AGRIFIN
Agriculture Finance Support Facility

Agriculture Finance
TRAINING TOOLS

Training Manual:
The Basics of Financing Agriculture

Module 4.4 | Analyzing Livestock Production

Acknowledgement

The Agriculture Finance Training Manual is part of AgriFin's Agriculture Finance Training Tools. The Manual was developed by IPC - Internationale Projekt Consult GmbH as part of AgriFin's technical advisory project for Cameroon Cooperative Credit Union League (CamCCUL).

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Session Overview

LEARNING OBJECTIVE	**Agriculture Loan Officers (ALOs) should have a basic understanding of livestock in farming. A familiarity with production systems and the management of livestock allows ALOs to advise and offer solutions to farmers in diverse environments and changing market demands.**
SCOPE	By the end of this presentation, the session will provide a basic introduction to: • Livestock systems and their different classifications • Feed management and maintenance • Livestock health management • Production management and organization
TARGET	Agriculture loan officers, trainers, agriculture experts with limited financial analysis training, and other professionals interested in agriculture financing
DURATION	3 hour

Content

1. Livestock Systems
2. FAO Livestock System Classification
3. Livestock Classification
4. Feeding Systems
5. Products and By-Products
6. Livestock Health
7. Organized Production

1. Livestock Systems

Definition:

- A livestock system is a set of dynamic elements that utilizes domestic animals as a resource (food, skin, manure, labor, by-products).
- A set of conditions and techniques that allow animals to be bred or animal by-products to be produced in ways compatible with a farmer's objective and production limits.

1a. Livestock Systems

Livestock systems are classified by:

1. Extensive/intensive system
2. Animal mobility in the living space (also defines fodder requirements)
   - Nomadic
   - Semi-nomadic
   - Non-nomadic
3. Technical criteria
   - Agricultural integration (pastoral system, agro-pastoral)
   - Agro-ecological
4. Economic criteria
   - Income from the livestock system

2. FAO Livestock System Classification

- **Solely Livestock Systems (L):** Livestock systems in which more than 90 percent of dry matter fed to animals comes from rangelands, pastures, annual forages and purchased feeds **and** less than 10 percent of the total value of production comes from non-livestock farming activities.

- **Landless Livestock Production Systems (LL):** A subset of the solely livestock systems in which less than 10 percent of the dry matter fed to animals is farm produced and in which annual average stocking rates are above ten livestock units (LU) per hectare of agricultural land. The following additional differentiation is made:
  - *Landless monogastric systems (LLM):* A subset of LL in which the value of production of the pig/poultry enterprise is higher than that of the ruminant enterprises.
  - *Landless ruminant systems (LLR):* A subset of LL in which the value of production of the ruminant enterprises is higher than that of the pig/poultry enterprise.

2. FAO Livestock System Classification (contd.)

- **Grassland Based Systems (LG):** A subset of solely livestock systems in which more than 10 percent of the dry matter fed to animals is farm produced **and** in which annual average stocking rates are less than ten LU per hectare of agricultural land.
  - *Temperate and tropical highland (LGT)*
  - *Humid/sub-humid tropics and sub-tropics (LGH)*
  - *Arid/semi-arid tropics and sub-tropics (LGA)*

2a. FAO Livestock System Classification

- **Mixed Farming Systems (M):** Livestock systems in which more than 10 percent of the dry matter fed to animals comes from crop by-products, stubble **or** more than 10 percent of the total value of production comes from non-livestock farming activities.
- **Rainfed Mixed Farming Systems (MR):** A subset of the mixed systems in which more than 90 percent of the value of non-livestock farm production comes from rainfed land use, including the following classes.
  - *Temperate and tropical highland (MRT)*
  - *Humid/sub-humid tropics and sub-tropics (MRH)*
  - *Arid/semi-arid tropics and sub-tropics (MRA)*

2a. FAO Livestock System Classification (contd.)

- **Irrigated Mixed Farming Systems (MI):** A subset of the mixed systems in which more than 10 percent of the value of non-livestock farm production comes from irrigated land use, including
  - *Temperate and tropical highland (MIT)*
  - *Humid/sub-humid tropics and sub-tropics (MIH)*
  - *Arid/semi-arid tropics and sub-tropics (MIA)*

There are different ways of producing livestock. Their classification is based on technical criteria that will influence the production system.

3. Livestock Classification

- **INTENSIVE VS. EXTENSIVE**
- **Intensive livestock production** : production on small acreage with a high stocking rate, e.g. on irrigated pasture, in feedlots, fattening barns, chicken battery houses, Singaporean animal flats, Californian drylots.
- **Extensive livestock production** : exact opposite - the least input used to raise the livestock (e.g. Mbororo livestock producers). Detailed definitions below (based on the feeding system):

3a. Livestock Classification

PASTORAL

1. Natural pastures
2. Mainly domestics herbivorous (bovine, ovine, goats)
3. Usually nomadic livestock (but non-nomadic pastoral system also exists)
4. By-products: meat, milk, blood, skins…
5. Social importance
6. Multiple functions: Livestock also used for savings or insurance
7. Assets
   - Low cost for feed
   - Utilization of unfavorable areas (mountains, arid and sterile lands)
   - Animals can move to marketable zones
8. Limits
   - Shared pasture used: when population increases, the pressure becomes too high
   - Competition with farmers
   - Politics tends not to like nomads

3b. Livestock Classification

MIXED SYSTEM - Two possibilities

- Farmer adds livestock to his farming system (can start with draft animals, animals for transport, livestock numbers grow)
- Livestock farmer, confronted with difficulties (because livestock numbers have decreased) starts to change his methods by settling down and cultivating a small garden, which then increases in size.

1. **Assets**
   - Livestock provide organic manure and energy
   - Livestock benefits from the cultivated space elements (feed)
   - Economical relations between farming and livestock (livestock diversity allows flexibility, the income from one side of the system finances the other…)
2. **Limits**
   - Depends on the area available
   - Transport problems
   - Use of the draft animal just to intensify farming methods

3c. Livestock Classification

PERI-URBAN SYSTEM

1. **Daily Urban Production**
    - Assets
        - A close and strong urban demand that is unsatisfied by the existing local production
        - Advantageous production costs (in comparison with importation)
        - Bovine livestock proximity (complementarity with local livestock)
        - Livestock farmers can access the required technology
    - Limits
        - Health problems (resulting from poor quality of the products and health problems for consumers)
        - Environmental pollution (poor water quality, noise…)

3d. Livestock Classification

PERI-URBAN SYSTEM (continued)

2. Soilless Livestock Production

- Very intensive (number of animal per square meter very high)
- The animals are fed indoors
- Can be a high source of pollution

3. Fattening

- Planned for the peak of consumption: poultry for Christmas, sheep or goat for Tabaski… (high production cost. Can be very profitable, but not always, depending on feeding costs)

4. Feeding Systems

Feeding system means:

1. The feeding resources available
2. The feeding practices
3. The knowledge and the strategies used by livestock farmers to cover the feeding needs of their livestock

The feed is sourced from:

1. Natural pasture (pasture, fodder, harvest residues, tree branches…)
2. processed feed (local or industrial, food supplement, concentrated feed…)

4a. Feeding Systems

Raw materials:

1. Cereals or other source of starch (roots, tubers) → mainly bring energy (and proteins for the cereals)
2. Seed cakes and other protein sources (fish meal, meat and bone meal)
3. By-products (bran, brewers grain) → good source of protein (benefit: not in competition with human foodstuffs)
4. Vitamins, minerals and other feed supplements

Quality of the raw material varies depending on the origin, the season's harvest, the storage conditions, the variety…

Reasons for feed supplements → what are the objectives?

(period? To correct nutritional deficiencies? Short-term (for reproduction, fattening…)?

4b. Feeding Systems

Feed values of major agro-by products in Sub-Saharan Africa (as-fed and dry-matter-basis for cattle)						
By-product	**Production ('000MT, 1984)**	**Dry Matter (%)**	**ME (Meal/kg) (%)**	**CP (%)**	**DP (%)**	**TDN (%)**
Molasses	1255	AF 75	2.47	3.2	1.8	68
		DM 100	3.29	4.3	2.4	91
Groundnut cake	442	AF 94	3.27	46.4	41.7[d]	83
		DM 100	3.50	49.6	44.6[d]	89
Cottonseed cake	497	AF 92	2.63	36.5	23.1[d]	68
		DM 100	2.87	39.8	25.1[d]	74
Sunflower seed cake	63	AF 93	2.49	41.5	36.9	69
		DM 100	2.68	44.6	39.6[d]	74
Palm kernel cake	271	AF 92	3.05	18.8	15.9	84
		DM 100	3.31	20.4	17.3	91
Fish meal	29	AF 92	3.38	60.9	54.2	85
		DM 100	3.69	66.2	59.2	95

ME = metabolisable energy; CP = crude protein; DP = digestible protein;
TDN = total digestible nutrients; AF = as fed; DM = dry matter

4c. Feeding Systems

Animals need to be fed the required quantities to produce meat, milk, eggs, etc.

The feed given is known as the “ration”

The ration formula/recipe should be adapted to each development stage of the animal

1. **Animals need:**

- Minerals (Ca, Mg, Fe…)
- Vitamins
- Proteins

2. **Their needs also depend on:**

- Climate (temperature, humidity): the quantity the animal’s is able to ingest easily depends on these conditions)
- Genetic (harder to take into consideration)

4d. Feeding Systems – Animal Feed Production

The theory is simple

- Grinding of raw materials
- Mixing them, following a given formula (or in some cases, mixing, then grinding)
- Store the mixtures
- Obtain and store raw materials

But

- Raw materials used by farmers are different to the ones used by industry
- Adequate raw materials may be not available when needed
- The farmer may not have the storage capacity (and is dependent on fluctuating market prices). Storage requires that the feed be kept at a constant humidity level, it should be protected from rotting and from being eaten by rats… Correct storage is costly

4e. Feeding Systems – Feed Distribution

1. Efficient feed should be concentrated (except for pigs) → high in energy and low in water
2. Quantities: since animals can regulate their own ingestion, they can help themselves to feed as required during the majority of their development
3. However, rationing can help to avoid waste
4. Broiler feed should not be rationed. Everything should be done so they can consume as much as possible!
5. Layers, however, should be rationed. Otherwise it is a waste of money

4f. Feeding Systems – Animal Housing

1. **Assets**
    - Avoids the disadvantages of unnecessary moves: crop damage, village pollution, lost animals, accidents
    - Protects animals against heavy rains, sun, and heat
    - Feed is better controlled
    - Less energy wasted by the animal → more production
    - Better development of the livestock waste (manure, biogas)
2. **Limits**
    - Costs are higher: feeding cost, animal housing cost
    - Neighborhood pollution and water pollution
    - More work for the farmer (animal are completely dependent on the farmer)
    - Socio-economic reasons

4g. Feeding Systems – Animal Housing

3. **Efficiency conditions**
    - Knowledge of the feed distributed
    - Optimization of the feed quality
    - Optimization of the animal nutrition (the needs can be well completed, optimization techniques and economics)
4. **Specific problems**
    - Check the health conditions and the well-being of the animals
    - Check the animal's behavior
    - Evaluate surrounding pollutants (noise, environmental) and look for the best development of the effluent (manure)
5. **Keys indicators**
    - Individual: bodily condition, health condition, performance
    - Workshop: housing, space, trough, manure development
    - Herd: behavior, objectives, competition, welfare

4h. Feeding Systems – Feed Quality Analysis

1. **Indicators related to available resource**
    - Overgrazing of meadows
    - Overgrazing of some woody species
    - End of the fodder stock during the dry season
2. **Indicators related to the animals**
    - Unsatisfied appetite (permanent quest for feed while in the pasture)
    - Poor physical condition of the animal (weight inappropriate, no egg-laying)
3. **Indicators related to herd instincts**
    - Herd moving
    - Survival feed acquisition
    - Herd reduction (can also be related to economic needs)

5. Products and By-Products

1. **Always keep in mind the objective of the production**
2. **Kinds of products:**
    - Renewable: eggs, milk, honey, manure, wood
    - Products that require slaughter: meat, skins
3. **Products can be contaminated**
    - when they are prepared
    - when they are stored

5a. Products and By-Products - Meat

1. **Transport**
2. **Ante- & post-mortem inspection**
3. **Slaughter condition**
    - Usually not in a purpose-built room, but the concept of hygiene should be respected
    - Avoid stress
    - Separate clean sector (for consumption), away from dirty sectors
    - A veterinary check is always preferable
4. **Processed**
    - Salted
    - Smoked
    - Dried
    - Cooked

5b. Products and By-Products - Dairy

Dairy products

1. Very perishable products
2. Hands should be washed with soap
3. Receptacles should be very clean
4. Teats should be cleaned
5. Milk has to be refrigerated without delay (if electricity available…)
6. Pasteurization (30min @ 63-65°C)
7. Sterilization (15-30 min @ 110-120°C or 2 – 4 sec @ 135-140 °C)
8. Processed into condensed sweet milk
9. Processed into milk powder
10. Processed into butter
11. Fermented (yoghurt, cheese…)

5c. Products and By-Products - Other

1. **Eggs:**
    - Usually chicken eggs
    - Broken/cracked eggs have to be removed, as they can be a source of contamination
2. **Honey**
    - Usually sterile
    - Usually traditional method
3. **Skins**

6. Livestock Health

Feed quality analysis

1. Epizootic diseases (African swine fever, etc.)
2. Can be caused by viruses, parasites, bacteria…
3. Can be very or slightly contagious, or not at all
4. Can also infect humans
5. Veterinary
6. Hygiene is the key
7. Vaccinations
8. When no treatment is available, animals should be killed
9. Good feeding → better condition to fight disease

6a. Livestock Health

Feed quality analysis

Increase of meat consumption can pollute and negatively impact biodiversity

1. Soil
2. Water
3. Atmosphere

7. Organized Production

The production must be well organized from beginning to end

1. Breed
2. Quality & quantity of the feed
3. Health care system (veterinary)
4. Processed product
5. Market

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