



# What are livestock indicators?

A background document for the  
SOURCEBOOK ON LIVESTOCK DATA IN AFRICA:  
COLLECTION AND ANALYSIS AS A DECISION-MAKING TOOL

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## **EXPLAINING LIVESTOCK INDICATORS**

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The transformation of information into a form useable for decision-making by investors lies at the heart of development. This is true for public and private investors, funding agencies and other development actors. Indicators, which ‘serve to indicate or suggest’ (OECD, 2011), are statistics that feature time and space dimensions (UN, 2011). In the development community indicator is a term more frequently used than ‘statistic’, as it attracts more attention from potential users, including decision-makers and the media (Brüngger, 2004). Indicators transform and communicate data. Data are pieces of information that are either directly observed and collected (primary data) or retrieved from other sources (secondary data), and then processed through appropriate methodologies to produce indicators.

Simple indicators are aggregations of data standardized by some time, space and/or other dimensions. Examples for livestock include the number of cattle in a country on a given day; the average number of animals affected by a disease in a given country each year; or the value of live animals exported from a country in a given year. More complex indicators involve combinations of data, such as cows’ milk productivity, and livestock value added. The former would require information on milk production, the number of cows milked, and the cows’ calving interval. The latter would require information on the monetary value of all livestock products countrywide and on the monetary value of all goods and services used in the production process (so-called intermediate consumption). There are then the so-called composite indicators, which present to decision-makers multidimensional concepts that cannot be captured otherwise, such as competitiveness, performance, or sustainability<sup>1</sup> (Brüngger, 2004; OECD, 2008).

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## **INTERPRETING AND USING LIVESTOCK INDICATORS**

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Livestock-related indicators are used for a range of purposes, including analyses of sectors’ or value chains’ performance, monitoring and evaluation of interventions in the form of policies, programmes and projects, and comparisons between countries and between sectors.

Decision-makers look at indicators from three main perspectives:

- Level of the indicator, showing its status.
- Dispersion or concentration of the indicator, which represents the variability of its status.
- Trends in the indicator over time, space or other progressions relevant to the decision being made.

For the livestock sector, a crude example is the number of head of cattle; the variance in live cattle weight; and the time trend in cattle population. A cursory look at major livestock-related policy and programme documents reveals that all rely on several level, dispersion and trend indicators. The

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<sup>1</sup> A non-livestock example is the Human Development Index produced by the United Nations’ Development Programme.

‘Companion Document to CAADP: Integrating livestock, forestry, fisheries subsectors into the CAADP’ (NEPAD, 2006) reads:

*In 2003, Africa’s livestock population was estimated at 231 million cattle, 244 million sheep, 223 million goats, and 22 million pigs, unevenly distributed across the continent. The majority of the livestock population is found in the Eastern, Western and Northern subregions. About half of all cattle, more than a third of all sheep and 40 percent of goats are found in the Eastern Africa region. The Northern sub-region accounts for 35 percent of all poultry while the Western sub-region has about 35 percent of the goat population. Livestock populations in the central and Southern sub-regions are very low, mostly because of climatic conditions and high disease pressure (p.7).*

*In Sub-Saharan Africa as a whole ... the annual growth rates in production were only 2.0 percent, 1.9 and 2.4 percent for meat, milk and eggs, respectively. [...] total livestock production would have to grow at an average annual rate of 4.2 percent by the horizon 2015 to meet the needs of the growing population, improve nutrition and progressively eliminate food imports, while required growth rates for the individual components would be 2.5, 4.9 and 4.4 percent per annum for meat, milk and egg production, respectively (p.9).*

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## **CLASSIFICATION: THE COMMON GROUND FOR LIVESTOCK INDICATORS**

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The concepts and definitions underpinning livestock data and indicators should be based on international classifications, where available. The United Nations Statistics Division defines a classification as ‘*a set of discrete, exhaustive and mutually exclusive observations which can be assigned to one or more variables to be measured in the collation and/or presentation of data*’ (UNSD, 2012). The primary purpose of statistical classification is to provide a framework to collect and analyse data, and to report and compare statistics across time, space and survey events.

Common classification concepts and definitions are vital in mobilising data and indicators for use by decision makers. For instance, milking animals could be defined variously as all females in reproductive ages, or as females bred especially for milk production and actually milked during a reference period. Furthermore, milk production could be gross, which includes the milk sold and that suckled by young animals, or net, which excludes milk suckled by young animals. Alternatively, meat production could be quantified as dressed carcass weight, gross carcass weight (including the hide or skin, head, feet and internal organs, but excluding the part of the blood which is not collected in the course of slaughter), or live weight (FAO, 2011).

The international classification for agriculture commodities, which includes live animals and livestock primary and processed products, is the ‘FAOSTAT Commodity List’ (FCL). The List is consistent with the Central Product Classification (CPC) developed and maintained by the United Nations Statistics Division, which provides a framework for international comparisons of statistics. CPC is based on the Harmonized Commodity Description and Coding System (HS) developed and maintained by the World Customs Organization (WCO) and used as a basis for trade statistics (AFCAS, 2011).

FCL provides the framework for collecting and analysing data on production and trade of crops and livestock used in FAOSTAT to compile FAO's Supply Utilization Accounts (SUA) and Food Balance Sheets (FBS). Its structure reflects the item 'commodity tree', i.e. live animals and their derived products are traceable all along the value chain. As to livestock, the FLC includes 20 types of 'live animals' (from asses to cattle to turkeys); 59 livestock primary products (from beeswax to indigenous chicken meat, to wool); and 26 processed livestock products (from butter to cows' milk, to lard, to yoghurt). A database with concepts, definitions and classifications (including codes, titles, scientific and common names, definitions and correspondences) is available in the metadata page of FAOSTAT.

Necessary classifications extend well beyond livestock data and indicators, even for items relevant to livestock sector investments. These include, for instance, definitions of the household, which is a common unit of analysis when socio-economic issues are examined; of rural and urban areas; and of income.

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## QUALITY LIVESTOCK INDICATORS

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The quality of livestock indicators is another pre-requisite for the effective design and implementation of public and private sector investments. Quality is generally defined as 'fitness for use' in terms of users' needs, a general term that includes not only intrinsic features of the indicator, such as its accuracy, but also other characteristics such as its accessibility, and timeliness.

International organizations have variously listed quality dimensions of data and indicators (e.g. EUROSTAT; 2007; FAO, 2006; IMF, 2003). The OECD 'Statistical Quality Framework' (OECD, 2011), consistently with the Fundamental Principles of Official Statistics endorsed by the United Nations Statistical Commission in April 1994 (UNSD, 1994), has identified a set of quality dimensions for both data and indicators. These are:

- Relevance  
A qualitative assessment of the value contributed by the indicator / data, i.e. the degree to which it serves certain purposes.
- Accuracy  
The degree to which the indicator / data correctly describes or estimates the quantities / characteristics it is designed to measure.
- Credibility  
The confidence that users place in the indicators / data, which depends on a variety of factors such as information on how, when and by whom a particular set of data was collected, and how the data is formatted (so-called metadata).
- Timeliness  
The length of time between the availability of the data / indicator and the event or the phenomenon it describes. Punctuality is a form of timeliness: it implies the existence of a

publication schedule and the degree to which data / indicators are released in accordance with it.

- **Accessibility**

An assessment of how readily data / indicators can be located and accessed. It includes the suitability of the form in which the data are available, the means of dissemination, and the availability of metadata and user support services.

- **Interpretability**

The ease with which the user may understand, analyse and use the data / indicator, including explanations of classification, target populations and sampling, the variables underlying the indicator, etc.

- **Coherence**

The degree to which available data / indicators are logically connected and mutually consistent.

The OECD also recommends considering cost-efficiency as a key dimension of data /indicators, though this is not a direct measure of quality. Cost-efficiency can however lead to improvements in the overall quality of the data / indicators in that if a quality dimension can be produced more efficiently, then resources can be released to improve other dimensions.

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## **CAVEATS ON LIVESTOCK INDICATORS**

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Some caveats on livestock indicators require elucidation. First, livestock-related indicators are typically generated using data from agricultural surveys, either censuses or sample surveys. These surveys are multi-subject (because they cover a variety of industries of which one is livestock); and are multi-method (as different methodologies and skills are needed to get information from the household, the community leader, the slaughterhouse, the processing firm or any other interviewee on different topics) (FAO, 1989). Furthermore, many livestock indicators are based on data that is self-reported rather than objectively measured. Users of indicators should thus be aware of the population of reference, sampling methods and data collection procedures, the form of survey and questionnaire, and local context (e.g. dry or wet season) to which observations belong.

A second caveat concerns appropriate thresholds in the interpretation of indicators. Some thresholds are established internationally and are universally applicable (e.g. extreme poverty, and poverty, are established at \$US 1.25 and \$US 2/day respectively, and severe acute malnutrition is defined as a very low weight for height relative to a WHO growth standard). Other thresholds, however, are context specific: national poverty levels differ from country to country and should not be used in cross-country analyses; potential productivity (or yield gap) differs between lowlands and highlands or between temperate and tropical zones. Also, the same threshold implies different things for different countries. For instance, in 2003, in Maputo, AU Heads of State and Government committed to allocate at least 10 percent of the national budgets to agriculture (AU, 2003), which has different implications for different countries: it placed limited pressure on the governments such as those of Mali and Ethiopia, which in 2003 already allocated about 10 percent

of their budget to agriculture, but made a difference for Senegal and Uganda, whose spending on agriculture was less than 5 percent of the national budget in 2003 (Fan *et al.*, 2009).

Following the discussion of interpretation of indicators presented above, a third caveat is that the way indicators are presented may convey different messages. Summary tables, although they provide complete information, may be less informative than a geometric representation, such as a map. Tables can present total or per-capita trends in consumption of animal sourced food as indicators of market opportunity; a coefficient of variation or inter-quartile range as measures of dispersion; and growth rates calculated over single or multiple years or presented as indices against base years as trend indicators. For instance, one can rightly present indicators to state that per-capita supply of meat in Uganda has decreased in the last decade (from 10.8 to 9.8 kg per capita year over the period 1997-2007); but can also correctly state that over the same period meat supply increased by over 25 percent (from 240.000 to 302.000 tonnes) (FAOSTAT, 2012).

Fourth, not everything can be appropriately measured by indicators: indeed a distinction is often made between hard and soft indicators. The former refer to situations which could be directly reported, observed and measured, such as the number of animals or the outbreaks of certain animal diseases. The latter refer to less tangible conditions, such as farmers' skills and happiness, which must be measured indirectly, say by years of schooling or extension visits, or by proxy use of income or expenditure behavior. For some indicators, ambiguity exists about definitions and classifications, such as the safety and quality attributes of animal sources food (see Jabbar *et al.*, 2010).

Finally, indicators may represent symptomatic conditions rather than underlying causes. This means that they may help identify priority topics for investment, but say little about how to design investment plans. For example, some indicators may show that rampant animal diseases cripple animal production and productivity, and hence that investments are needed to improve the coverage / efficiency of animal health services. However, there are many ways of improving the efficiency of animal health services (see FAO, 2010) and appropriate indicators for selection may not be available: alternative approaches could be attempted to generate the relevant information for investment decisions (Duflo *et al.*, 2007).

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## CONCLUSIONS

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Livestock indicators provide the basis of livestock development investments. They are formed from a variety of data, by a variety of organisations and for a variety of purposes and generally appear expressed as levels, distributions and trends. Livestock indicators largely rely for raw data on surveys of self-reported information, and suffer and benefit from the variety of contexts and methodologies used. Their quality can be judged by well-established criteria, and their interpretation must be subject to caveats.

To the extent that is possible, livestock stakeholders should use indicators produced and disseminated according to the Fundamental Principles of Official Statistics (UNSC, 1994), and which are hence of good quality. These principles should not only be followed by the Bureaus / Institutes of Statistics, which in most countries are responsible for producing official statistics, but

by also by other actors involved in the collection of livestock related data, such as the Ministries responsible for Livestock, Dairy/Meat Boards, Processing Plants, Slaughterhouses, and Market and Customs Authorities. This should ensure that the data / indicators used and produced by the various institutions could be valued as ‘official data / statistics’, or as a minimum their strengths and weaknesses should be spelled out and agreed upon. If decision-makers speak the same language, i.e. they use the same indicators and trust data / indicators produced by each other and the information they convey, investments are designed which are widely agreed upon and supported, an essential element for their effective implementation.

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