Factors affecting agricultural production

Agricultural production, including food and other crops and livestock husbandry, is determined by the interaction of farmers with:

- natural resources - biophysical framework of soils, water, temperature, flora and fauna;
- traditional practices;
- government policies (e.g. land tenure, marketing, animal welfare, labour relations);
- international trade agreements;
- public opinion and concerns;
- environmental fluctuations.

The above interactions result in farming systems. A farming system may be defined as a combination of elements in recognisable proportions, which, over a predetermined period, produces an identifiable agricultural product/s of an anticipated standard in anticipated quantities. Table I offers a comparison between the components of two extreme farming systems.

Table 1: Typical Components of “Peasant” and “Agribusiness” Farming Systems

<table>
<thead>
<tr>
<th></th>
<th>Peasant</th>
<th>Agribusiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Subsistence + near subsistence</td>
<td>Commercial</td>
</tr>
<tr>
<td></td>
<td>Multi-product</td>
<td>Single product</td>
</tr>
<tr>
<td></td>
<td>Vulnerable</td>
<td>Protected</td>
</tr>
<tr>
<td></td>
<td>Risk averse</td>
<td>Risk taking</td>
</tr>
<tr>
<td></td>
<td>Traditional</td>
<td>Progressive</td>
</tr>
<tr>
<td></td>
<td>Low input / low output</td>
<td>High input / high output</td>
</tr>
<tr>
<td>Land</td>
<td>User rights based</td>
<td>Owned or leased</td>
</tr>
<tr>
<td></td>
<td>Unsurveyed</td>
<td>Surveyed</td>
</tr>
<tr>
<td></td>
<td>Tribal / state land ownership</td>
<td>Secure tenure</td>
</tr>
<tr>
<td></td>
<td>Marginal</td>
<td>Favoured</td>
</tr>
<tr>
<td></td>
<td>Structurally deficit (often)</td>
<td>Area size suited to enterprise</td>
</tr>
</tbody>
</table>
Table 1 shows that in most cases, the components of the two systems are at opposite ends of the component spectrum. Therefore, although in any system the quantity of production is essentially \( \text{area} \times \text{yield per unit area} \), the type of system affects dramatically the nature of the work required to obtain an accurate assessment of the crop produced.

The panel below compares crop assessment approaches appropriate to the agri-businesses of pre-independence and post-independence Outer Mongolia with the approach to assessing the production of a peasant-based economy of a similar size (c. 1 million ha).

### Assessments of farming systems that are predominantly agribusiness or peasant-based

In pre-independence Outer Mongolia, all agricultural production came from **less than 50** state collectives (vertically-integrated **agri-businesses**) of some 20,000 ha each. Such collectives were staffed with a cadre of resident Subject Matter Specialists (SMSs) who were conversant with every aspect of production/processing and the factors affecting the components of performance. The collectives were fully-recorded in every detail and data were accessible to authorized missions. Consequently, CF-SAMS had only to audit the data already collected and processed to obtain a very reasonable understanding of the annual national production of crops.

Following independence, the collectives were privatised and, during the first 3 years, the 50 collectives were fragmented with the result that the number of independent units increased to around **500 private enterprises** of about 2 000 ha each. The SMSs left most of the units and farm recording was abandoned in most places. Crop assess-
ments thus became a much more complex task as basic data regarding area, yield and the factors affecting both area and yield were no longer immediately available. Nevertheless, the relatively small number of production units on about 1 million ha, compared to a peasant farming economy, still enables CFSAMs to visit all, or at least a substantial proportion of, farms and obtain production estimates by measuring areas and sampling yields in each enterprise.

By contrast, a similar area farmed in a peasant-based economy necessitates estimating performance of some 500,000 independent units, each with their own components and perspectives.

Contrary to general perceptions, peasant systems of agriculture, which determine the level of national production in most developing countries, are influenced by a complicated network of factors as shown in Figure 1, below, of which half are outside the control of the farmer.

A basic understanding of the inter-relations between factors affecting production is an essential prerequisite for an accurate assessment of production. Assessment procedures need to take into consideration any disruption or disturbance to the factors involved in the interacting network shown in Figure 1 when looking for variations from expected levels of production based on data from the available time-series.

The most direct source of information regarding factors affecting agriculture are the farm-families themselves, the ones who actually do the work. Their knowledge of the season in their own localities is essential for each team to obtain. This may be through interviews using a common checklist as outlined in the next section.

Interviews, then, may be considered as the building blocks of qualitative data but they need mortar to hold them together. Such binding material should come through the team’s own continuous observations of the rural situation, formalized through the simple procedure of turning every journey into a transect. (Technical Note P1)

Checklist

To explain the level of food production in any one year you need to identify and, to the best of your ability, quantify the following:

**Fixed factors**

- Access to land
- Household labour availability
- Season’s rainfall both quantity and quality
- Irrigation possibilities

**Variable factors**

- Credit, access and cost
- Mechanical power, spare parts access, fuel availability.
- Draught animal health and availability
• Seed availability and quality; actual planting times.
• Fertilizer use, availability and cost
• Migratory pest challenges and responses
  - army worm
  - locusts
  - quelea quelea
  - Non-migratory pest attack
  - movement from norm
  - control, both traditional and pesticide use
• Fungal disease challenges- seed dressing
• Weed challenges- weeding regimes and herbicide use.
• Natural disasters: floods, landslides, hail
• Civil disturbances: wars, threats of wars, raiding/theft
• Population disturbance
  - settlements, resettlements
  - political pressures to move
• Market control measures
  - local taxes
  - restrictions on movement of grain or traders.
Figure 1: Main factors influencing enterprise choice and productivity of a peasant farmer. Factors affected negatively by unrest/conflict are marked *.