An Overview of Livestock and Poverty

The combination of crops and livestock produced across Uganda varies considerably. In the north, large areas are too dry to support much cropping, thus households rely extensively on livestock for their living. In contrast, across much of the rest of the country, a wide range of crops and livestock can be found. Agricultural research and development strategies, therefore, need to be well targeted to the heterogeneous landscapes and diverse biophysical and socioeconomic contexts within which the agricultural production system operates. Information that spatially delineates landscapes with broadly similar livestock production strategies, constraints, and investment opportunities can be very useful for planners and policymakers.

Livestock production systems in Uganda can be categorized into two main groups based on their biophysical characteristics: the rangeland-based livestock-only system, and the mixed rainfed crop-livestock system. Each system can be further disaggregated by average temperatures and length of growing period into temperate and tropical highlands, humid and sub-humid zones, and arid and semi-arid zones (Thornton et al., 2002). Map 1 shows the prevalence of rangeland-based livestock-only systems
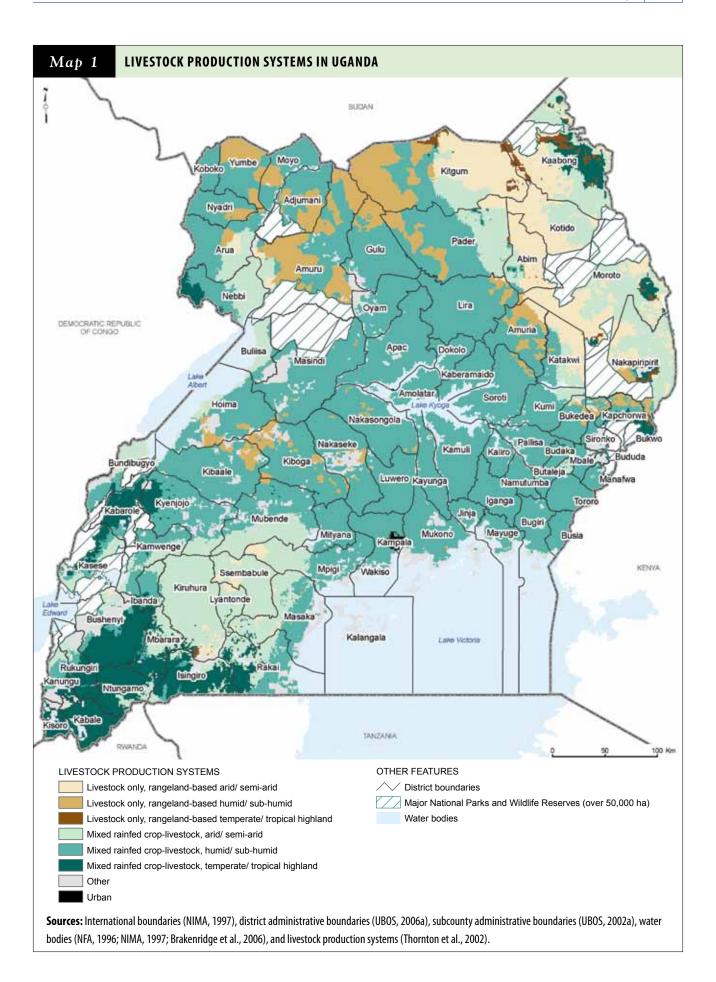
(tan colors) across the north. Uganda's largest livestock production area falls in the mixed rainfed crop-livestock category in the humid and subhumid zone (medium shade of turquoise) across the center of the country. The dark turquoise areas are the mixed rainfed crop-livestock system in the temperate and tropical highland zone, seen in the higher altitude areas of southern and western Uganda and along the Kenyan border in eastern Uganda.

Table 1 presents the amount of land and number of people found in each livestock system as of 2005. Almost 13 million people—about 55 percent of Uganda's population—live within the mixed rainfed crop-livestock system in the humid and sub-humid zone (within an area of 97,000 square kilometers, or 48 percent of Uganda's land area). The mixed rainfed crop-livestock system in the temperate and tropical zone follows second with a population share of 15 percent.

The human population in these two systems is projected to almost triple by 2050 (Thornton et al., 2002) and is expected to be associated with a growing importance of the livestock sector for the following reasons:

Table 1	LAND AREA AND HUMAN POPULATION IN UGANDA BY LIVESTOCK PRODUCTION SYSTEM, 2005					
		Land Area		Population		
Production System		(000 square kilometer)	(percent)	Total Population in all Rural Subcounties (000)	(percent)	Average Population Density for all Rural Subcounties (persons/square kilometer)
Rangeland-Based Livestock-Only Systems	Arid and Semi-arid	19	9.4	653	2.8	35
	Humid and Sub-humid	17	8.6	727	3.1	42
	Temperate and Tropical Highlands	1	0.6	75	0.3	62
Total: Rangeland-Based Livestock-Only Systems		*37*	*18.5*	*1,455*	*6.3*	*39*
Mixed Rainfed Crop-Livestock Systems	Arid and Semi-arid	36	18.0	2,822	12.2	77
	Humid and Sub-humid	97	47.8	12,759	55.3	132
	Temperate and Tropical Highlands	16	7.9	3,490	15.1	219
Total: Mixed Rainfed Crop-Livestock Systems		*149*	*73.7*	*19,072*	*82.6*	*128*
Other Livestock Systems		16	7.7	2,554	11.1	164
TOTAL		202	100.0	23,081	100.0	114

Source: Authors' calculation. The data are derived from combining the livestock production systems (Map 1) with the rural population figures from the 2002 Uganda population and housing census (UBOS, 2002b), using GIS overlay functions.

| *Map 1* | LIVESTOCK PRODUCTION SYSTEMS IN UGANDA |

LIVESTOCK PRODUCTION SYSTEMS

- Livestock only, rangeland-based arid/ semi-arid
- Livestock only, rangeland-based humid/ sub-humid
- Livestock only, rangeland-based temperate/ tropical highland
- Mixed rainfed crop-livestock, arid/ semi-arid
- Mixed rainfed crop-livestock, humid/ sub-humid
- Mixed rainfed crop-livestock, temperate/ tropical highland
- Other
- Urban

OTHER FEATURES

- District boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and livestock production systems (Thornton et al., 2002).

■ Increased overall demand for livestock products driven by population growth and dietary shifts resulting from higher incomes (assuming new or better income opportunities are provided by all economic sectors).

■ Increased local importance of livestock, especially in rangelands with limited cropping opportunities, to help feed, generate biogas, and provide livelihoods to a larger number of rural people.

Future livestock research and development efforts will need to focus on this dual challenge.

Box 2	LIVESTOCK PRODUCTION SYSTEMS IN UGANDA

Rangeland-based livestock-only systems: In these systems, 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 crops. There is a high degree of importance of livestock in the farm household economy, and the land available per head of cattle is relatively high. Depending on the length of the growing period and the average temperature during the growing seasons, this system can be disaggregated into temperate and tropical highlands, humid and sub-humid zone, and arid and semi-arid zone.

Mixed rainfed crop-livestock systems: In these systems, more than 10 percent of the dry matter fed to animals comes from crop by-products and stubble, or more than 10 percent of the total value of production comes from non-livestock farming activities. There is another source of income besides livestock and relatively low land holdings per head of cattle. This system can also be further disaggregated by temperature and length of growing period.

Other livestock production systems: These include landless production systems with very high animal density per area such as intensive poultry production, pig and cattle feedlot operations, and large-scale dairy facilities. Many of the large-scale operations are located in peri-urban areas in close proximity to high demand areas for livestock products.

Area estimates shown in Table 1 represent potential extent and are based on landcover, population, and agroclimatic data. The area estimate for 'other livestock systems' is a residual and does not represent a precise number for landless production systems in Uganda, which include large-scale operations and small-scale stall-fed dairy.

Sources: Thornton et al., 2002 and Seré and Steinfeld, 1996.

LIVESTOCK DISTRIBUTION

The 11.4 million head of cattle counted in Uganda's 2008 national livestock census (see Box 3 for more detail) are not evenly distributed across the districts (see Map 2a). Kotido, Nakapiripirit, and Kaabong are the districts with the highest cattle numbers followed by Kiboga, Moroto, Kiruhura, Rakai, and Soroti Districts (MAAIF and UBOS, to be published). Another 21 districts, shown in light tan on Map 2a have cattle numbers between 140,000 and 270,000, slightly above Uganda's district average. Many
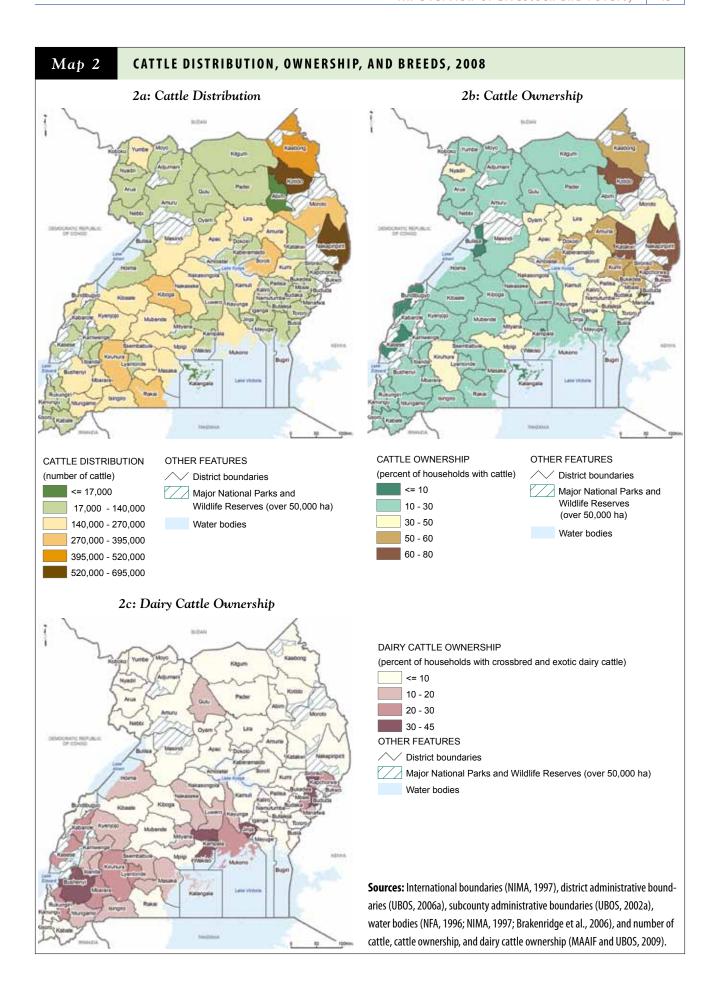
of these districts are in Uganda's 'cattle corridor,' an area stretching from northeast (e.g., Kotido District), through central (e.g., Nakasongola District) to southwest Uganda (e.g., Rakai and Ntungamo Districts).
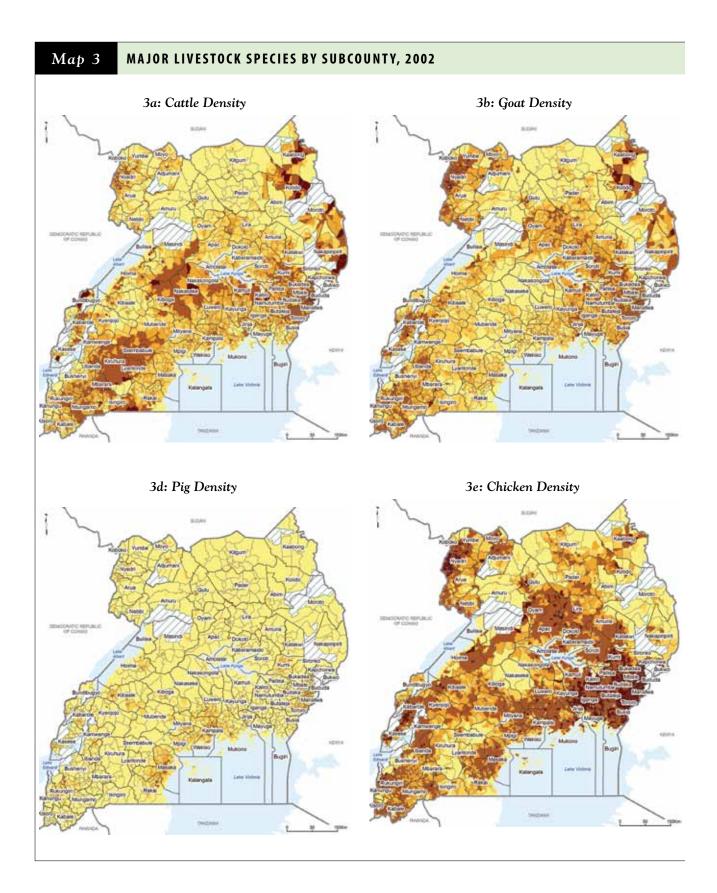
In 2008, 1.7 million households owned cattle, representing 26 percent of all Ugandan households (MAAIF and UBOS, to be published). Cattle ownership is more widespread in northeast Uganda (Map 2b), where more than half of the households own cattle (e.g., Kaabong, Kotido, Nakapiripirit, Katakwi, Bududa, Amuria, Dokolo, Amolatar, Kumi, Bukedea, Sironko, and Kapchorwa Districts). Ownership of cattle is above the country average (30 percent) in most districts bordering Lake Kyoga and below the national average in the remaining districts.
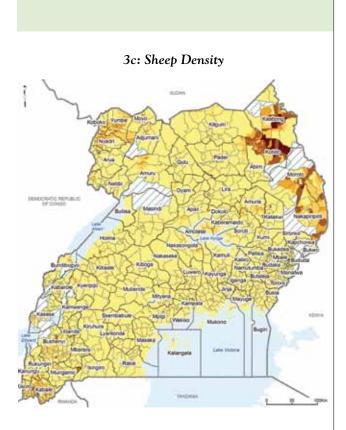
Data from the 2008 national livestock census reveal the potential for a greater share of improved breeds in the livestock sector: Only 5.6 percent of the total cattle herd in Uganda were exotic or crossbred dairy cattle, 0.8 percent were exotic or crossbred beef cattle, and the remaining 93.6 were indigenous breeds such as Ankole and Zebu/Nganda (MAAIF and UBOS, to be published). Only 10 percent of cattle-owning households in Uganda owned exotic or crossbred dairy cattle; Map 2c highlights districts with such households. Districts with the highest share of households with exotic or crossbred dairy cattle are geographically concentrated in southwest, central, and southeastern Uganda. Bududa, Bushenyi, Kampala, Wakiso, and Sironko are the top five districts with the largest herds (MAAIF and UBOS, to be published) and all have a high percentage of households owning improved breeds.
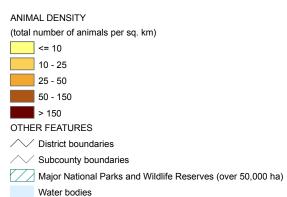
Numbers (and associated stocking rates) of cattle and other livestock increased considerably between 2002 and 2008, but the relative importance of different production zones has not changed greatly across the country. Maps 3a-e give a visual representation of average livestock densities in number of animals per square kilometer of cattle, goats, sheep, pigs, and poultry in subcounties across Uganda, drawing on modeled data from the 2002 population and housing census (see Box 3 for more detail).

The importance of cattle across Uganda in 2002 as captured in Map 3a (cattle density by subcounty) is similar to 2008 as displayed in Map 2a (number of cattle by district): The northeastern part of the country – Kotido, Kaabong, and Nakapiripirit Districts – has some of the highest cattle densities with over 150 cattle per square kilometer. In central Uganda, areas with similarly high cattle densities exist such as in Kiboga, Nakaseke, and Nakasongola Districts. Areas with cattle densities of 50–150 cattle per square kilometer extend from central Uganda down through the southern region, as seen in Kiruhura, Ssembabule, Mbarara, and Ntunguma Districts covering most of the 'cattle corridor' of Uganda. Densities of fewer than 25 cattle per square kilometer are found in many subcounties in central and western Uganda. Very low cattle densities (less than 10 cattle per square kilometer) are found in the

Map 2 — CATTLE DISTRIBUTION, OWNERSHIP, AND BREEDS, 2008

2a: Cattle Distribution

CATTLE DISTRIBUTION
(number of cattle)
- <= 17,000
- 17,000 - 140,000
- 140,000 - 270,000
- 270,000 - 395,000
- 395,000 - 520,000
- 520,000 - 695,000

OTHER FEATURES
- District boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

2b: Cattle Ownership

CATTLE OWNERSHIP
(percent of households with cattle)
- <= 10
- 10 - 30
- 30 - 50
- 50 - 60
- 60 - 80

OTHER FEATURES
- District boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

2c: Dairy Cattle Ownership

DAIRY CATTLE OWNERSHIP
(percent of households with crossbred and exotic dairy cattle)
- <= 10
- 10 - 20
- 20 - 30
- 30 - 45

OTHER FEATURES
- District boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and number of cattle, cattle ownership, and dairy cattle ownership (MAAIF and UBOS, 2009).

Map 3 | **MAJOR LIVESTOCK SPECIES BY SUBCOUNTY, 2002**

3a: Cattle Density

3b: Goat Density

3d: Pig Density

3e: Chicken Density

3c: Sheep Density

ANIMAL DENSITY
(total number of animals per sq. km)

- <= 10
- 10 - 25
- 25 - 50
- 50 - 150
- > 150

OTHER FEATURES

- District boundaries
- Subcounty boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and animal density (UBOS, 2002b).

center of the northern region and in a few subcounties in the western, central, and eastern regions.

The distribution of other livestock species follows different spatial patterns, but in both 2002 and 2008 the relative importance of different production zones for each species did not change considerably. The following maps show animal densities by subcounty in 2002.

The greatest number of goats per square kilometer, as shown in Map 3b, can be found in the northeast (Kaabong, Kotido, Nakapiripirit, and Moroto Districts), in the northwest (from Yumbe to Nebbi Districts), and in the southwest (Bushenyi and Ntungamo Districts). Goat density is also high in districts bordering Lake Albert, subcounties north of Lake Kyoga, and in southeast Uganda close to Kenya.

There are relatively few sheep in comparison to cattle or goats (Map 3c). Highest densities are in the northeast, northwest, and in Kabale and Kisoro Districts bordering Rwanda.

Pig production is spatially more concentrated (Map 3d). The highest density of pigs is found in areas of high human population density along Lake Victoria and near urban areas, along the Kenyan border, and in parts of the central and western regions. Masaka, Wakiso, and Mukono Districts are important production areas.

Africa is on alert for bird flu, with many African states— Benin, Burkina Faso, Cameroon, Djibouti, Egypt, Ghana, Ivory Coast, Niger, Nigeria, Sudan, and Togo— now having confirmed cases of the highly pathogenic H5N1 strain in poultry (EMPRES, 2010). The chicken densities shown in Map 3e provide information on areas potentially at risk in the event of bird flu reaching Uganda. Map 3e also shows the high densities of chickens around major urban centers such as Kampala, Jinja, Entebbe, Masaka, Mpigi, and Mbarara. In these densely populated areas, demand for chicken has outstripped the local supply.

ROLE OF LIVESTOCK IN LIVELIHOODS AND POVERTY REDUCTION

To examine the relative importance of livestock in rural livelihoods across Uganda, analysts have to turn to household survey data from smaller samples. With respect to the mixed crop-livestock systems, a 2002 study by Ashley and Nanyeenya examined livestock ownership and benefits in three districts: Mbale, Kamuli, and Mubende (Ashley and Nanyeenya, 2002). It showed that 78 percent of households in these systems held livestock of one kind or another. The majority of livestock in these areas were kept in small herds and flocks (less than five animals), with 65 percent of households owning chickens and 44 percent owning goats. Cattle were held by 29 percent of households and pigs by 23 percent. The authors found that livestock were kept by the poorer households as well as the wealthier,

Box 3 — SOURCES OF LIVESTOCK DATA IN UGANDA

To overcome limitations in the supply and quality of crop and livestock statistics during the 1990s, Uganda developed an Integrated Framework for Agricultural Statistics in 2000 (Magezi-Apuuli, 2000) and invested in the collection of new agricultural data, including the following:

- an agricultural module as part of the Population and Housing Census (2002),
- an agricultural module as part of the Uganda National Household Survey (2005/06),
- a National Livestock Census (2008), and
- a National Crop Census (2008-2009).

The first three sources provide livestock data useful for mapping and subnational analyses, although the spatial resolution and the quality of the data vary.

Agricultural Module in the 2002 Population and Housing Census

The Uganda Bureau of Statistics (UBOS) conducted the Population and Housing Census in September 2002 which incorporated a short questionnaire (i.e., agricultural module) inquiring about household-based agricultural activities such as crop growing, livestock rearing (including poultry), and fish farming. The main purpose of this module was to collect data for constructing appropriate sampling frames to be used for a planned agriculture and livestock census and other surveys. In 2004, UBOS released the final version of the data for the 3.8 million households with agricultural activity.

In its report accompanying the release of the census data (UBOS, 2004), UBOS provided the following caveats regarding the agricultural module:

- The census did not cover private, large-scale, and institutional farms, which have large crop holdings and raise large numbers of livestock.
- The questionnaire was brief compared to those designed for a conventional agricultural survey or census, and the quality of the agricultural module may have suffered because of being last in the sequence of questions.
- There was only limited training of enumerators on agricultural concepts, and field supervision was not as thorough as UBOS would have wished.
- The questions on the agricultural activities did not filter between activities within the enumeration area where the household was located and those outside the enumeration area. For example, it was possible that a respondent in an enumeration area in Kampala answered that he had 500 head of cattle, yet those cattle were physically located in a different district.
- When the livestock numbers are shown for small administrative areas such as a parish, some obvious errors are revealed. UBOS recommended using data at such spatial resolution with some caution.

Despite these drawbacks, UBOS felt that the 2002 census represented a unique source of agricultural data that could be put to further use. Since the census included enumeration of all households, it is possible to aggregate the data to small administrative areas.

In the current publication, we aggregate census data to the subcounty level to show maps of livestock densities (cattle, goats, sheep, and chickens) for 2002 and to estimate the number of cattle in areas with high trypanosomiasis risk in 2002. To produce the maps, the original subcounty data were first converted to a density number (animals per square kilometer), checked for consistency across subcounties, then spatially reallocated to exclude areas most likely without livestock (for example by excluding protected areas or steep slopes), and finally converted to 1 kilometer by 1 kilometer grid

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with the poorer households more likely to have small stock and the wealthier more likely to own cattle. Wealthier households also kept proportionately more animals than poorer households.

Ashley and Nanyeenya also showed that farmers ranked livestock among the most important means of livelihood, despite the fact that they only contributed around five percent of households' total cash income. This reflects the common practice of investing in livestock rather than putting money in a bank. The return on investments in livestock, which continue to grow, produce milk, meat, and eggs, and have offspring, are often higher than other investment options accessible to poor households (but they are also exposed to the risk of animal diseases and drought).

Recent studies looking at the role of livestock in pathways out of poverty in Uganda and western Kenya (Krishna et al., 2006; Kristjanson et al., 2004) suggest that diversification of income through livestock is an important factor in helping households escape poverty. They provide a kind of 'asset stairway' out of poverty, first through investments in chickens, then goats and sheep, and finally local and then improved breeds of cattle. Livestock-related activities were found to have contributed to improved welfare for many poor households in Kenya and Uganda (Burke et al., 2007; Krishna et al., 2006).

Livestock also play an important 'safety net' role, keeping households from falling into poverty (Burke et al., 2007). They are often sold when there is an emergency or unplanned expenditure, for example, when someone in the household becomes ill. Different types of livestock play different roles across poor households, and the kind of livestock and livestock breeds that matter vary across regions, so research approaches that lead to a better understanding of this are critical, and will contribute to more targeted and effective pro-poor livestock-related policies and interventions.

cells. The final numbers are robust enough to create a national map with a consistent spatial representation of important production zones and to provide a national estimate of cattle in high risk trypanosomiasis areas by production system.

Agricultural Module in the 2005/06 Uganda National Household Survey

After testing a diagnostic agricultural survey in 2003/04, the Uganda Bureau of Statistics (UBOS) decided to include an agricultural module as a core component of its long-term household survey program. The purpose of this module is to provide regular updates and more detail about Uganda's farm economy and farm incomes. The module includes questions on the following topics: investments in land, crop areas, labor and nonlabor inputs for both the first and second cropping season, crop disposition, land rights, disputes and certificates, livestock ownership including small animals and poultry, expenditure on livestock, agricultural extension services, and technologies. Results of the Uganda National Household Survey are only statistically valid at a national scale and for subnational regions, because of the relatively small sample size.

In the current publication, we did not map the data from the 2005/06 survey because of its coarse spatial resolution, but we examined the data when discussing national livestock trends.

The National Livestock Census 2008

The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), together with the Uganda Bureau of Statistics (UBOS), undertook the field enumeration of the National Livestock Census from 18-25 February, 2008. Data processing and report preparation were completed during 2008 and 2009. MAAIF and UBOS released the new livestock data in October 2009.

The National Livestock Census obtained data on basic livestock characteristics (breed, sex, and age) of selected species such as cattle, goats, sheep, pigs, poultry, and rabbits. The questionnaire also captured important information about milk and honey production, farm infrastructure, equipment, ownership and tenure of land used for livestock rearing, and use of labor by source and gender.

The Census used information on households with livestock from the 2002 Population and Housing Census to establish a sampling frame that would generate reliable estimates at district, regional, and national levels (see MAAIF and UBOS, to be published, for more detail on the two-stage stratified cluster sampling design). A total of 8,870 enumeration areas (villages) were selected from 80 districts. This resulted in a sample of 964,047 households, representing 15.1 percent of the total number of households in Uganda in 2008 (more comprehensive than other livestock or agricultural censuses conducted in the past and in other developing countries, which typically have sample sizes between 1-5 percent of the total number of households). As a result of its large sample size, the National Livestock Census provides the most precise estimate of total livestock number by type and is considered a benchmark for future surveys and censuses.
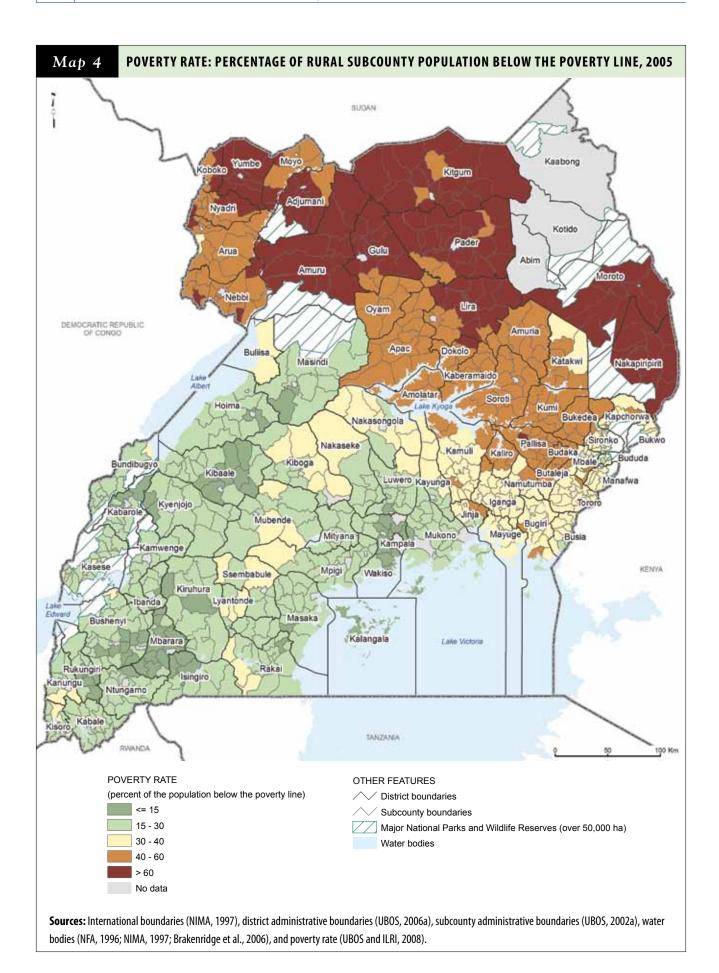
In the current publication we used the National Livestock Census data when reporting on national trends in livestock numbers. Maps of cattle distribution, cattle ownership, and share of improved dairy breeds by districts for 2008 are based on the same source.
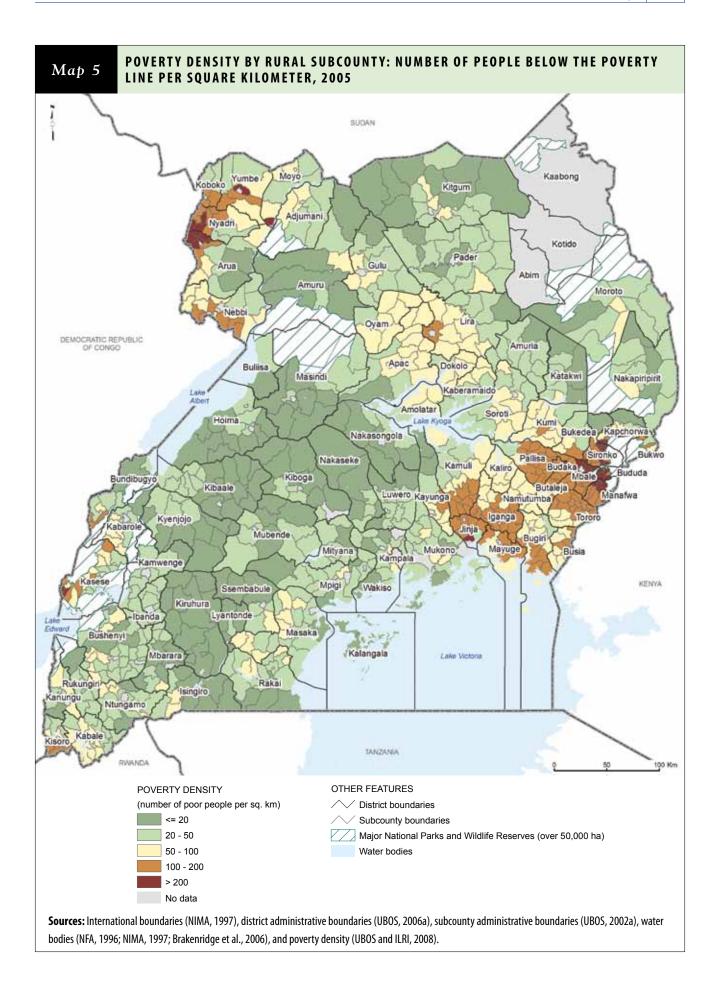
WHERE ARE THE POOR?

Geography can play a role in determining relative levels of household well-being, as can be seen in Uganda's latest poverty maps (for 2005). Subcounties with high poverty levels tend to be clustered, as are the wealthier subcounties (Map 4). The highest incidences of poverty—greater than 60 percent of the population living below Uganda's official rural poverty line—are seen across the north of the country (see Box 4 for more detail). Still high, at 40–60 percent, are the districts of Nyadri, Arua, and Nebbi in the northwest, with another dozen districts stretching across to eastern Uganda, where most of the districts fall in the 30–40 percent poverty range. Low poverty levels (less than 15 percent) are found in pockets of western and southern Uganda, and around Kampala. The reasons for this spatial pattern are complex, and include factors such as rainfall and soil quality (which determine agricultural potential), land and labor availability, degree of economic diversification, level of market access, and issues of security and instability.

Map 5 gives a visual representation of the poverty density: the number of poor per square kilometer in 2005 (see Box 5 for a discussion of mapping poverty rate, poverty density, and the number of poor). This map looks different from Map 4 because there are relatively few people living in the north where the highest poverty incidences are found, for example. The areas of highest poverty densities in Uganda lie in the east, the northwest (parts of Nyadri, Arua, Nebbi, Koboko, and Yumbe Districts), in pockets in the far west (Kasese and Kabarole Districts), and in Kisoro District in the southwest.

Map 4 | **POVERTY RATE: PERCENTAGE OF RURAL SUBCOUNTY POPULATION BELOW THE POVERTY LINE, 2005**

SUDAN

Koboko Yumbe Moyo Kitgum Kaabong

Nyadri Adjumani

Arua Gulu Pader Kotido Abim Moroto

DEMOCRATIC REPUBLIC OF CONGO

Nebbi Amuru

Oyam Lira Nakapiripirit

Buliisa Masindi Apac Dokolo Amuria Katakwi

Lake Albert Kaberamaido

Hoima Amolatar Lake Kyoga Soroti Kumi Bukedea Kapchorwa Bukwo

Nakasongola Pallisa Sironko

Nakaseke Kamuli Kaliro Budaka Bududa

Bundibugyo Butaleja Mbale

Kibaale Kiboga Luwero Kayunga Namutumba Manafwa

Kyenjojo Iganga Tororo

Kabarole Mubende Jinja Bugiri

Mityana Mukono Mayuge Busia

Kamwenge Mpigi Wakiso Kampala KENYA

Kasese Ssembabule

Kiruhura Masaka

Ibanda Lyantonde Kalangala Lake Victoria

Lake Edward Bushenyi

Mbarara

Rukungiri Isingiro Rakai

Kanungu Ntungamo

Kisoro Kabale

RWANDA TANZANIA

0   50   100 Km

POVERTY RATE
(percent of the population below the poverty line)

- <= 15
- 15 - 30
- 30 - 40
- 40 - 60
- > 60
- No data

OTHER FEATURES

- District boundaries
- Subcounty boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and poverty rate (UBOS and ILRI, 2008).

| **Map 5** | **POVERTY DENSITY BY RURAL SUBCOUNTY: NUMBER OF PEOPLE BELOW THE POVERTY LINE PER SQUARE KILOMETER, 2005** |

POVERTY DENSITY
(number of poor people per sq. km)

- <= 20
- 20 - 50
- 50 - 100
- 100 - 200
- > 200
- No data

OTHER FEATURES

- District boundaries
- Subcounty boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and poverty density (UBOS and ILRI, 2008).

Box 4   2005 UGANDA POVERTY MAPS: INDICATORS

Human well-being has many dimensions. Sufficient income to obtain adequate food and shelter is certainly important, but other dimensions of well-being are crucial as well. These include good health, security, social acceptance, access to opportunities, and freedom of choice. Poverty is defined as the lack of these dimensions of well-being (MA, 2005).

The poverty indicators produced by the Uganda Bureau of Statistics (UBOS) are based on household consumption and cover some but not all dimensions of poverty. Consumption expenditures include both food and a range of non-food items such as education, transport, health, and rent. Households are defined as poor when their total expenditures fall below Uganda's rural or urban national poverty lines. These lines equate to a basket of goods and services that meets basic monthly requirements (UBOS and ILRI, 2007).

In 2005, the national poverty line (an average of the poverty lines in Uganda's four regions) was 20,789 Uganda Shillings (US$ 12) per adult equivalent per month in rural areas, and 22,175 Uganda Shillings (US$ 13) per month in urban settings. With these poverty lines, the 2005 poverty rate (percentage of the population below the poverty line) was 31.1 percent at the national level, translating to about 8.4 million Ugandans in poverty (UBOS, 2006b). Rural and urban poverty rates differed significantly, at 34.2 percent for rural areas and 13.7 percent for urban areas.

The poverty maps shown in this report are based on the 2005/06 Uganda National Household Survey (UBOS, 2006b). They rely on a statistical estimation technique (small area estimation) that combines information from the 2002 population and housing census and the 2005/06 household survey. This analysis allows a high level of spatial resolution, providing data for all rural subcounties except those in Kotido, Kaabong, and Abim Districts (UBOS and ILRI, 2008).

Box 5   MAPPING POVERTY: THE RELATIONSHIP BETWEEN POVERTY RATE, POVERTY DENSITY, AND THE NUMBER OF POOR

Understanding the complementarity between poverty rate and poverty density is important for designing and implementing pro-poor interventions. Using either poverty rate or poverty density alone may be ineffective, either missing many poor people or wasting resources on families that are not poor. For example, targeting only subcounties with the highest poverty rates will not reach the vast majority of Uganda's poor. In densely settled areas, the proportion of the poor relative to the non-poor may be low, but these areas contain large numbers of poor people. Relying exclusively on poverty rates for targeting would lead to "under-coverage" of the poor in these areas. On the other hand, providing resources only to areas with the highest poverty densities will bypass the poor in drier and less densely settled areas.

The total number of the poor in a given area is also an important metric. Poverty rate and poverty density measures alone are not sufficient to identify the most promising subcounties for pro-poor targeting. Subcounties may have high poverty rates or high poverty densities but still differ in their total count of poor persons. Two subcounties, for example, could each have a poverty density of 50 poor persons per square kilometer, but only 5,000 poor persons may be living in the 100 square kilometers of the first subcounty versus 50,000 poor persons inhabiting the 1,000 square kilometers of the second subcounty. Examining the total number of poor people per subcounty is necessary because Uganda's subcounties differ greatly in population size (ranging from as few as 2,500 to more than 200,000 inhabitants) and in area.

In this publication, poverty rate and poverty density were selected to portray the geographic distribution of the poor. While there are other useful poverty indicators, these were chosen as a first approximation to show how poor each subcounty is, and where poor households are spatially concentrated. With this information, decision-makers can gain first insights in order to develop more effective support and services for the poor. In most cases, additional analyses using metrics that capture the depth and severity of poverty (e.g., poverty gap and squared poverty gap) and other dimensions of well-being will be needed to better understand poverty patterns, and different types of analyses are needed to examine cause-and-effect relationships.