



**SMALLHOLDER  
DAIRY PROJECT**

[www.smallholderdairy.org](http://www.smallholderdairy.org)

# SDP Policy Brief 7



## Multiple benefits of smallholder dairy production

### Key points

- In many smallholder livestock systems of the developing world, cattle perform important non-market roles in addition to their more obvious market functions.
- In western Kenya, for example, studies of dairy households have revealed that considerable economic benefit is gained from use of cows for manure and draught, as insurance, and as a financial and social asset.
- Such non-market functions play a crucial role in the competitiveness and efficiency of livestock smallholder systems.
- However, households in such systems often suffer from shortage of cash and lack of market access.
- Recognition of the importance of the role played by non-market attributes of livestock can help policymakers to understand better the role of livestock to rural people, and implement interventions appropriate to supporting that role for economic development



### Introduction

To the smallholder dairy farmer a cow is far more than a simple economic asset whose value is reckoned in terms of the milk it produces. The cow will also be valued for a wide range of additional attributes: it will provide manure for the farm, act as a form of insurance against unforeseen contingencies, or be viewed as a capital asset to finance periodic expenditure (table 1). Such non-market functions take on particular significance in economies where financial market may not operate efficiently, or when poverty prevents access to more formal markets.

These non-market benefits are of immense perceived value in farming communities, yet they are often given insufficient attention in studies of smallholder livestock production systems and in livestock policies. Although they may be recognized qualitatively, the difficulty of quantifying non-market benefits means they rarely appear in livestock production benefit-cost estimates. This brief describes how quantification of these benefits can deepen our understanding of the way that livestock production systems work, thereby helping to improve the accuracy of development interventions.

### Assessing the value of cattle in smallholder dairy systems

How important are non-market benefits to the competitiveness and survival of smallholder dairy systems? In order to answer this question a study was undertaken in two districts of western Kenya in 2002 (box 1).<sup>3</sup> Data were collected from 250 farmers in extensive, semi-intensive and intensive systems. The value of non-market benefits was found to vary with household, production system and market access factors. Table 2 and figure 1 show how market and non-market benefits vary with production system.

Non-market benefits were found to increase as production became more extensive and less market-oriented. For instance, in the extensive system 77 percent of the benefits realized are non-cash compared to 52 percent and 45 percent for the semi-intensive and intensive systems respectively. The high non-cash contribution results from the predominant use of cattle for draught power in the extensive system and the use of manure in the intensive and semi-intensive systems. The socioeconomic benefits from cattle account for 21 percent, 17 percent and 16 percent of total annual income from cattle in extensive, semi-intensive and intensive systems respectively.

**Table 1. Classification of the multiple roles of cattle**

<b>Market roles</b>	Recurrent cash income	Sale of milk Sale of meat
	Annual income	Sale of animals
<b>Non-market roles</b>	Recurrent income in kind (production that is consumed, exchanged or invested)	Manure for crops in mixed crop-livestock systems: In Kenya, it has been found that the value added to crop production by use of manure produced on a small dairy farm may be approximately 30 percent of the value of the milk produced <sup>1</sup>  Draught power  Consumption of milk by household  Calves born
	Socioeconomic benefits	Insurance against contingencies: The monthly premium of cash-based insurance systems is, in effect, embodied in the value of the herd, part of which can be converted to a cash payout if unforeseen expenses arise Financing periodic expenditures: Cattle can act as living savings to finance planned, expected needs, such as school fees Acting as security assets, aiding access to informal credit and loans: Formal credit is difficult for small-scale producers to obtain and is relatively expensive; the fixed component of each transaction will be relatively large for small borrowers <sup>2</sup> Social value: Cattle are often a means of demonstrating wealth and cementing relationships through, for example, bride price payments

## Non-market benefits: Help or hindrance?

The high proportion of non-market income in these farming systems has both its advantages and disadvantages.

### Advantages

**Stability.** The high non-cash contributions in smallholder systems can help maintain stability in the face of market fluctuations that may prove problematic for larger commercial livestock producers, who depend more heavily on cash returns.

**Competitiveness and efficiency.** Using profitability as an indicator of these characteristics, the study found that all three systems generated above-normal profits<sup>5</sup> when both market and non-market benefits were considered. However, when only cash benefits were taken into consideration the extensive system yielded negative returns and, on this basis, would be deemed unprofitable and uncompetitive. Thus non-market benefits play a crucial role to the survival of these systems. Further, the non-market benefits explain why farmers justifiably keep raising cattle in these areas, even when standard economic assessment may conclude that it is not rational to do so.

### Disadvantages

**Lack of market orientation.** The high proportion of non-market benefit may be a consequence of poor market access, and thus they are a strategy to stabilise income. However, these benefits cannot be converted into cash, and farmers may remain cash-constrained due to lack of market orientation.

**Conflicting priorities.** Emphasis on the non-market attributes of cattle may hinder economic advancement. Another study in western Kenya (box 2) found that farmers in areas where cattle were valued for cultural reasons (for example slaughtering bulls for funerals) placed a relatively low value on the milk yield attribute.<sup>6</sup>

**Increased risk.** The use of cattle as an insurance or a source of finance is associated with additional risks, such as theft or death from disease.

**Box 1.**
**Smallholder dairy study in western Kenya:  
Data sources and methods**

Survey data were collected by questionnaire using a sample of 250 smallholder cattle-keeping households in Kisii and Rachuonyo Districts of western Kenya in 2002. Some secondary data were also used. Extensive, semi-intensive and intensive systems of cattle keeping were defined according to the amount and type of productive factors used in relation to agroclimate.<sup>4</sup> The objective was to estimate the value of the non-market, socioeconomic contribution of cattle and determine its contribution to the competitiveness and survival of smallholder cattle systems, from an agricultural development perspective. Three analytical methods were used in the study: the contingent valuation method, the Tobit model and complete budget analysis for the cattle enterprise. The systems studied were:

**Intensive system:** Crops and livestock closely integrated on small landholdings. Cattle stall-fed on crop residues and manure from livestock used to fertilize agricultural plots. High input per unit of land, including manufactured feeds (especially at milking).

**Semi-intensive system:** Lower human population density than intensive system. Dairy animals rely mainly on grazing, which is usually supplemented with cultivated fodder in a cut-and-carry system of feeding. More use of local zebus rather than improved dairy cattle.

**Extensive system:** Low input per unit of land; mainly local zebus grazing natural pasture. Landholdings relatively large. Use of cattle for draught power important.

**Box 2.**
**Study of cattle attributes in western Kenya**

What effect does the value placed on certain cattle attributes have on the adoption of dairy technologies (improved breeds, feeding, and disease control)? In order to shed light on this question a study was undertaken in western Kenya using data from a sample of 1575 households. Respondents were asked to rank the following attributes of cattle: disease resistance, feed requirement, milk yield, and price. The study assessed the marginal willingness to pay for cattle with particular attributes. Households in areas that valued cattle for cultural practices attached low value to milk yield and were willing to accept less than other societies to give up a dairy cow with good milk yield.

Households located in areas with good economic potential for dairy placed high value on disease resistance and low feed requirement, and were willing to trade off a greater-than-average proportion of milk yield to obtain cattle with such attributes. Information on feed resources and diseases would lower these trade-offs, leading to the use of dairy technologies that increase milk yield. There is an opportunity for the government to take the lead here to build up the sector and increase the demand for such services, increasing the potential for private sector involvement.

**Table 2. Average annual household income by production system (US\$)**

Income categories	Production systems					
	Intensive (n = 12) Ave. herd size: 3.7		Semi-intensive (n = 111) Ave. herd size: 3.0		Extensive (n = 132) Ave. herd size: 5.6	
	Annual income	% of total income	Annual income	% of total income	Annual income	% of total income
<i>Market benefits</i>						
Net recurrent cash income	234.9	34.3	190.4	32.0	7.3	10.0
Annual income from sale of animals	137.8	20.1	97.9	16.4	75.3	13.2
<i>Non-market benefits</i>						
Recurrent income in kind	205.0	29.9	205.5	34.5	316.3	55.4
Non-market socioeconomic benefit	107.4	15.7	101.9	17.1	121.7	21.3
<i>Total net annual income</i>	685.1	100.0	595.7	100.0	570.6	100.0
Value of assets		737.5		544.5		610.4
Return on assets		92.9%		109.0%		93.5%



[www.smallholderdairy.org](http://www.smallholderdairy.org)

The Smallholder Dairy Project (SDP) carries out research and development activities to support sustainable improvements to the livelihoods of poor Kenyans through their participation in the dairy sub-sector. SDP is jointly implemented by the Ministry of Livestock and Fisheries Development, the Kenya Agricultural Research Institute, and the International Livestock Research Institute, and is funded by DFID.

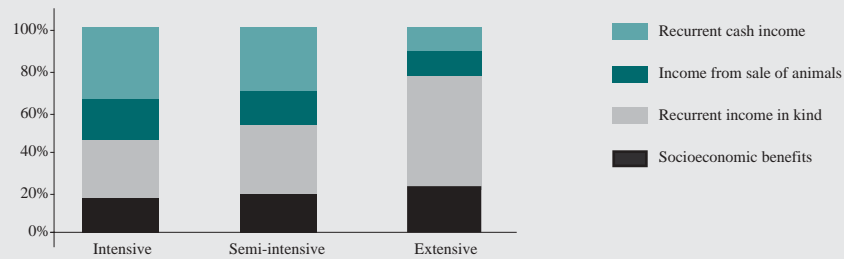
#### CONTACTS:

SDP Project Manager  
MoLFD  
P.O. Box 30028 Nairobi  
Tel: +254 (20) 2722601  
[sdp-ma@africaonline.co.ke](mailto:sdp-ma@africaonline.co.ke)

SDP Assistant Project Manager  
KARI Headquarters  
P.O. Box 57811-00200 Nairobi  
Tel: +254 (20) 583301/20  
[DMMwangi@kari.org](mailto:DMMwangi@kari.org)

SDP Field Manager  
ILRI  
P.O. Box 30709  
Nairobi 00100  
Tel: +254 (20) 4223000  
[s.staal@cgiar.org](mailto:s.staal@cgiar.org)

Figure 1. Market and non-market benefits of cattle (%) by production system



## Policy implications

### Seeing the full picture

The capture of non-market benefits of cattle is crucial to the survival and competitiveness of smallholder cattle production systems. They play a significant role in meeting household needs, especially for resource-poor farmers and women. Policy formulation must take full account of this feature if appropriate interventions are to be developed.

### The national context

The livestock sector is important to the Kenyan economy, contributing 10 percent of gross domestic product.<sup>7</sup> An increased understanding of the way in which the livestock sector functions - including consideration of non-market elements - would therefore help devise policies to further enhance the vital contribution of livestock to Kenya's economy.

### Mobilizing local resources

Given the regional variations in perceptions of the value and attributes of cattle, policy interventions should, where possible, mobilize local resources to exploit the opportunities for increased dairy output and livestock offtake. Such interventions might include:

- Use of extension agents to promote crop-livestock interaction projects in order to utilize available labour and feed resources.
- Formation of farmer groups to help combat risk aversion through improved information flow and mutual support.
- Support for women's groups, taking account of the fact that women are most involved in household decision making.



<sup>1</sup> Lekasi, J.K., Tanner, J.C., Kimani, S.K. and Harris, P.J. 1998. *Manure Management in the Kenya Highlands: Practices and Potential*. The Henry Doubleday Research Association.

<sup>2</sup> Moll, H.A.J., Staal, S.J. and Ibrahim, M.N.M. 2001. *From Meat to Milk: Smallholders' Livelihoods and Markets*. Paper Presented at 12th Symposium of Tropical Animal Health and Production: Dairy Development in the Tropics. University of Utrecht.

<sup>3</sup> Ouma, E.A., Obare, G.A. and Staal, S.J. 2002. *The Socioeconomic Dimensions of Smallholder Livestock Management in Kenya and Its Effects on Competitiveness of Crop-Livestock Systems*. Uganda Journal of Agricultural Sciences (9) pp 31-37: Conference Proceedings.

<sup>4</sup> McIntire, J., Bourzat, D. and Pingali, P. 1992. *Crop-Livestock Interaction in Sub-Saharan Africa*. First edition. International Bank for Reconstruction and Development, World Bank.

<sup>5</sup> Normal profits are realized when the enterprise generates exactly enough income to cover all costs, including the opportunity costs of labour, land and capital. Profits above this are regarded as above normal profits.

<sup>6</sup> Makokha, S.N.. *An Analysis of Factors Influencing Dairy Rearing in Western Kenya*. PhD Thesis, Dept of Agricultural Economics, UI of Nairobi, 2004.

<sup>7</sup> Omore, A., Muriuki, H., Kenyanjui, M., Owango, M. and Staal, S.J. 1999. *The Kenya Dairy Sub-Sector: A Rapid Appraisal*. MOA/KARI/ILRI.

This publication is an output from a project funded by the Department for International Development (DFID) of the United Kingdom for the benefit of developing countries. However, the views expressed here are not necessarily those of DFID.