Food security defined

- Health Canada defines household food insecurity as “the inability to acquire or consume an adequate diet quality or a sufficient quantity of food in socially acceptable ways or the uncertainty that one will be able to do so”, which is most often the result of inadequate income.

Source: Li, Dachner, Tarasuk, Zhang, Kurrein, Harris, Gustin and Rasali (2016)

Where does the buffalo fit into food security in Nepal?

- Buffalo holds a special place in the economy of farming households.
- For food, agricultural inputs, agricultural sustainability and financial needs and assets all leading to the food security of the households.
- Buffalo plays major role in country’s self-sufficiency targets in milk & meat in 2 years.

<table>
<thead>
<tr>
<th>Product</th>
<th>Consumption (milk/l; year)</th>
<th>Existing supply (milk/l; year)</th>
<th>Target to achieve (milk/l; year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>14 kg</td>
<td>12.3 kg</td>
<td>Fiscal Year 2017/18</td>
</tr>
<tr>
<td>Milk</td>
<td>91 liters</td>
<td>72 liters</td>
<td>Fiscal Year 2018/19</td>
</tr>
</tbody>
</table>

Source: Ministry of Livestock Development

Buffalo production overview

- Total population of 5.2 million as of 2015/16, with major concentrations in Western Hills (663 thousands), followed by Central Hills (716,000), Eastern Terai (587,000) and Central Terai (779,000) (MoAD, 2017).
- Economically the most important livestock in the economy of Nepalese farms, 53% of the livestock share in the country’s gross domestic products (GDP).
- In 2015/16, the milk production (1,210,000 MT, 65%), and the buffalo meat production (175,000 MT, 54%) (MoAD, 2017).

Breed in Nepal: Buffalo types as genetic resources for future development

- Murrah (Purebreds & Crossbreds)
- Parkote, Lime & Intermediate types
- Arna (wild) to be explored as a genetic resource

Other (not shown in the pictures):
- Gaddi type
- Tarai-Madhesh type
Four phenotypic clusters based on external phenotypic characteristics were found in the Western hills (Rasali et. al., 1998).

Typical four phenotypic cluster members based on six categorical variables- found corresponding to above four types (Rasali et. al., 1998).

Among hill buffaloes of Nepal, Lime has long been considered Swamp buffalo, though no attempt was done to karyotype them until 1998.

Rasali et. al. (1998) karyotyped Lime and other types of buffaloes across the country found no swamp type, and confirmed Lime to be riverine.

Source: Rasali and Joshi (1996)
Source: Rasali and Joshi (1996), Proc. 1st National Animal Science Workshop
**Strategic goal # 1: Genetic improvement including composite breed formation**
- Geared towards forming composite breed within few generations
- Genetic resources of Parkote, Lime, Gaddi and Terai type buffaloes should be conserved
- Geared towards forming composite breed of
  - Parkote, Lime and Murrah blood in the East and Western hills
  - Gaddi and Murrah in the Far western hills, and
  - Terai and Murrah blood in Madhesh

**Strategic goal # 2: Improvement in reproductive performance**
- Technologies in reproduction such, especially artificial insemination should be intensified
- Improving ‘Age at calving’
- Broadening calving season through reproductive technologies and nutritional adjustment

**Strategic goal # 3: Improvement in feeds, feeding and veterinary services**
- Feeds and feeding strategies should depend on nutritional requirements of animal groups that have different physiological and reproductive status
- Veterinary care and enhanced local and international quarantine as the basic service cover is essential for improved buffalo development resulting in enhanced production.

**Strategic goal # 4: Marketable buffalo production for household & national food security**
- Breeding animal stock production
- Commercial calf rearing
- Feedlot production of market buffaloes
- Small-holder production of milking buffaloes
- Commercial operations of dairy buffaloes
- Buffalo meat processing for domestic and export markets

**Conclusions, policy implications and future considerations**
- Nepalese buffaloes have not yet received adequate national and international attention.
- Eastern and Western hills have geographical pocket areas with a concentrations of Lime and Parkote dominant mixed type and Murrah crossbred populations.
- Buffalo research centers be established for each of Lime, Parkote, Gaddi, Terai Native and Murrah with a reasonable sized nucleus breeding herd.
- A satellite buffalo farm in each of the newly formed seven provinces.

**Conclusions, policy implications and future considerations**
- A series of priority research projects on:
  - high altitude buffalo production (Lime);
  - reproductive performance, d) buffalo fattening,
  - preventative veterinary care, e) nutrition,
  - market based production strategies.
- National coordinated collaboration among Agriculture and Forestry University (AFU), Nepal Agricultural Research Council (NARC) and the Ministry of Livestock Development.
- Multi-lateral or bilateral cooperation be sought through Food and Agricultural Organisation (FAO).
Disclaimer: I declare that the views expressed in this presentation are my own and do not necessarily represent the position of my past or present employers or institutions of my affiliation.

Thank you!

For contact:

Dr. Drona Rasali
d_rasali@yahoo.ca
Twitter: @d_rasali

http://www.rasaliresources.com/