Trip Report: Lesotho
June 27 to July 15, 2013

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**Purpose:**
1. Harvest maize plots in Maphutseng, Lesotho
2. Meet with partners at Growing Nations and the National University of Lesotho

**Sites Visited:** Maphutseng, Roma, Lesotho

**Description of Activities**

**Summary**
Dr. Forbes Walker was accompanied by Chelsea Johnson and Keagan Handley (two University of Tennessee undergraduates) on this trip. The students covered all their own expenses for the trip, and contributed much of the labor for the harvest!

In Lesotho, we met with our key partners and harvested the maize experiments in Maphutseng. Yields up to 8 tonnes per ha were measured with the use of up to 150 kg nitrogen and 60 kg phosphorus (as P₂O₅) per hectare. No responses to potassium were observed. Cover crops did not negatively affect yields in unfertilized maize.

Plans were also made to initiate a grazing study on some of the cover crop fields to assess the grazing pressure that the oat / grazing vetch cover crops can withstand in the dry season.

*Maize plots, Maphutseng, Lesotho*
In late November / early December last year Dr. Forbes Walker and Dr. Neal Eash established a total of 220 soil fertility plots at Maphutseng, Lesotho:

1. Two N rate studies (N as LAN @ 0, 50, 100, 150 and 200 kg per ha plus 60 kg P₂O₅ and 30 kg K₂O per ha) on an ultisol-type, red soil and a more fertile, mollisol-type, black soil under no-till
2. Two P rate studies (P$_2$O$_5$ as SSP @ 0, 30, 60, 90 and 120 kg per ha plus 150 kg N and 30 kg K$_2$O per ha) on an ultisol-type, red soil and a more fertile, mollisol-type, black soil under no-till
3. Two K rate studies (K$_2$O as KCl @ 0, 20, 40, 60 and 80 kg per ha plus 150 kg N and 60 kg P$_2$O$_5$ per ha) on an ultisol-type, red soil and a more fertile, mollisol-type, black soil under no-till
4. Two nitrogen rate studies using urea (0, 1, 2, 3 and 4 bags per ha) and LAN (0, 2, 4, 6, and 8 bags per ha) assessing the N rate responses in a oat / grazing vetch cover crop under no-till
5. One NPK plus LAN study (150 kg 6.2.1 per ha plus 0, 1, 2, 3, and 4 bags LAN per ha) and N (N as LAN @ 0, 50, 100, 150 and 200 kg per ha plus 60 kg P$_2$O$_5$ and 30 kg K$_2$O per ha) on a more fertile, mollisol-type, black soil under no-tillage

A total of 220 maize plots were harvested by hand at Maphutseng between July 1$^{st}$ and 10$^{th}$.

In summary we found:

1. No differences in yields between the ploughed and no-till treatments on the “black” soils were observed.
2. There were differences in yield between the Vertisols and Ultisols. Vertisols are inherently more fertile due to differences in the clays and organic matter content, so gave higher yields
3. Maize yields were an average of 8.2 tonnes per ha at 150 kg N per hectare compared with 4.6 tonnes per ha with no nitrogen fertilizer on the black soils and 5.4 tonnes per ha compared to 1 tonne per ha on the red soils.
4. Maximum yields for maize were achieved at fertilizer rates of 150 kg N (as LAN) and 60 kg P$_2$O$_5$ per hectare.
5. Cover crops did not negatively impact yield on unfertilized maize.

From our observations and discussions with farmers the integration of “self-seeding” cover crops such as oats and grazing vetch has great potential to not only significantly reduce weed pressure over the dry season, but also provide a permanent soil cover, reduce erosion and potentially be a valuable source of fodder for livestock. This system, if adopted widely, would also have a significant impact on reducing erosion-especially on fields where all maize residues are typically removed for animal feed.

National University of Lesotho, Roma, Lesotho
We visited Dr. Marake at the National University of Lesotho (NUL). Dr. Marake has also successfully harvested his maize plots at the Roma site on the University farm.

Suggestions and Recommendations

Discussions were held with Growing Nations on designing a simple grazing study to assess the potential for grazing the oat / grazing vetch cover crops. This study will be conducted by Growing Nations starting in mid-August using three similar aged heifers owned by Growing Nations. Measurements of the relative amount of cover crops and maize residue will be assessed
prior to grazing and after grazing each day. We are hoping to learn what sort of grazing preferences the cattle have, as well as how much grazing pressure the cover crops can endure, and whether or not they can recover.

**List of Contacts Made:**

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<thead>
<tr>
<th>Name</th>
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**Appendix I:**

**Trip Log Lesotho Trip, June / July 2013**

**Friday 28th June.** Arrive in Johannesburg on flight from Atlanta. Overnight in Heidelberg.

**Saturday 29th June.** En route to Lesotho by car. Overnight at Roma, Lesotho.

**Sunday 30th June.** Collect weighing equipment from National University Lesotho, drive to Maphutseng.

**Monday 1st to Wednesday 10th July.** Harvest maize plots in Maphutseng, Lesotho.

**Wednesday 10th to Thursday 11th July.** Data analysis, Malealea, Lesotho.

**Friday 12th July.** Visit National University of Lesotho, meeting with Dr. Marake. Return equipment. Night at Ramanbanta.

**Saturday 13th July.** En route to Johannesburg. Night in Ladybrand, South Africa.

**Sunday 14th July.** Return to Johannesburg for flight to Atlanta.

**Sunday 15th July.** Return to Knoxville.