COPING WITH CLIMATE CHANGE THROUGH SUSTAINABLE BREEDING STRATEGIES FOR THE RED MAASAI SHEEP

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**ANIMAL PRODUCTION IN EASTERN AFRICA**

- Extreme climate variations and harsh environment
- Ruminants play an important role
  - 105 million cattle  
  - 77 million goats  
  - 58 million sheep
- Often too many unproductive animals
  - Overgrazing
- Increased productivity – a necessity for food security
- Many breeds underutilized and threatened by extinction
RED MAASAI SHEEP

- Indigenous breed
- Kenya, Tanzania & Uganda
- Fat tailed sheep
- Disease resistant
- Drought tolerant
- Endangered
- Decreasing no. of animals due to indiscriminate crossbreeding
Dorper Sheep

- Imported from South Africa
- Composite breed of Dorset and Blackhead Persian breeds
- Meat breed
- Not sufficiently adapted to dry climatic conditions
- Uncontrolled crossbreeding with Red Maasai
INDISCRIMINATE CROSSBREEDING

Red Maasai x Dorper crosses
OBJECTIVES OF STUDY

- Characterization of the maasai sheep production system
- Phenotypic and genetic characterization of important sheep traits
  - production - fertility - survival
- Assess farmers and market preferences to develop breeding objectives for sheep
- Working with farmers to develop a sheep recording scheme as basis for a sustainable breeding and management strategy
WORKING WITH PEOPLE…

Pilot sheep recording scheme in two Maasai village areas

- Similar data from research ranches (Kapiti and Naivasha)

Naivasha Sheep and Goat Station, Governmental farms

Isinya, Kajiado, Semi Pastoral Farming

Selengei and Lenkisem, Amboseli, Pastoral Group Ranch

Kapiti Plains, Research Station, ILRI

Kenya
RECORDING GROWTH, HEALTH AND FERTILITY
on Red Maasai, Dorper sheep and their crosses

Ear tagging
Defining age
Fertility
Interviews
Linear Measurements
Weighing
BREEDING OBJECTIVES
set by interviewing farmers and middlemen and butchers
WORKSHOPS AND DISSEMINATION OF RESULTS
**What farmers like in their sheep**

- Growth and Body size
- Condition
- Milk production
- Mothering ability and reproduction
- Drought and Disease resistance

Relative percentage of responses

- **Dorper**
- **Red Maasai**
- **Cross**
WHAT FARMERS WANT TO IMPROVE IN THEIR SHEEP

Relative percentage of responses

- Growth and Body size
- Condition
- Milk production
- Mothering ability and Reproduction
- Drought and Disease resistance
## Survival to 320 Days

<table>
<thead>
<tr>
<th>Breed group</th>
<th>No. of lambs</th>
<th>Percent culled</th>
<th>Relative risk of culling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorper</td>
<td>681</td>
<td>25.6</td>
<td>1.00</td>
</tr>
<tr>
<td>Red Maasai</td>
<td>993</td>
<td>11.8</td>
<td>0.65</td>
</tr>
<tr>
<td>F1</td>
<td>932</td>
<td>13.2</td>
<td>0.90</td>
</tr>
<tr>
<td>¾ Dorper</td>
<td>811</td>
<td>8.5</td>
<td>1.07</td>
</tr>
<tr>
<td>¾ Red Maasai</td>
<td>159</td>
<td>3.8</td>
<td>0.27</td>
</tr>
</tbody>
</table>

All with p-values ***

(Ojango, J.M.K. et al 2013. EAAP)
**DIFFERENT RESULTS DEPENDING ON THE CLIMATE**

Least Square Means of traits in different areas

Amboseli = arid and Harsh climate
Isinya = Semi arid and less harsh climate
CONCLUDING RESULTS

- Red Maasai sheep are more resistant to diseases and survive better during droughts.
- Dorper and crosses are preferred for better growth, body weight and slaughter value.
- Important traits are body size, milk production, lamb growth and drought and disease resistance.
POSSIBLE OPTION FOR A SUSTAINABLE BREEDING STRATEGY

- Red Maasai Sheep:
  - to constitute the main female flock
  - purebreeding for improvement of maternal and survival traits

- Dorper Sheep:
  - use as terminal ram breed for controlled crossbreeding to produce slaughter lambs
  - selection for growth and survival
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Thank you!
SMALL RUMINANTS ARE NOT THE MAJOR VILLAINS

GHG efficiency of meat production (exp. In kg CO$_2$eq/g protein) in year 2000

Cattle meat

Small ruminant meat

Herrero M et al. PNAS 2013;110:20888-20893