

Introduction

Uganda's diverse agroclimatic and soil conditions support various agricultural activities, but livestock are an essential part of agricultural systems in most parts of the country. About 71 percent of all households in Uganda owned livestock in 2008 (MAAIF and UBOS, to be published).

Agriculture plays a key role in Uganda's economic development. For the majority of Ugandans, the agricultural sector (including crops, livestock, and fisheries) is the main source for livelihoods, employment, and food security. The sector provided 73.3 percent of employment in 2005/06, and most industries and services in the country are dependent on it (UBOS, 2009). Despite its significance, growth in agricultural output has declined from 7.9 percent in 2000/01 to 2.6 percent in 2007/08 (UBOS, 2009; NPA, 2010) with almost no growth in output in 2005/06 and 2006/07. A combination of factors including drought, instability, pest outbreaks, and productivity and price declines for selected crops and commodities contributed to the decline (NPA, 2010). Combined with faster growth in the services and industrial sectors, it has reduced agriculture's share of Uganda's gross domestic product (GDP). Agriculture's contribution to GDP fell from 20.6 in 2004 to 15.6 percent in 2008, measured in constant 2002 prices (UBOS, 2009).

Smallholder production dominates the agricultural sector with the exception of tea and sugar, which are primarily large-scale commercial efforts (Matthews et al., 2007). About 68 percent of Ugandan households depend on subsistence farming for their livelihood (UBOS, 2007), with the majority located in rural areas. Most subsistence farmers are involved in a combination of agricultural activities—growing crops and raising various poultry and livestock—but also rely on other means for their livelihood, such as remittances and wage labor.

While growth rates in total agricultural output have declined, livestock trends are up considerably. According to the Uganda Bureau of Statistics, there were an estimated 11.4 million cattle in Uganda in 2008, up from 5.5 million in 2002 (UBOS, 2009).¹ Milk production in 2008 reached 1,458 million liters, up from 1,320 million liters in 2005 (UBOS, 2009). Beef and milk production both increased

by 8 percent during 2008. The total number of sheep and goats more than doubled between 2002 and 2008, and the number of pigs and chickens grew by 88 and 59 percent, respectively (MAAIF and UBOS, to be published). Strong domestic and regional demand for livestock products contributed to this growth. In 2008, Ugandans raised 12.5 million goats, 3.4 million sheep, 3.2 million pigs, and 37.4 million poultry (MAAIF and UBOS, to be published).

Smallholders and pastoralists dominate the livestock sector. Farming households with mixed crop and livestock production, and pastoralists together own 90 percent of Uganda's cattle and almost all of the country's poultry, pigs, sheep, and goats (Turner, 2005). Livestock production in Uganda contributed 1.6 percent to total GDP in 2008 (measured in constant 2002 prices), down from 1.8 percent in 2004 (UBOS, 2009).

Livestock play multiple roles and provide many valuable services and products for rural households (LID, 1999), many of them not captured in standard household surveys and national accounts. A detailed livelihoods study in three districts of Uganda shows that while income from livestock provides only one of many sources of income for rural households, people typically rank livestock as their second or third most important means of livelihood (Ashley and Nanyeeena, 2002). The same study found that livestock are valued by the majority of poor livestock-keepers in Uganda for the multiple contributions they make to livelihoods, including enabling saving, providing security, accumulating assets, financing planned expenditures, providing livestock products (e.g., meat, milk, eggs, manure, draft power), and maintaining social capital (reflected, for example, by the number of social contacts who can be expected to provide support and resources in case of an emergency).

Livestock production has drawbacks: the animals can degrade the environment when not managed in a sustainable manner, they harbor disease agents that transmit illnesses between cattle and humans (for example, trypanosomes in cattle and highly pathogenic avian influenza viruses in poultry), and animal-source foods can contribute to health risks. However, when compared to the much larger benefits of livestock-keeping to livelihoods and human well-being for poverty reduction, these risks are relatively small and can be mitigated, especially when applied in less intensive subsistence farming systems (Randolph et

1. See Box 3 on the limitations of the 2002 livestock data and the compatibility of national livestock estimates between 2002 and 2008.

al., 2007; Perry and Grace, 2009). Managing the negative environmental impacts of intensive livestock production systems, however, requires a more concerted effort which includes a careful examination of intensive production schemes, better management of inputs, elimination of perverse subsidies, and full accounting of off-farm externalities.

Uganda's policymakers have acknowledged the importance of livestock to household incomes, the achievement of national food security and the Millennium Development Goals, as well as employment creation and poverty reduction (MFPED, 2004). The 2000 Plan for the Modernisation of Agriculture (PMA) has 'poverty eradication' as its overarching goal (MAAIF and MFPED, 2000). The focus of the PMA is the reorientation of farmers toward commercial agriculture. It does not lay out a livestock sector development strategy per se, but mentions increased productivity through improved breeds and feeding strategies.

The government is currently outlining priorities for the agricultural sector to support the new National Development Plan covering 2010/11 to 2014/15 (NPA, 2010). Under that plan, Uganda's national livestock sector is expected to follow and expand upon the priorities established under the PMA. Stakeholders contributing to the drafting of the plan have identified increasing farmers' income as a key objective for the agricultural sector. To achieve this, government would provide targeted support for six agricultural commodities in specific production zones, in addition to strengthening agricultural advisory services and research. For the livestock sector, the government intends to boost meat and dairy production, and preliminary plans are proposing increased investments in improved breeds, water infrastructure for livestock, and better management of rangeland and forage resources (NPA, 2010). Ensuring that these investments reach smallholders and disadvantaged high-poverty locations will require more evidence-based planning supported by data, maps, and analyses.

Why Mapping Matters

A primary challenge for government agencies working on livestock and poverty issues is that planning and implementing effective interventions requires coordination among multiple actors and across many sectors within and outside government. It involves reconciling a multiplicity of plans and policies introduced to deal with poverty reduction, agricultural modernization, rural development, land use, and other issues.

Maps—and the geographic information systems (GIS) that underlie them—are powerful tools for integrating data from various sources and therefore can be the vehicle necessary to overcome these coordination challenges. Maps showing poverty, livestock distribution, animal diseases, extension services, markets, and other indicators can provide decision-makers with a more coherent picture of how these

indicators are related, leading to more effective plans and interventions. Better and more detailed spatial analyses of these indicators can be used to examine whether current policies and interventions are targeting the crucial issues and localities. Maps can also be an effective vehicle for communicating to experts across sectors. In addition to informing various government actors, access to improved spatial information can help empower the public to query government priorities, advocate for alternative interventions, and exert pressure for better decision-making. Of course, spatial analysis of the type used here, though powerful, does have limitations. For one, the ability to show spatial relationships between livestock management and poverty depends greatly on the availability of high-resolution georeferenced data. Even when the required data are available, the complexities of the poverty-livestock relationship often make interpretation of map analyses and their application to policy challenging. Nonetheless, map analyses offer a unique window on how physical, social, ecological, and economic factors interact to determine the livelihood options available to rural Ugandans.

RATIONALE AND APPROACH

Today, decision-makers have access to a growing body of information about Uganda's livestock sector. For example, a study of how the sector can best contribute to the overall goal of poverty reduction in Uganda drew on field data collected from the districts of Mubende, Mbale, and Kamuli (Ashley and Nanyeenya, 2002), and an analysis of the Uganda dairy sector looked at trends in dairy development and associated factors (Staal and Kaguongo, 2003). However, knowledge about the intricate interrelationships between livestock and poverty is still limited. Two factors, among others, have contributed to the knowledge gap: (1) Household surveys undertaken to date in Uganda have not broken down household income into its various components so that an explicit link can be made between welfare and the role of livestock at the household level; (2) Subnational poverty and livestock data for small administrative areas have not been available until recently (see Boxes 3 and 4). In addition, analytical approaches to integrate relevant spatial datasets are lacking.

Mapping a Better Future, the outcome of a partnership of Ugandan and international organizations, helps address these barriers by comparing the latest 2005 poverty maps with maps of livestock data from the 2002 population and housing census, and the 2008 national livestock census. By providing illustrative examples of maps that can be developed with these indicators and analyses of what they mean for policy, this report demonstrates how information on the location and severity of poverty can assist livestock sector decision-makers in setting priorities for interventions. Similarly, decision-makers concerned with reducing poverty levels will see how comparing levels of poverty in a given location with maps of livestock indicators can inform efforts to fight poverty.

This report aims at motivating analysts and planners to develop their own maps (for example by using livestock data from the 2008 national livestock census), to fill remaining analytical gaps with new information, and to align livestock sector development and poverty reduction strategies. By integrating more detailed information on livestock distribution, animal husbandry and veterinary service provision, disease incidence, and poverty, planners can more effectively design and target livestock management interventions and policies so that the benefits reach a greater proportion of poor communities and the costs associated with land-use changes or new restrictions on livestock use do not disproportionately affect the poor.

Livestock present both opportunities and challenges for poor households as they try different strategies to improve their well-being. *Mapping a Better Future* highlights two examples where maps and spatial analyses are being used by various agencies and government planners to target livestock sector investments (e.g., milk cooling plants) and interventions (e.g., disease vector control programs):

- **Creating new market opportunities for poor dairy farmers and others involved in the dairy marketing chain, such as traders and processors.**
- **Assessing the impact of trypanosomiasis: a serious and widespread disease that transmits between humans and cattle (called nagana in cattle and sleeping sickness in people).**

Differentiating subcounties by their poverty and livestock profiles is a first step to formulate questions and hypotheses to better integrate livestock (or other environmental parameters) and development objectives into planning. However, this publication is not intended to explain causal relationships between poverty and specific livestock uses. For that, other factors would need to be examined that reflect different poverty dimensions and measure poverty not just at the subcounty level but also at other scales such as parish, village, and household levels. Rather, this publication is meant to trigger questions about livestock-poverty linkages by identifying the spatial relationships between them. The answers to these questions can then help inform and improve poverty and livestock management interventions.

AUDIENCE

The maps, analytical examples, and ideas for future analyses are intended to be of value to a variety of audiences for the following purposes:

- **Ministry of Agriculture, Animal Industry and Fisheries:** to highlight the widespread and important role livestock play in the livelihoods of the poor, and help better target their efforts to improve lives through livestock-related research and development efforts, and disease control policies and plans.

- **National Agricultural Research Organization:** to identify knowledge gaps and research opportunities in the livestock sector, and to strengthen the capacity of researchers to use spatial analysis for policy-relevant livestock research.
- **National Agricultural Advisory Services:** to identify service gaps and opportunities and support efforts and pro-poor investments in the livestock sector.
- **Dairy Development Authority:** to consider the linkages between poverty and dairying and support activities that are of particular benefit to poorer households and ensure the full participation in dairy sector development of more vulnerable groups, including women.
- **Ministry of Finance, Planning and Economic Development and decision-makers at all levels of government:** to change budgeting and planning so that it reflects the importance of livestock in livelihoods and the national economy; to support investments that boost the benefits of livestock such as income diversification, better household nutrition, and enhanced access to livestock assets; and to enhance the capacity of decision-makers to absorb policy research that employs spatial analysis.
- **National Planning Authority and Budget Monitoring and Accountability Unit:** to recognize the important role livestock play in the livelihoods of poor households and to monitor performance in implementing the National Development Plan through improved livelihoods from livestock.
- **Uganda Bureau of Statistics:** to account for the many livelihood roles played by livestock in future data collection.
- **Analysts and planning experts:** to provide decision-makers with more integrated analyses of livestock and poverty indicators.
- **Civil society and nongovernmental organizations:** to improve the capacity of civil society organizations to participate in policy processes and to hold decision-makers accountable for livestock-related efforts to reduce poverty and environmental degradation.

The geographic approach used in this publication will help Uganda's decision-makers "see" the livestock sector in a new light, and visualize ways to ensure the sector's optimal contribution to poverty alleviation. Moreover, better and more detailed spatial analyses of poverty-livestock relationships can then be used to scrutinize existing government priorities and examine whether current policies and programs target crucial issues and localities.

Box 1**USE OF POVERTY MAPS FOR GEOGRAPHIC TARGETING IN EAST AFRICA**

Both Kenya and Uganda have relied on poverty maps to allocate government resources to disadvantaged areas. Planners establishing priorities in Uganda's livestock sector could rely on similar approaches to design more specific geographic targeting or an allocation formula.

In Kenya, the national Water and Sanitation Programme, a 5-year (2005-2009) US\$ 65.5 million effort funded by Danida and Sida, the Danish and Swedish development agencies, used poverty maps to reach the most disadvantaged administrative areas. The Programme selected the poorest 362 of 2,500 Locations (an administrative unit with on average 10,000 people in rural areas). These Loca-

tions were chosen in stakeholder workshops with the help of an index showing the poorest ones with the lowest water and sanitation coverage. Half of the index value was determined by the poverty level in the Location, using data provided by Kenya's Central Bureau of Statistics and based on the country's poverty map. The other half of the index incorporated indicators of safe drinking water access, sanitation coverage, and past investments.

Uganda has relied on poverty maps to determine transfer amounts from central government to local governments in its Agriculture Extension Conditional Grant. Districts with higher poverty levels receive a higher share of the grant. The Min-

istry of Agriculture, Animal Industry and Fisheries has included population (60 percent), land area (20 percent), and poverty level (20 percent) in its formula to direct funds from the national budget to districts. The Agricultural Extension Conditional Grant was established in fiscal year 2007/08, and the total budget allocation for that and the following year has been equivalent to \$US 15 million. Districts are using the funds to expand agricultural extension services that provide training and information to farmers.

Sources: Jorgensen, 2005 and MFPED, 2009

