The livestock census and the nomadic livestock methodology

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Outline

- Importance of livestock statistics
- Issues to be addressed
- Enumeration Methods
- Survey design
- Data collection tools
- Cost
- Decision tree
- General recommendations
Importance of livestock statistics

• Total number of pastoralists in the world not known within any degree of confidence:
  - 180.7 million individuals (Thornton et. al., 2002);
  - 200 million individuals (Rota and Sperandini, 2009)

• For nomads, a commonly quoted figure seems to be 30-40 million individuals

• Probably safe to estimate that there are at least 100 million people who depend on nomadic or transhumance production systems
Issues to be addressed

- Nomadic and transhumant pastoralists move their animals according to the availability of fodder resources and tend to inhabit relatively remote and inaccessible areas
- Standard surveys methods of agricultural enumeration cannot be easily applied
- Special attention is required to devise appropriate methods
- FAO’s previous Guidelines on collecting livestock data were published more than 20 years ago.
- Some definitions needed to be adapted
- Review of existing literature - the issue is discussed in several documents and research papers, no single document holistically synthesising the approaches used
Enumeration Methods

Two main approaches: ground and aerial surveys

• Ground Surveys
  - Enumeration points
    • Watering Points
    • Vaccination Posts
    • Dip tanks
    • Stock Routes
    • Temporary seasonal camps
    • Specific enumeration points
    • Livestock Markets
  - Ethnic Groups/Clans
Enumeration Methods (ctd.)

How to Count Animals?
• Requires prior careful consideration, standardisation and guidance: what species? Only totals or the breed, sex and age?

1. Direct observations
   - Interviewers count animal themselves
     • Use of hand tally, or counter
       (single or multiple counters)
     • Taking photographs (ex. Pictorial Evaluation Tool)
     • Marking counted livestock
     • Giving enumeration certificate
Enumeration Methods (ctd.)

• Aerial Surveys
  - Low Level Aerial Surveys
  - Counting livestock in areas from aerial photographs taken for that purpose
  - Drones and micro-drones
  - Satellite imagery
Survey design

• Ground surveys
  - Enumeration points
    • First step – complete list of all enumeration points for the frame
      • Case of Niger: enumeration points identified – stock routes for nomadic livestock; water points for transhumant
    • Census or sample survey?
    • Stratification: geographical or by type of enumeration point
      • Case of Niger (2004/5), 3 strata of water points have been identified: Boreholes, incl. drilled boreholes and pumped water sources; Wells, incl. cemented and traditional; Other watering points, permanent ponds and rivers
      • Case of Mali (2001), water points classified into 2 categories: deep water, isolated pools, boreholes, wells or small isolated ponds; surface water: perennial ponds, large lake, rivers and tributaries
    • Multi-stage sampling
Survey design (ctd.)

- **Ethnic Groups/Clans**
  - **Sampling frame** - complete list of all the ethnic groups/clans of the country, can be obtained from the agricultural census or updated secondary data (administration, university, NGO…)
    - In Niger, a complementary survey on nomadic camels has been through a multi-level sampling: the primary statistical units were nomadic tribes and the secondary statistical units were households

- **Specific livestock species**
  - Mongolia: separate stratum was assigned to camels because of their relatively low number compared to the other livestock species
  - Niger: specific questionnaire has been design for camels
Survey design (ctd.)

Aerial Surveys
• Two methods
  • Total Aerial Counts or Block Counts
    - All area is covered, no gaps between the flown patterns;

Parallel Flight Pattern

Spiral Flight Pattern
Survey design (ctd.)

Aerial Sample Surveys

• Systematic Reconnaissance Flights (SRF)

• Stratified Random Aerial Transects

• Aerial Quadrat Sampling

• Aerial Block Sampling
Data collection tools

- CATI/CAPI - recommended
- Use of GPS

### Cost

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Method</th>
<th>Total cost (USD)</th>
<th>Total nomadic / transhumance animals counted</th>
<th>Estimated total nomadic / transhumance population</th>
<th>Cost per animal counted (USD)</th>
<th>Cost per animal in the estimated population (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>2002</td>
<td>Census: village visits</td>
<td>No cost given</td>
<td>Unclear as many may be sedentary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethiopia-Afar</td>
<td>2004</td>
<td>Stratified sample: household visits</td>
<td>312,416</td>
<td>Not clear</td>
<td>9,014,365</td>
<td>Cannot calculate</td>
<td>0.03</td>
</tr>
<tr>
<td>Ethiopia-Somali</td>
<td>2004</td>
<td>Aerial: 3.5% Systematic sample</td>
<td>223,453</td>
<td>477,694</td>
<td>13,648,408</td>
<td>0.47</td>
<td>0.02</td>
</tr>
<tr>
<td>Jordan</td>
<td>1991</td>
<td>Census: Constructed locations</td>
<td>2,476,616</td>
<td>3,346,000</td>
<td>3,346,000</td>
<td>0.74</td>
<td>0.74</td>
</tr>
<tr>
<td>Mali</td>
<td>2001</td>
<td>Census: water points</td>
<td>241,535</td>
<td>4,193,848</td>
<td>4,193,848</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Mongolia</td>
<td>2012</td>
<td>Ground: 33% stratified sample</td>
<td>277,976</td>
<td>13,640,000</td>
<td>40,920,000</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Niger</td>
<td>2004-5</td>
<td>Stratified sample: water points and transhumance routes</td>
<td>No cost given</td>
<td>Not given</td>
<td>10,644,899</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>1992</td>
<td>Aerial: 5% systematic sample</td>
<td>No cost given</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Decision tree**

1. **START HERE**
   - Are livestock owners/managers mobile/nomadic with no permanent home base, settled in one place?

   - **Mobile (Nomadic)**

2. Do animals stay in the same general location all year round?
   - Yes → Livestock should be included in standard agricultural surveys
   - No → Transhumant (semi-nomadic)

3. Depending on timing and location, livestock may or may not be assessed during standard agricultural surveys.

4. Are locations of all or most concentrations points known and can a comprehensive list be made?
   - Yes → Review and update or prepare list of sites, map locations and prepare questionnaire
   - No → Consider Aerial Survey Options

   - **Aerial Survey Options**
     - Large Areas > 1,000km²
       - Systematic Reconnaissance Flights
       - Stratified Sample Transects
     - Small Areas < 100km²
       - Random Geographic Clusters
       - Total Count

5. Are livestock owners/managers mobile/nomadic with no permanent home base, settled in one place?
   - Yes → Mobile (Nomadic)
   - No → Transhumant (semi-nomadic)

6. Do animals concentrate in well-recognised areas at certain times of the year?
   - Yes → Settled
   - No → Not included

7. **Ground Survey Options**
   - Water Points
   - Vaccination Points
   - Dipping Points
   - Ethnic Group Seasonal Camp Sites
   - Stock Routes
   - Markets

8. Having Selected One of the Above
   - Pilot field test of questionnaire. Revise as necessary. Proceed with the survey
   - Review and update or prepare list of sites, map locations and prepare questionnaire

9. Pilot field test of questionnaire. Revise as necessary. Proceed with the survey.
General Recommendations

- Close Linkage and Coordination with National Agricultural Census
- Training and Guidelines for Standardised Data Collection
- Avoidance of Double Counting
- Advance Public Awareness Campaign
- Dissemination of Results to All Stakeholders

It is essential that field activities are coordinated with wider agricultural surveys, the data collected are in line with the integrated survey framework and international classifications and definitions advocated by the Global Strategy to Improve Agricultural and Rural Statistics are used.
## Comparison of Nomadic / Transhumance Enumeration Example Methodologies

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Method</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>2002</td>
<td>Ground</td>
<td>Census (total enumeration) Whole country included Single level result</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All villages visited</td>
<td></td>
</tr>
<tr>
<td>Ethiopia - Afar</td>
<td>2004</td>
<td>Ground</td>
<td>Stratified sample survey Result at Wereda (Zone) level 40 households per Kebele (Village). All Kebeles visited</td>
</tr>
<tr>
<td>Ethiopia - Somali</td>
<td>2004</td>
<td>Aerial</td>
<td>Systematic sample survey (3.5% of area surveyed) Single level result</td>
</tr>
<tr>
<td>Jordan</td>
<td>1991</td>
<td>Ground survey, herds brought to specially constructed counting centres</td>
<td>Census (total enumeration) Whole country covered Single level national result</td>
</tr>
<tr>
<td>Mali</td>
<td>2001</td>
<td>Ground</td>
<td>Census (total enumeration) All areas included Single national level result</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry season concentration areas around water points</td>
<td></td>
</tr>
<tr>
<td>Mongolia</td>
<td>2012</td>
<td>Ground survey, visits to individual herds</td>
<td>Stratified sample survey, Result at Province (Aimag) level 33% of herds sampled (why that many?)</td>
</tr>
<tr>
<td>Niger</td>
<td>2004-5</td>
<td>Ground</td>
<td>Stratified sample survey Result at national, regional and department level Several months duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water points and transit corridors</td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>1989-91 1992</td>
<td>Aerial</td>
<td>Systematic sample survey (5% of area surveyed) Single national level result Targeted surveys</td>
</tr>
</tbody>
</table>
More information


**Guidelines for the Enumeration of Nomadic and Semi-Nomadic (Transhumant) Livestock**

These Guidelines are intended to be a reference document providing technical and operational guidance on various aspects of the Enumeration of Nomadic and Semi-Nomadic (Transhumant) Livestock in various country conditions, with particular attention being paid to developing countries.
Thank you!