Unexploited Agricultural Growth:
The Case of Crop–Livestock Production Systems in Zimbabwe
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Abstract
Livestock is the most important source of cash for small-scale farmers in the semi-arid tropics of southern Africa. However, with limited access to markets, farmers do not have the incentive to invest in improved livestock management. Livestock production and off-takes remain low and farmers are unable to realize the full potential of their herds. We believe that improved market access will be the driver to increase technology adoption for income growth and poverty reduction. In Zimbabwe, a recent baseline diagnosis by ICRISAT and partners found that cash income from goats is crucial to cover day-to-day expenditures for food, education and human health. Cattle are more important for draft power and milk, and support subsistence cropping activities. Major production constraints include high mortality rates attributed to dry season feed shortages, particularly affecting farmers with small herds. An increasing demand for livestock products in rural and urban areas offers small-scale farmers opportunities for market participation. However, the existing markets are underdeveloped, with high transaction costs implying low producer prices and poor access to information for farmers. The challenge is to sustain livestock production, develop more effective market facilities, and thereby increase off-take. The potential of market-led technology development in crop–livestock systems has not been sufficiently exploited by research and development. To have an impact on incomes and poverty, we develop an innovative approach that would first evaluate local constraints in production and marketing, and then test alternative livestock markets and management strategies, with a strong linkage between private and public sectors.

Introduction
Crop-livestock production systems have the potential to improve small-scale farmers’ livelihoods and income growth in the semi-arid tropics of southern Africa (Ryan and Spencer, 2001). Livestock production plays an important role as a source of cash income and insurance, especially for poor households in drought-prone areas. Through cash from livestock products farmers alleviate seasonal food availability, thus enhancing their own food security. The market for livestock products offers new opportunities to enhance crop-livestock production in the small-scale sector (Delgado et al., 1999). Also, in Zimbabwe there is a growing demand for livestock products at national and regional markets. Livestock statistics indicate that cattle populations are stagnant, whereas the number of goats is increasing. The supply gap in livestock products has resulted in increased meat prices, and goat meat is now matching beef prices. Farmers who do not own cattle but own goats now have the possibility to participate in markets. The focus in research and development must shift towards these new opportunities. Yet, the potential of commercializing small-scale livestock production is mostly untapped (Hargreaves et al., 2004). The priority of the agricultural sector is on crops, and secondly on commercial cattle production. Small-scale livestock farmers who cannot comply with the standards of export markets are excluded from trade and product development. Goats are largely neglected although most small-scale farmers keep them. Unless better markets for cattle and goats are developed farmers do not derive the appropriate benefits from their animals. Although improved technologies are available, farmers are reluctant to adopt them and productivity in the small-scale sector remains low. Interventions need to address the different roles of cattle and goats within changing crop-livestock systems, and promote crop-livestock integration as an entry point for increased livestock productivity. We hypothesize that improved market access will create the necessary incentive for small-scale farmers to enhance their investments in cattle and goat management, particularly dry-season feeding, thereby achieving higher production and off-take. This paper examines the different roles that cattle and goats play in these production systems and the challenges and opportunities that exist to improve the livelihoods of resource-poor households in semi-arid Zimbabwe. The paper proposes an innovative approach of linking
small-scale farmers to improved livestock markets by facilitating partnerships among stakeholders in cattle and goat production.

Materials and Methods
A baseline diagnosis evaluated local constraints in commercializing small-scale goat and cattle production in Zimbabwe, exploring existing livestock marketing systems and management practices in relation to socio-economic household characteristics and herd dynamics. From May to June 2006, a survey on goat production involved a total of 825 households in six districts in Matabeleland North and South, and a cattle survey investigated a subset of 428 households in three of those districts. After data analysis, in May 2007, draft results were shared at feedback workshops with communities, local authorities and support services to validate the research findings and kick-start a well-informed learning process at the local level. About 50 participants attended the workshops.

Results and Discussion
Cattle and goats fulfill different user functions particularly for resource-poor farmers’ livelihoods in mixed crop-livestock systems (Figure 1). Farmers use cattle primarily for flow products, such as draft power and milk, and supporting subsistence farming. Although cash is important, they may be reluctant to sell their cattle, whereas goats are primarily kept for immediate cash needs and meat, adding income and insurance. Cash from both cattle and goats is primarily spent on food and education, followed by human health and farming inputs. Poor households depend more on cash from goats, especially when they do not have cattle. Keeping and disposing goats is less risky (reproduce faster, more drought resilient). Goats are therefore critically important for food security, directly through meat and milk, and indirectly through cash. Many women own goats and actively participate in decision making. Therefore, targeting goat production can contribute to risk mitigation, improved nutrition, income growth and empowerment of vulnerable groups (poor, women, HIV/AIDS).

The role of cattle and goats and the potential to commercialize is largely determined by ownership patterns. Although cattle are critically important for small-scale farmers, 39% of the goat keepers do not own cattle. Also, the distribution of cattle and goats varies between households, with an average of 9 cattle and 13 goats per household. The majority of households keep small or medium cattle herds and a small number of goats, and few households keep large herds (Figure 2). Most farmers did not have sufficient animals to sustain their livelihoods, and continuously over-utilize their flocks for immediate needs. Few farmers with large herds own more than 60% of the total cattle herd and more than 50% of all goats, and provide the largest volume of animals available for production and sale; the potential to commercialize therefore exists for a small group of farmers. Interventions need to address these two different types of farmers: those without cattle or few cattle and heavy reliance on goats who have a high risk of distress sales, but need support to sustain their herd sizes and ensure production, rather than increasing off-take for sale, as well as those with large herds of cattle and/or goats who need support in improved livestock quality, marketing and increased off-take.

A closer look at the herd dynamics of cattle and goats gives a more realistic picture about the potential for increased production. Farmers often do not realize the benefits of their cattle and goats because of high mortality rates in relation to consumptive outflows (sales and slaughter, Table 1). The herd balance is more negative for goats than for cattle, because of higher mortality rates, as well as higher consumptive outflows. The data also suggest that the reproductive rates of goats are below their potential, thus relatively slow herd recovery. Reducing mortality rates is identified as the most effective strategy to sustain farmers in production, increase productivity and provide more animals for sale and consumption. Efforts to reduce the mortalities of goats are even more crucial because of their strong potential for increased production, and the important role they play for resource-poor farmers. This will benefit particularly the owners of small herds, who are more affected by high mortality rates.

| Table 1. Flock dynamics by major in- and outflow rates of cattle and goats (%) |
|-------------------------------|--------|--------|
| In flows                      | Birth  | 22     | Goats  | 40     |
| Outflows                      | Mortality | 18     | 26     |
|                               | Sold   | 3      | 11     |
|                               | Slaughtered | 1     | 7      |
| Net dynamics                  | 3      | -2     |
In order to reduce mortality rates, farmers need to invest more in improved management technologies, particularly dry-season feeding and animal health. Farmers recognize feed shortages during the dry season, contrary to the assumption that animals could feed on the range alone. More than 90% of the farmers invest in low-cost dry-season feed technologies for cattle and goats (crop residue collection, key resource utilization, home mixes), but could not necessarily supply sufficient feed quality. Farmers expressed their readiness to increase investments in feeding, provided that knowledge and technology were made available and benefits were demonstrated to them. Similarly farmers invest in animal health care, but in most cases rely on natural methods or utilize residual cattle inputs for goats as they have neither the appropriate knowledge nor the commercial inputs. The survey clearly shows that lack of access to information, inputs and technologies restricts goat production more than cattle production. Strong support for service delivery and cost-effective infrastructure to the small-scale livestock sector is required, so that farmers can make optimal use of their livestock assets.

Although farmers see the need to enhance investments in management and try to market animals, they rarely obtain the full benefits. Most farmers do not sell for commercial purposes, but because they have immediate cash needs. 44% of the farmers participate in goat markets, and sell on average 3.6 goats (std. dev. 4.9) per year, while only 21% of the farmers sell cattle, and on average only 1.5 cattle (std. dev. 1.7). Poor households are also engaging in goat markets, and although individually they sell few goats, when considered as a group, they contribute significantly to the total volume of goats sold (28%). Farmers show a response to market development by selling more goats in districts with better access to markets and where traders buy goats in bulk; for cattle no such difference is found. In turn, traders buy more goats in areas with better market facilities, and this sustains the argument that they could play an important role in facilitating higher offtakes and improved market strategies. Yet, farmers do not show a response by higher investments in management technologies in areas with better-developed markets, indicating that a commercial mindset has not yet developed. Poor market conditions hamper the potential to enhance goat and cattle production. Most farmers rely on informal farm gate sales for their goats, and only in few areas farmers have access to organized sales, parallel to the formal Rural District Councils (RDC) or at local collection points with local authorities acting as market intermediaries. For cattle formal RDC sale pens and alternative market options exist. Although market information is critical, more than 30% of the farmers have no information on cattle and goat markets, and those who have access to information mainly depend on other farmers, traders/buyers or local authorities. Lack of appropriate handling facilities, grading and weighing systems, and price setting control, results in low prices to farmers. High transaction costs (collection, transport, bureaucracy) restrict buyers/traders from venturing into the livestock business, resulting in little competition and low flows of livestock products to urban areas, for goats worse than for cattle. Farmers agreed at feedback meetings that if improved, markets would increase investment in improved management.

**Conclusion**

Pro-poor development portfolios need to underscore the importance of livestock in the SAT of Zimbabwe and acknowledge the different roles that cattle and goats play in crop livestock production systems. The first priority is to ensure survival of existing livestock and the second is to enhance quality to meet market requirements. Market development is necessary to provide farmers with the right incentive to adopt improved management technologies and ensure that farmers realize the returns from their investments.

To achieve this an innovative approach that brings all stakeholders together is needed. Such a forum is established to evaluate specific local constraints in production and marketing and derive options for further development, then to test and evaluate more effective market systems (facilities, organization, institutions), and within that process select most appropriate technologies (feeding, animal health care) and input delivery systems. This sets technology development and adoption into context, creating ownership among key players, and allowing research to be targeted to farmers’ specific needs. It engages policy makers and catalyzes better understanding for policy improvements.

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