



## Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program

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### **Trip Report: Lesotho**

13 November – 5 December 2010

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**Purpose:** (1) to conduct the baseline survey of farm households in Butha Buthe;  
(2) to install the Bowen's Ratio unit; and  
(3) to assess weed suppression and ground-cover work.

**Sites Visited:** Lesotho: National University of Lesotho, Roma; Growing Nations, Maphutseng; St Charles Mission and survey villages of Butha Buthe.  
South Africa: USAID/Pretoria.

### **Description of Activities**

The baseline household survey in Butha Buthe conducted in collaboration with the National University of Lesotho (NUL) was completed. Meetings were held with our partners to review the results of a series of ongoing on-farm maize yield trials and on-farm conservation agriculture demonstrations across the country. Meetings were also held with colleagues at the National University of Lesotho and partners from the non-governmental organization Growing Nations (<http://www.barrymannphotography.com/human-GN.html>). Planning meetings occurred to discuss the approaches and methodologies to be used during the five-year project. This trip was partially funded by the Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP). Eash, Smith and Walker traveled on a USDA International Science and Education grant.

### *First Conference of the Lesotho National Agricultural Research Systems (NARS)*

On November 16<sup>th</sup> the group was invited to attend the First Conference of the Lesotho National Agricultural Research Systems (NARS). This was stake-holders conference in Maseru that focused on the way forward for coordinating agriculturally-oriented research and extension activities in Lesotho. Participants included representatives from the National University of Lesotho (NUL), the Ministry of Agriculture, FAO, Lesotho National Farmers Union and the Natural Resources Institute (NRI).

### *Visits to US Embassy, Maseru, Lesotho and USAID Mission Pretoria, South Africa*

Some of the team visited with the US Embassy in Maseru on November 23<sup>rd</sup> and the USAID Mission in Pretoria on November 29<sup>th</sup>. At the Embassy the team met with Mr. Alexander Sharpe, the recently appointed Political and Economic Officer. He was briefed on the activities that the University of Tennessee and SANREM are involved with in Lesotho. At the USAID mission in Pretoria the team met with Ms. Cecilia Khupe, Senior Regional Agriculture Program Manager, with USAID in Southern Africa to discuss SANREM activities and how they may tie in with USAID objectives in the region.

### *Monitoring Carbon Dynamics in CA Systems*

As part of the SANREM CRSP we are mandated to monitor C sequestration potential of CA systems. Since changes to soil C happen slowly it would be rare to see any differences to soil total organic C within the five year project duration. For the Lesotho and Mozambique project we have opted to explore quantifying C sequestration by monitoring several parameters used to calculate Bowen's Ratio, a micrometeorological method effective for finding minor meteorological changes on a daily basis. This process measures temperature, photosynthetically active radiation, soil T, soil heat flux, relative humidity, carbon dioxide concentrations, soil moisture, and wind speed.

Dr. Neal Eash and Mr. David Smith spent much of their time at the Growing Nations site at Maphutseng. During this time a Bowen ratio unit (on loan from the USDA ARS National Soil Tilth lab., Ames IA) was set-up on a site in the research plots. The system is powered by a 55W solar panel, equipped with a Campbell Scientific CR23X datalogger programmed to execute and store measurements from the sensors (temperature, relative humidity, carbon dioxide etc.). A considerable amount of time was spent concentrating on setting the unit up, providing solar and battery power to the unit, and making other needed parts on site. In early 2011 another unit will be set-up on an adjacent site to compare real-time carbon emissions from a no-till site and one on an adjacent degraded conventional tillage site.

Wendy Bruns, a graduate student from the University of Tennessee joined the group November 28 and will remain in Lesotho until late February to collect data from the unit.

### *Winter Cover Crop Assessment, Maphutseng*

During the visit to Maphutseng, data was collected on weed suppression and ground-cover under a variety of different leguminous and cereal cover crops. Some of the cover crops showed promise as a tool to dramatically reduce weed pressure in CA systems. The results of this study will be shared at a Regional FAO Workshop on Conservation Agriculture in Johannesburg in February, 2011.

### *Household Survey in Butha Buthe*

Butha Buthe was a primary target for the baseline survey given the relatively widespread attempts to introduce mechanized (no-till planters) and rudimentary (hole digging by hand, *likoti*) conservation agricultural practices. The Lesotho Ministry of Agriculture has promoted the mechanized version in several villages using a no-till planter that can be rented by residents. Interestingly, inputs (esp., herbicide and Round-Up ready seed) are being sourced by the

Ministry on behalf of farmers from South Africa and would likely not be available otherwise. The *likoti* method was promoted by a local NGO in the villages included in the survey.

All target survey numbers were obtained except in JoalaBoholo and Ha Sefako, where we were short 2 and 7 respectively. In contrast, we collected three more in Ha Keletso (Mafika-Lisiu). However, given the number of households in each village (according to the 2006 Lesotho Bureau of Statistics Census), the sample was quite representative. The  $r^2$  between the survey samples and the 2006 household census is 0.99. In all, we had a 98.6% response rate (427/433).

The daily log for the survey is in Appendix I.

**Table 1. Communities Included in Household Survey**

Date	Village	Council	Sample	Census
11/22 and 11/26	Ha Rasekila	Likila	37	37
11/23 and 11/24	Ha Keletso (Mafika-Lisiu)	Liqobong	56	64
11/25 and 12/3	Ha Sefako	Liqobong	69	62
11/26	Manoeleng	Liqobong	21	22
11/29	Mokotjela	Makhunoane	33	35
11/30	Ha Mou	Makhunoane	15	19
11/30	Phamong	Makhunoane	9	10
12/1 and 12/2	Joala-Boholo	Likila	45	50
12/6 and 12/7	Ha Tabolane	Likila	89	85
12/8 and 12/9	Maloseng (MAFS)	Tša-le-Moleka	59	61
		<b>Total</b>	<b>433</b>	<b>445</b>

#### *Collaborations*

**Jaap Knot:** Mr. Knot recently enrolled as a PhD candidate at UFS. His research work will focus on the adoption of conservation agriculture in Lesotho. He currently works part-time for Growing Nations overseeing some of their efforts in Tebelloong. Mr. Knot conducted a survey to enumerate the numbers of farmers in Tebelloong and Simulkong in the southern hemisphere Summer 2010. His results were helpful in designing our survey-sampling frame. Mr. Knot spent a considerable amount of time in Ha Seboche assisting the survey team. Beyond providing additional transportation to the study sites, Mr. Knot worked closely with the team to refine the survey instrument and assisted enumerators by providing very valuable guidance in the field.

**Dr. Mampiti Matete, National University of Lesotho:** The mission met with Dr. Mampiti Matete, and Agricultural Economist at N.U.L. Dr. Matete has experience in conducting participatory rural appraisal research, and specializes in natural resources economics and water economics. At this time, Dr. Matete is unable to commit formally to serving on the team but remains a valuable resource. Dr. Matete also re-introduced the team to her star student, Ms. Puselesto Likoetla. Ms. Likoetla (MS, Agricultural Economics) has applied to the University of Tennessee for graduate studies. In her previous graduate work, Ms. Likoetla had hands-on experience working with survey data. Her application is currently under review. Ms. Likoetla provided valuable insights on a draft version of the survey instrument.

RethabileNchee, Lesotho Ministry of Agriculture - Department of Agricultural Research: Ms. Nchee has an MSc in Agriculture from University of KwaZulu Natal and she is currently a Senior Extension & Research Officer. Ms. Nchee has done a considerable amount of work on developing manuals and guidelines for new agricultural technologies and studied information dissemination and technology transfer. She has also worked in the area of drought relief and recovery. The team met with Ms. Nchee to discuss the survey in detail and to determine if she was available to serve formally on the team. At this juncture, she is awaiting approval from her administration.

### **Suggestions and Recommendations**

1. Following the departure of the team on December 4<sup>th</sup> only two communities (Ha Tabolane and Maloseng) were left to survey. This task was completed by December 9<sup>th</sup> under the supervision of Dr. Marake from NUL. The completed surveys will be held at NUL, copied and returned to the University in February
2. The work of monitoring carbon data was continued at Maphutseng by Wendy Bruns who will remain in Lesotho for a further 3 months. It is hoped that another Bowen ratio unit will be brought out to Maphutseng in early 2011 to enable side by side comparisons of carbon emissions from tilled and untilled fields.
3. Dr. Marake will be overseeing the establishment of this seasons research plots. Wendy Bruns will monitor and report on progress.
4. Several of the enumerators expressed an interest in applying to graduate school at the University of Tennessee.

### **Training Activities Conducted:**

Program type (workshop, seminar, field day, short course, etc.)	Date	Audience	Number of Participants		Training Provider (US university, host country institution, etc.)	Training Objective
			Men	Women		
Workshop	19 Nov	Survey enumerators	3	5	University of Tennessee and National University of Lesotho	To prepare enumerators to successfully apply the household survey

**List of Contacts Made:**

Name	Title/Organization	Contact Info (address, phone, email)
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## Appendix I:

### Trip Log for Lesotho Trip, November / December 2010

**Saturday 13<sup>th</sup> November.** Forbes Walker, Neal Eash, Dayton Lambert, David Smith and Michael Wilcox depart Knoxville / Nashville en route to Johannesburg via Atlanta.

**Sunday 14<sup>th</sup> November.** Arrive Johannesburg 5pm. Hire vehicles. Night in Johannesburg.

**Monday 15<sup>th</sup> November.** En route to Lesotho. Meetings at National University of Lesotho (NUL) with Dr. Marake. Night in Roma (Maseru), Lesotho

**Tuesday 16<sup>th</sup> November.** Attend *First Conference of the Lesotho National Agricultural Research Systems (NARS)* stakeholders conference in Maseru that focused on the way forward for coordinating agriculturally-oriented research and extension activities in Lesotho. Purchased supplies for survey. Night in Roma (Maseru), Lesotho.

**Wednesday 17<sup>th</sup> November.** Lambert, Walker and Wilcox (LWW) depart for Butha Buthe and St. Charles Mission (Ha Seboche) with Ms. Muremi, one of the survey enumerators. Upon arrival, meeting with enumerator team assembled by Dr. Marake to discuss logistics for Friday and Saturday and to obtain initial input on the draft survey instrument. LWW, spend night in Ha Seboche. Enumerators spend night at home. Eash and Smith travel to Maphutseng.

**Thursday 19<sup>th</sup> November.** LWW spend the entire day with the enumerators to discuss, in detail, the entire survey instrument and to begin formulating plans for how best to implement the survey in the villages. Lambert further refines the sampling methodology and final villages and desired survey numbers are decided. Given their close association with the survey area, enumerators provide information regarding village layout, road conditions and other useful data that serve to inform logistics. Team is joined by Dr. Marake who discusses logistics, workplan and contract terms with entire team.

**Friday 20<sup>th</sup> November.** Lambert, Marake, Walker, Wilcox assist the enumerators in a field test of the survey. Enumerators choose to work in pairs in the morning to refine the translation of the survey instrument from English to Sesotho. By the afternoon, enumerators have divided into single units and complete the desired number of field test surveys. Using Ha Seboche now as the staging point for all survey activities, Lambert, Walker and Wilcox use the late afternoon and evening as an opportunity for debriefing and training. This evening activity persists throughout while the US-based team is present.

**Saturday 21<sup>st</sup> November.** Lambert and Wilcox, along with Dickson (driver), Muremi and Maruthelane, spent the entire day visiting each of the villages that are to be surveyed. In each village, the team met with the chief, or chief representative, to deliver news on their impending arrival (orally and with an official correspondence in Sesotho on NUL letterhead), and to determine a date and time for the survey team's arrival. Walker and Marake returned to Maseru to get surveys photocopied. Walker met with Keith Moore (SANREM ME), Neal Eash, David Smith and August Basson at Ramabanta.

**Sunday 22<sup>nd</sup> November.** Lambert and Wilcox used the day to make final plans and explore, in exhausting detail, the main transport artery (and farm to market road) in ButheButhe. Walker returns to ButheButhe.

**Monday 23<sup>rd</sup> November.** Surveying commences in Ha Raskillia using the entire enumerator team. Twenty nine surveys are completed. The remaining eight are completed on Friday 26<sup>th</sup> of November. As will be completed in all of the other villages, an initial meeting is held at the chief's residences to explain, to everyone present, the goals of the research and the enumeration process. Mr. Jaap Knot arrives from Ladybrand, South Africa and assists the team throughout the week. Walker to Maseru to meet with Keith Moore, Neal Eash, Makoala Marake, David Smith for meeting at US Embassy with Alexander Sharp, Political and Economic Officer to discuss SANREM activities. Walker and Moore return to ButheButhe. Eash and Smith return to Maphutseng.

**Tuesday 23<sup>rd</sup> November.** Ha Keletso (Mafika-Lisiu). Second day of surveying. The team splits into smaller teams to conduct the survey in all of the different regions of the village. Accompanied by Keith Moore.

**Wednesday 24<sup>th</sup> November.** Surveying continues and is completed in Ha Keletso (Mafika-Lisiu). Moore and Walker visit District Agriculture officer, ButheButhe, agricultural resource centers, see no-till tractor planting and visit local markets to learn about agri-supply chain.

**Thursday 25<sup>th</sup> November.** Surveying is initiated in Ha Sefako. Given the expansive nature of the village and the availability of respondents, the team completes nearly three quarters of the surveys but is required to return during the next week (December 3<sup>rd</sup>) to make up the difference.

**Friday 26<sup>th</sup> November.** Surveying in Manoeleng and Ha Raskillia. Despite extremely poor weather conditions, both villages are completed. Mr. Knot departs for South Africa.

**Saturday 27<sup>th</sup> November.** Intensive GPS training provided to all of the enumerators by Lambert.

**Sunday 28<sup>th</sup> November.** Moore, Wilcox and Walker leave for JNB to drop off Wilcox and pick up incoming graduate student, Wendy Bruns. Wilcox leaves. Meet with Eash, Smith and Marake at Johannesburg. Lambert stays in ButheButhe to continue with surveying.

**Monday 29<sup>th</sup> November.** Wilcox arrives in the US. Lambert and the enumerators conduct and complete surveying in Mokotjela. Enumerators are instructed to use GPS devices to measure farmer fields. Moore, Eash, and Marake visit USAID office in Pretoria. Leave Moore in Johannesburg, other return towards Lesotho

**Tuesday 30<sup>th</sup> November.** Lambert and the enumerators conduct and complete surveying in Ha Mou and Phamong. Eash, Smith, Walker and Bruns arrive in Maphutseng.

**Wednesday 1<sup>st</sup> December.** Lambert and the enumerators conduct surveying in Joala-Boholo.

**Thursday 2<sup>nd</sup> December.** Lambert and the enumerators complete surveying in Joala-Boholo.

**Friday 3<sup>rd</sup> December.** Lambert and the enumerators complete surveying in Ha Sefako. Eash, Smith and Walker leave Maphusteng. Meet with Jaap Knot at Ladybrand.

**Saturday 4<sup>th</sup> December.** En route to Johannesburg. Night in Johannesburg. South Africa.

**Sunday 5<sup>th</sup> December.** Day in Johannesburg. Depart on flight to Atlanta at 9pm.

**Monday 6<sup>th</sup> December.** Arrive Knoxville, 10am. Enumerator team commences surveying in Ha Tabolane.

**Tuesday 7<sup>th</sup> December.** Enumerator team completes surveying in Ha Tabolane.

**Wednesday 8<sup>th</sup> December.** Enumerator team commences surveying in Maloseng.

**Thursday 9<sup>th</sup> December.** Enumerator team completes surveying in Maloseng.