volunteer is advised to prepare necessary training and demonstration aids and written handouts. Softcopies of the handouts and any other paper materials can be printed for immediate use at the CRS office in Addis Ababa on request by the volunteer.
- If the volunteer requires simple training aids like flip charts, markers or tape s/he should make the request and collect from the CRS office in Addis Ababa prior to travel to the assignment place.
- Translation of handouts to the local language can be done in the locality of the assignment, if required.
- Depending on the meeting places and availability of electric power and LCD projector, the volunteer may use a laptop and projector for power point presentations.

K. KEY CONTACTS

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