V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger - improving animal production for small producers

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
<th>%1862 Extension</th>
<th>%1890 Extension</th>
<th>%1862 Research</th>
<th>%1890 Research</th>
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<tbody>
<tr>
<td>204</td>
<td>Plant Product Quality and Utility (Preharvest)</td>
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<tr>
<td>301</td>
<td>Reproductive Performance of Animals</td>
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<td>Nutrient Utilization in Animals</td>
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<td>601</td>
<td>Economics of Agricultural Production and Farm Management</td>
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<td>604</td>
<td>Marketing and Distribution Practices</td>
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</tbody>
</table>

Total 100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

<table>
<thead>
<tr>
<th>Year: 2011</th>
<th>Extension</th>
<th></th>
<th>Research</th>
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<tbody>
<tr>
<td></td>
<td>1862 1890</td>
<td>1862 1890</td>
<td>1862 1890</td>
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<td>0.0</td>
<td>0.0 11.3</td>
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<td>0.0</td>
<td>0.0 9.5</td>
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<td>0.0</td>
<td>0.0 0.0</td>
</tr>
</tbody>
</table>

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)
V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct seminars, conferences, hands-on clinics, provide proceedings and training to producers, participation in industry events and the development of industry-targeted publications based on research findings.

Conduct research on alternative forages: forage production and quality; animal performance / growth response

Conduct research on the longitudinal survival and reproductive output of meat goat does.

Conduct research on nutritional requirements for Guinea fowl.

Perform genome mapping of important production qualities in Guinea fowl.

Conduct literature review of available secondary information

Conduct focus group meetings to collect information from producers and consumers

Develop and administer surveys to selected producers and consumers

Collect and analyze several available marketing data

Identify selected meat goat consumers/ethnic groups/communities

2. Brief description of the target audience

Dairy and meat goat producers

National meat goat industry

Institutions of meat goat research

Ruminant livestock producers

Students

Public officials

Guinea fowl and poultry industries

Small farmers

Scientific community

Extension specialists

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures
2011 Tennessee State University Research Annual Report of Accomplishments and Results - Global Food Security and Hunger - improving animal production for small producers

<table>
<thead>
<tr>
<th>2011</th>
<th>Direct Contacts Adults</th>
<th>Indirect Contacts Adults</th>
<th>Direct Contacts Youth</th>
<th>Indirect Contacts Youth</th>
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<tbody>
<tr>
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<td></td>
<td>125</td>
<td>11500</td>
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<td>100</td>
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</table>

2. Number of Patent Applications Submitted (Standard Research Output)
   Patent Applications Submitted
   
   Year: 2011
   Actual: 0

   Patents listed

3. Publications (Standard General Output Measure)
   Number of Peer Reviewed Publications

<table>
<thead>
<tr>
<th>2011</th>
<th>Extension</th>
<th>Research</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Actual</td>
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<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

V(F). State Defined Outputs

Output Target

Output #1
   Output Measure
   • Producer workshops to improve animal production in small farm and limited resource populations.

   Year       Actual
   2011       2

Output #2
   Output Measure
   • Dietary recommendations for improved Guinea fowl production.

   Year       Actual
   2011       1

Output #3
   Output Measure
   • Techniques to improve dairy goat production.

   Not reporting on this Output for this Annual Report

Report Date   05/08/2012
### V. State Defined Outcomes Table of Content

<table>
<thead>
<tr>
<th>O. No.</th>
<th>OUTCOME NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Percentage of direct contact meat goat producers with knowledge of altered doe selection techniques</td>
</tr>
<tr>
<td>2</td>
<td>Percentage of direct contact meat goat producers practicing altered doe selection techniques</td>
</tr>
<tr>
<td>3</td>
<td>Percentage of goat producer doe non-recorders with knowledge of the advantages of doe record keeping</td>
</tr>
<tr>
<td>4</td>
<td>Percentage of goat producer doe non-recorders participating in doe record keeping</td>
</tr>
<tr>
<td>5</td>
<td>Percentage of ruminant livestock producers with knowledge of pigeon pea as an alternative forage</td>
</tr>
<tr>
<td>6</td>
<td>Percentage of ruminant livestock producers adopting pigeon pea as an alternative forage</td>
</tr>
<tr>
<td>7</td>
<td>Percentage of guinea fowl producers with knowledge of calcium and phosphorus recommendations for optimal nutrition</td>
</tr>
<tr>
<td>8</td>
<td>Percentage of guinea fowl producers adopting calcium and phosphorus recommendations for optimal nutrition</td>
</tr>
<tr>
<td>9</td>
<td>Percentage of guinea fowl producers adopting lysine recommendations for optimal nutrition</td>
</tr>
<tr>
<td>10</td>
<td>Percentage of guinea fowl producers with knowledge of lysine recommendations for optimal nutrition</td>
</tr>
<tr>
<td>11</td>
<td>Percentage of guinea fowl producers with increased profitability of production</td>
</tr>
<tr>
<td>12</td>
<td>Number of producers with increased knowledge of meat goat marketing channels</td>
</tr>
<tr>
<td>13</td>
<td>Number of researchers with increased understanding of the constraints and prospects of the meat goat industry</td>
</tr>
<tr>
<td>14</td>
<td>Number of producers expanding their marketing to identified channels and markets</td>
</tr>
<tr>
<td>15</td>
<td>Increase in number of consumers aware of the healthy benefits of meat goat consumption</td>
</tr>
<tr>
<td>16</td>
<td>Number of producers aware of consumer preferences for meat goat products</td>
</tr>
<tr>
<td>17</td>
<td>Number of producers and researchers with a better understanding of how maternal genetics can affect meat goat carcass yield</td>
</tr>
</tbody>
</table>
Outcome #1

1. Outcome Measures

Percentage of direct contact meat goat producers with knowledge of altered doe selection techniques

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>75</td>
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Producers need to better assess the ability of breeds to contribute to an efficient production of market kids under limited inputs.

What has been done

A set of presentations and research updates were developed and distributed.

Results

Seventy-five commercial producers gained a better understanding of how to evaluate breeds for use in commercial meat goat herds.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>Reproductive Performance of Animals</td>
</tr>
<tr>
<td>303</td>
<td>Genetic Improvement of Animals</td>
</tr>
<tr>
<td>307</td>
<td>Animal Management Systems</td>
</tr>
</tbody>
</table>
Outcome #2

1. Outcome Measures

   Percentage of direct contact meat goat producers practicing altered doe selection techniques

2. Associated Institution Types

   ● 1890 Research

3a. Outcome Type:

   Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>30</td>
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</table>

3c. Qualitative Outcome or Impact Statement

   **Issue (Who cares and Why)**
   Meat goat producers need to better assess the ability of breeds to contribute to an efficient production of market kids under limited inputs.

   **What has been done**
   A set of presentations and research updates were developed and distributed to various producer groups.

   **Results**
   An increasing number of experienced and new producers are altering their breed selection to establish or improve their meat goat breeding programs.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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<td>301</td>
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<tr>
<td>307</td>
<td>Animal Management Systems</td>
</tr>
</tbody>
</table>
Outcome #3

1. Outcome Measures

Percentage of goat producer doe non-recorders with knowledge of the advantages of doe record keeping

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>75</td>
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</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Meat goat managers raising seedstock recognize the need to properly select breeding females within breeding herds for enhanced fitness.

What has been done
A system of doe herd evaluation has been offered to record and select breeding stock based on objective performance measurements.

Results
Producers have begun to reconsider the need to record performance to improve the genetic and economic status of their meat goat breeding programs.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>Reproductive Performance of Animals</td>
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<tr>
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<td>Genetic Improvement of Animals</td>
</tr>
<tr>
<td>307</td>
<td>Animal Management Systems</td>
</tr>
</tbody>
</table>
Outcome #4

1. Outcome Measures

Percentage of goat producer doe non-recorders participating in doe record keeping

2. Associated Institution Types

● 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
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</thead>
<tbody>
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<td>2011</td>
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</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Meat goat managers raising seedstock recognize the need to properly select breeding females within breeding herds for enhanced fitness.

What has been done
A system of doe herd evaluation has been offered to record and select breeding stock based on objective performance measurements.

Results
Implementation of performance recording within purebred meat goat herds has occurred on a limited basis.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>Reproductive Performance of Animals</td>
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<td>303</td>
<td>Genetic Improvement of Animals</td>
</tr>
<tr>
<td>307</td>
<td>Animal Management Systems</td>
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</tbody>
</table>
Outcome #5

1. Outcome Measures

Percentage of ruminant livestock producers with knowledge of pigeon pea as an alternative forage

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Percentage of ruminant livestock producers adopting pigeon pea as an alternative forage

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Percentage of guinea fowl producers with knowledge of calcium and phosphorus recommendations for optimal nutrition

2. Associated Institution Types

● 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
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</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

While the guinea fowl industry is growing in the United States, there are constraints in developing a thriving and sustainable industry because of lack of established nutrient requirements to guide the formulation of least-cost rations. Information on the required dietary levels of calcium, phosphorus and lysine, a limiting amino acid that would ensure optimum performance of these birds, is limited.

What has been done

Dietary calcium (Ca) and phosphorus requirement for optimum growth performance of the Pearl
Grey guinea fowl replacement pullets and laying hens were evaluated.

Results
Pearl Grey guinea fowl replacement seems to utilize more efficiently diets containing 0.8% Ca and 0.32-0.48% available phosphorus. Pearl Grey Guinea Fowl laying hens utilized more efficiently diets containing 3.25 to 3.75% calcium and 0.35 to 0.40% available phosphorus.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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</thead>
<tbody>
<tr>
<td>302</td>
<td>Nutrient Utilization in Animals</td>
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</table>

Outcome #8

1. Outcome Measures

Percentage of guinea fowl producers adopting calcium and phosphorus recommendations for optimal nutrition

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

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<thead>
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<th>Year</th>
<th>Actual</th>
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<tbody>
<tr>
<td>2011</td>
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</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The costs associated with the production of guinea fowl need to minimized for producers to realize maximum profit as this species becomes more accepted in American diets.

What has been done
Data on calcium and phosphorus requirements of the pearl grey guinea fowl replacement pullets and laying hens were shared with the scientific community at the International Poultry Scientific Forum and also the annual Poultry Association Conference, and the guinea fowl industry.

Results
Assessment of number of number of producers who have adopted the recommendations has not been completed.

4. Associated Knowledge Areas
Outcome #9

1. Outcome Measures
   Percentage of guinea fowl producers adopting lysine recommendations for optimal nutrition

   Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures
   Percentage of guinea fowl producers with knowledge of lysine recommendations for optimal nutrition

2. Associated Institution Types
   ● 1890 Research

3a. Outcome Type:
   Change in Knowledge Outcome Measure

3b. Quantitative Outcome
<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
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<tbody>
<tr>
<td>2011</td>
<td>0</td>
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</table>

3c. Qualitative Outcome or Impact Statement

   Issue (Who cares and Why)
   The costs associated with the production of Guinea fowl need to minimized for producers to realize maximum profit as this species becomes more accepted in American diets.

   What has been done
   Research to determine the optimum levels of lysine is still in progress.

   Results
   Optimum levels have not been communicated to producers, thus no opportunity for producer knowledge/adoption of optimized levels yet.

4. Associated Knowledge Areas

   KA Code   Knowledge Area
   302       Nutrient Utilization in Animals
302  Nutrient Utilization in Animals

**Outcome #11**

1. **Outcome Measures**

   Percentage of guinea fowl producers with increased profitability of production

   Not Reporting on this Outcome Measure

**Outcome #12**

1. **Outcome Measures**

   Number of producers with increased knowledge of meat goat marketing channels

   Not Reporting on this Outcome Measure

**Outcome #13**

1. **Outcome Measures**

   Number of researchers with increased understanding of the constraints and prospects of the meat goat industry

   Not Reporting on this Outcome Measure

**Outcome #14**

1. **Outcome Measures**

   Number of producers expanding their marketing to identified channels and markets

   Not Reporting on this Outcome Measure

**Outcome #15**

1. **Outcome Measures**

   Increase in number of consumers aware of the healthy benefits of meat goat consumption

   Not Reporting on this Outcome Measure
Outcome #16

1. Outcome Measures

Number of producers aware of consumer preferences for meat goat products

Not Reporting on this Outcome Measure

Outcome #17

1. Outcome Measures

Number of producers and researchers with a better understanding of how maternal genetics can affect meat goat carcass yield

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
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<th>Year</th>
<th>Actual</th>
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</thead>
<tbody>
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The meat goat industry has been directed towards the production of market kids over the last 10-15 years under the assumption that Boer germplasm is superior for carcass yield among goat breeds.

What has been done

Research data were provided to industry participants that provides new insight on relative breed evaluations for meat goat carcass traits.

Results

A reassessment of long-held beliefs regarding breed selection for carcass traits is occurring among researchers and producers engaged in meat goat production.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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</thead>
<tbody>
<tr>
<td>303</td>
<td>Genetic Improvement of Animals</td>
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<td>Animal Management Systems</td>
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</table>
Outcome #18

1. Outcome Measures

Number of producers with increased income by marketing through new channels

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

Some of the state defined outcomes in the meat goat area concerning the measurement of consumer preferences and economic analyses were not met this reporting period due to staffing issues in this research area.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Most objectives in this project are on schedule for being met, notable results include:

- 75 commercial producers gained a better understanding of how to evaluate breeds for use in commercial meat goat herds
- The number of experienced and new producers altering their breed selection to establish or improve their meat goat breeding programs is increasing
- 75 percent of direct contact meat goat producers have knowledge of altered doe selection techniques; of those, 30 percent of direct contact meat goat producers are practicing altered doe selection techniques
- 20 percent of guinea fowl producers have knowledge of calcium and phosphorus recommendations for optimal nutrition
- 15 percent of goat producer doe non-recorders are participating in doe record keeping
- 200 producers and researchers have a better understanding of how maternal genetics can affect meat goat carcass yield

However, although producers have begun to reconsider the need to record performance to improve the genetic and economic status of their meat goat breeding programs, the percentage of goat producer doe non-recorders with knowledge of the advantages of doe record keeping remains low, thus an increased effort will be made in communicating the need for record keeping of performance-based. Similarly, although 15 percent of goat producer doe non-recorders are now participating in doe record keeping, this is less than optimal; and additional measure will be taken to communicate the advantages of keeping up-to-date performance records.
The target percentage of guinea fowl producers adopting calcium and phosphorus recommendations for optimal nutrition has not been met because the assessment of the number of producers who have adopted the recommendations has not been completed. This target will be measured when the assessment is completed.

Key Items of Evaluation