**Longitudinal survey of cattle and buffalo production in northern Lao PDR**

**ACIAR AH 2006/159 Research Team**

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**Outline:**

1. Background
2. Study result:
   - Three year longitudinal survey
   - Reproductive performance survey
3. Discussion

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**Cattle and Buffalo Production in Lao PDR**

Majority of livestock producers are poor and smallholder farmers:

- Own 5-10 heads of cattle and buffalo per household
- Up to 50% of their household cash income

- Improving livestock production may contribute to reduce poverty in Laos!!

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**Study objectives**

To establish baseline production parameters for large ruminants production:

- Live weight (kg)
- Average daily weight gain (ADG, g/d)
- Reproductive performance (calving rate, inter-calving interval)
Survey areas and farmer selection

Two villages/province were selected on the basis that:
1. There was a potential of uptake of technologies
2. At least 250 cattle and buffaloes in each village
3. Can be accessed year round

Classified into two groups:
- HI high intervention where multiple intervention implemented
- LI low intervention where only vaccination implemented

232 of 293 smallholder farmers had at least one head of cattle or buffalo enrolled in this study

Data collection

1500 cattle and buffalo were ear-tagged and weighed using electronic scale every:
- Three months (12/08 and 12/10: 5 data collections)
- Four months (03/10 – 10/11: 5 data collections)
- Age, BCS, Girth and reproduction data of each ear-tagged animal were recorded (Girth vs Weight will be explained on Dr. Russell Bush’s presentation)

Ten data collections were completed

Data management and analysis

ADG = (Current - Previous weight) / Number of days between weight measurements.

9 ADG datasets were determined

Descriptive and analytical analysis were conducted using a restricted maximum livelihood (REML) in Genstat

Results

<table>
<thead>
<tr>
<th>Cattle</th>
<th>Province</th>
<th>Village category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP</td>
<td>LPB</td>
</tr>
<tr>
<td>Weight</td>
<td>182 (±1)⁺</td>
<td>204 (±0.8)ᵇ</td>
</tr>
<tr>
<td>ADG</td>
<td>63(±5)⁺</td>
<td>84(±3)ᵇ</td>
</tr>
</tbody>
</table>

- Significant differences in the cattle mean weight between both provinces (p<0.001) and village category (p<0.001) observed
- Cattle in LPB and in HI significantly heavier than other groups.
- Overall mean weight and ADG in LPB were 204 kg and 84 g/d.
### Cattle weight: province vs province

- The mean weight in LPB was 187 and 214 kg in data collection 1 and 10 with overall mean weight of 203 kg.
- The mean weight in HI was 169 and 197 kg in data collections 1 and 10 with overall weight of 186 kg.
- A seasonal reduction in weight was observed in data collections 1-2, 4-5 and 7-8.

### Results (cont)

<table>
<thead>
<tr>
<th></th>
<th>Province</th>
<th>Village category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP</td>
<td>LPB</td>
</tr>
<tr>
<td>Weight</td>
<td>325(±1.8)</td>
<td>358(±3.1)</td>
</tr>
<tr>
<td>ADG</td>
<td>95(±7)</td>
<td>106(±11)</td>
</tr>
</tbody>
</table>

- Significant variation in buffalo predicted mean weight between the provinces ($p<0.01$) but not between the village category ($p=0.56$) observed.
- Overall mean weight and ADG in LPB were 358 kg and 106 g/d.

### Buffalo weight: province vs province

- The buffalo overall predicted mean in LPB were significantly heavier than other provinces of 358 kg.
- Reduction in predicted mean weight was observed between collections 1-2, 4-5 and 7-8.

### Results: Reproduction data (cont)

<table>
<thead>
<tr>
<th>Species / Variables</th>
<th>LPB</th>
<th>XK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle No. of cows that calved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 calves or more</td>
<td>315</td>
<td>293</td>
</tr>
<tr>
<td>Calving rate (%)</td>
<td>72.4</td>
<td>74.8</td>
</tr>
<tr>
<td>Inter-calving interval (months)</td>
<td>14.5 (±4.5)</td>
<td>13.6 (±3.1)</td>
</tr>
<tr>
<td>Buffalo No. of cows that calved</td>
<td>63</td>
<td>46</td>
</tr>
<tr>
<td>Calving rate (%)</td>
<td>52.5</td>
<td>46.73</td>
</tr>
<tr>
<td>Inter-calving interval (months)</td>
<td>20.6 (±6.1)</td>
<td>19.8 (±5.3)</td>
</tr>
</tbody>
</table>

- Low reproduction performance for cattle and buffalo respectively were observed.
- Calving rates (51.3-74.8% and 40.9-52.5%).
- Inter-calving intervals (13.6-15.7 and 18.6-20.6 months).
**Discussion**

- The longitudinal study showed a fluctuation of large ruminant weight. That is highly due to the availability of feed between season.

- The FMD outbreak in 2009 in XK may have a severe impact reproduction performance (plus weight loss) contributing to low calving rate in XK

- Cold exposure in XK and HP in March 2011 could have negative effect on the large ruminant performance in the observed site.

- Cattle and buffalo performance in LPB was higher than other province where forages plantation was reasonable success introduced plus no major outbreaks of important diseases/event reported

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**Discussion (cont)**

- The participatory applied research method is very appropriate and received high collaboration from farmers

- This participatory approach takes time and requires incentive to convince farmers to slow move from ‘livestock keepers’ to ‘livestock producers’

- For livestock keepers who normally let their stock free-grazing, vaccination the stock twice a year is still recommended to reduce risk of FMD and HS infection.

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