The role of livestock in food and nutrition security

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University of Florida Global Nutrition Symposium

‘Nurturing development: Improving human nutrition with animal-source foods’

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Overview

Livestock and global food security

Issues of food security and nutrition

Many roles of livestock

Complexities and trade-offs for the future
Livestock and global food security
Animal-source foods are valuable: 5 of 6 highest value global commodities (total value of these 5 = US Int $715 billion). Cow milk has overtaken rice.
Demand for animal-source foods

![Graph showing the production of different commodities (Eggs, Milk, Pork, Poultry) in High Income Countries (HICs) and Low and Middle Income Countries (LMICs) over time from 1975 to 2050. The graph indicates an increasing trend in production for all commodities in both HICs and LMICs, with a sharper rise in LMICs compared to HICs.]
Smallholders still dominate livestock production in many countries

<table>
<thead>
<tr>
<th>Region</th>
<th>% production by smallholder livestock farms</th>
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<tbody>
<tr>
<td></td>
<td>Beef</td>
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<tr>
<td>East Africa</td>
<td></td>
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<tr>
<td>(≤ 6 milking animals)</td>
<td></td>
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<tr>
<td>Bangladesh</td>
<td>65</td>
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<tr>
<td>(&lt; 3ha land)</td>
<td></td>
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<tr>
<td>India</td>
<td>75</td>
</tr>
<tr>
<td>(&lt; 2ha land)</td>
<td></td>
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<tr>
<td>Vietnam</td>
<td></td>
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<tr>
<td>(small scale)</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>50</td>
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<tr>
<td>(backyard)</td>
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</table>
Livestock: 40% of agricultural GDP and growing
Total ODA disbursements to developing countries, USD million
Percentage of ODA disbursements for agriculture and livestock
Issues of food and nutrition security
Nutritional divides among 7 billion people today

- Less than one third well fed and nourished
- 11% of GNP lost annually in Africa and Asia from poor nutrition

- Hungry people
- Stunted children
- Insufficient nutrients
- Overweight/obese
- Balanced diets

Healthcare for obesity economic cost: $2 trillion
Diverse nutritional status demands diverse solutions.

Low income countries:
- Reduce energy deficiency
- Reduce micro-nutrient deficiency

Middle income countries:
- Reduce energy deficiency

High income countries:
- Reduce excessive net energy and unhealthy diets

% population
Food and nutrition security

‘.....all people at all times have physical, social and economic access to safe and nutritious food that meets their dietary needs for an active and healthy life.....’
Many roles of livestock
Food and nutrition security: Animal-source foods contribute to global food and nutrition

Balanced nutrients

Enough food

Diet diversity
Animal products provide 40% of global daily protein supply (18% of total kcal)
Balanced nutrition: The critical and unique role of animal-source foods

Animal-source foods

• High density of macro- and micro-nutrients per 100 g
• Contain essential nutrients difficult or impossible (e.g. vitamin B12) to find in other foods
• Contain micronutrients in biological forms enabling easier uptake into the body (bioavailability)
• Better digestibility and biological value of proteins, with amino acid profile matching human needs
• Contain lower levels of anti-nutrient factors (i.e. compounds that interfere with absorption of nutrients)

Hidden hunger (missing nutrients)

• E.g.: stunted children in Malawi lacked amino acids that are deficient in plant foods
Livestock-derived foods enhance the nutrition of mothers & of infants in the first 1,000 days of life

**Milk:** improves children's growth, prevents stunting

**Meat:** improves long-term cognitive ability

Livestock interventions improve
- production, incomes, expenditure
- nutrient composition and diets
- nutritional outcomes in children and women

Diseases associated with livestock-derived foods
- Disproportionate burden for children under 5
- Pregnant women more vulnerable to foodborne diseases
In Ethiopia

- Cow ownership reduced stunting by 6–13% 

In millennium development village clusters

- Households with livestock are more likely to consume animal-source foods
- Linking animal-source food consumption with anthropometric measures is complex and influenced by other variables
Food and nutrition security:
Livestock contribute to crop production

Manure
Crop production
Income

Balanced nutrients

Enough food
Diet diversity

Traction
At least half the cereals in the world can only be produced with animals in the farm system.

Developing-country mixed crop-livestock systems, most of them smallholders, supply a large proportion of cereal and livestock products.
Soil fertility: 23% of nitrogen for crop production in crop-livestock systems comes from manure

In Europe as much as 38% of the nitrogen inputs come from manure
Animal traction remains essential for crop production, especially in Africa. 15% farms in southern Africa and 81% in northern Africa depend on traction for ploughing. 7 million oxen are the main source of power for tilling soil in the Ethiopian highlands.
Food and nutrition security:
Livestock provide income to purchase nutritious food.
Livestock generate income, some of which is spent on food

Income—value of meat, milk, eggs

- Market value of animal-source foods in Africa in 2050 estimated as USD151 billion
- Milk and eggs provide a steady (daily) income stream

Income—employment

- 700,000 employed in the dairy sector in Kenya
- Major opportunities for youth

Income—animals

- Important to manage ‘lumpy’ expenditures (school and medical fees)
- Insurance against risks
**Engel's law** (economics):
‘As income rises, the proportion of income spent on food falls, even if absolute expenditure on food rises.’

8 countries spent less than 10% of household income on food: Australia, Austria, Canada, Ireland, Singapore, Switzerland, UK, USA

9 countries spent more than 40% of household income on food: Algeria, Azerbaijan, Cameroon, Guatamala, Kenya, Kazakhstan, Nigeria, Pakistan, Philippines
Annual income spent on food
(% of household consumptive expenditures)

A map of the world based on food costs as a percentage of income compared with incidence of juvenile malnutrition.

The size of the country represents the percentage spent on food. The darker the color, the higher the rate of malnutrition.
Role of livestock in increasing income results in more diverse diets

Zambian households that received animals (via Heifer):
• Increased their dietary diversity via:
  ➢ Direct consumption (1/3 more for dairy)
  ➢ Increased expenditure on more food groups
• Decreased their poverty (from 78% to 59% below $1.25/day for dairy cow recipients)
• Increased ‘sense of security’ and improvement in welfare

Beyond recipients
• Influence on local food markets
  (e.g. more affordable dairy)
Complexities and trade-offs for the future
Today’s producers: Tomorrow’s enterprises

750 million smallholder livestock producers are diverse:
• 1/3 will find alternate livelihoods
• 1/3 may or may not remain
• 1/3 will succeed at market-oriented livestock livelihoods

Opportunities to respond to food and nutrition security

Smallholders to smartholders:
To thriving enterprises, part of a vibrant, productive and resilient food system . . . with particular opportunities for women and youth

photo credit: ILRI/ Camille Hanotte
Competition for land and grains? Maybe not!

6 billion tonnes dry feed
- Could be eaten by humans: 14%
- Inedible by humans: 86%

5 billion ha global agricultural area
- Feed production: 10%
- Crop agriculture: 49%
- Grassland that could be converted for crops: 14%
- Pastures/rangelands - not suitable for crops: 27%

Latest for 1 kg boneless meat:
- 2.8kg human-edible food for ruminants
- 3.2kg human-edible food for monogastrics
Trade-offs and opportunities in responding to future demand

• Livestock contribute to GHG emissions but are also one of the key ways to reduce future emissions
• Livestock production is intimately linked to the environment
• Transforming markets present new opportunities for safe food

3 interlinked principles:
• Improve resource use efficiency
• Strengthen resilience
• Improve social equity/responsibility outcomes
better lives through livestock

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