



Tropentag, September 18 - 20, 2019 in Kassel, Germany.

"Filling gaps and removing traps for sustainable resources development"

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## **Socio-Economic Contribution of Indigenous Goats to Smallholders' Livelihoods in Crop-Livestock Production System in Malawi**

Wilson Kaumbata<sup>1</sup>, Liveness Banda<sup>1</sup>, Gábor Mészáros<sup>2</sup>, Timothy Gondwe<sup>1</sup>, M. Jennifer Woodward-Greene<sup>3</sup>, Benjamin Rosen<sup>3</sup>, Curtis Van Tassell<sup>3</sup>, Johann Sölkner<sup>2</sup>, Maria Wurzinger<sup>2</sup>

<sup>1</sup>Lilongwe University of Agriculture and Natural Resources, Animal Science, Malawi

<sup>2</sup>University of Natural Resources and Life Sciences, Vienna (BOKU), Dept. of Sustainable Agricultural Systems, Austria

<sup>3</sup>United States Department of Agriculture/Agricultural Research Service (USDA/ARS), United States

### **Abstract**

Indigenous goats are important in resource-poor communities because they provide tangible benefits such as cash revenue from animal sales, meat for home consumption, manure, skins, and fiber. They are also a source of intangible benefits, e.g. savings, insurance, and for socio-cultural purposes. Despite the valuable contributions of goats to the livelihoods of millions of resource-poor farmers in developing countries, goats have been overlooked in national agriculture development strategies and prejudice towards other livestock species like cattle still exist. This study was conducted to determine socio-economic contributions of indigenous goats to smallholders in low input crop-livestock production system where community-based goat breeding programs (goat CBBPs) are being implemented. The aim was to provide government and other development agencies with the information which can form the basis for policy, technical and financial support for the goat CBBPs. Data was collected through a 12-month flock and household (137 households) monitoring study between August 2017 to July 2018. Data collected was analyzed using enterprise budgeting and cost-return analysis. The results showed that indigenous goat enterprises in smallholder farms are profitable and economically viable. The mean annual gross margins per flock and per goat was MK83,800 and MK14,600, respectively (€1=MK830.00). The average return on capital invested was 24.6%, exceeding the prevailing average commercial deposit rate (8%) by several folds. Goats accounted for 61.2% of the total livestock household income representing the biggest contributor, while cattle, pigs and chickens contributed 17.6%, 15.5% and 4.1%, respectively. Sale of live goats constituted the major (79.2%) proportion of the total offtake rate, suggesting that goats are primarily kept for generation of cash revenues. Inclusion of intangible benefits of goats significantly increased the mean annual gross margins and the return on capital by 60.3%, reflecting the importance of socio-economic roles goats play in providing current and future economic stability to rural households' economy. Hence, programs like goat CBBPs are meant to harness the potentials of indigenous goats to optimize their contributions towards reduction of rural poverty and hunger. Therefore, financing and supporting scaling up of such programs is a meaningful direct investment into the development of rural economy.

**Keywords:** Breeding program, community-based, gross margins, rural poverty, tangible and intangible benefits

Corresponding author email: wilk18@yahoo.com

## **Introduction**

In Malawi, indigenous goats rank first among ruminants in terms of numbers and utilization (Maganga et al., 2015) and provide socio-economic, cultural and religious benefits. They are mostly kept by rural households for ready cash to meet immediate needs such as purchasing staple food, acquiring agricultural inputs, paying school fees, and even for building stock of other livestock species. Despite their valuable contributions to livelihoods of farmers, goats have been overlooked in national agriculture development strategies (Miller et al., 2012; Mayberry et al., 2018). Few studies have addressed the technical and infrastructural issues pertaining to sustainable genetic improvement programs for goats in smallholder low-input production systems (Kosgey and Okeyo, 2007). However, community-based breeding programs (CBBPs) have recently emerged as a viable option to implement breeding programs for indigenous small ruminants in low-input systems (Gutu et al., 2015; Mueller et al., 2015; Haile et al., 2018). But successful establishment and sustainability of CBBPs in rural communities require collaborative technical and financial support from stakeholders in small ruminant subsector. The support from development partners and the political will expressed by governments to support CBBPs is a prerequisite for ensuring that the program will be sustainable for longer than the duration of an externally funded project (Mueller et al., 2015). Harmonization of goat CBBPs with government development priorities and plans is important as these create enabling technical and policy environment for sustainability and possible scaling up. This study was conducted to determine socio-economic contributions of indigenous goats in low input smallholder production systems where goats CBBPs are being implemented to provide government and other development agencies with the information which can form the basis for policy, technical and financial support for the goat CBBPs.

## **Materials and methods**

A 12-month household and flock monitoring study were conducted in three CBBP study areas between August 2017 and July 2018. A total of 137 goat keeping households were randomly selected from the study areas (Zombwe-42, Mitundu-46 and Magote-49). Data was collected every four weeks using a semi-structured questionnaire and included: number and type of livestock kept, sold, slaughtered and given away, average livestock prices, costs incurred for different livestock enterprises and goat flock dynamics. Intangible benefits of goats (IBGs) which included benefit of financing and insurance were calculated. Benefit of financing was estimated by multiplying the monetary value of number of goats sold, slaughtered and given away by local interest rates from village banks (Village Savings and Credit Schemes). Benefit of insurance was estimated by multiplying the monetary value of the whole household goat flock by the prevailing insurance factor (Ayalew, 2000; Bosman, 1995; Moll, 2005). Gross margins (GM), net profit (NP) and return on capital (RC) were used as indicators of economic success for the goat enterprises and were calculated as follows:  $GM = GR - VC$ ;  $GMI = GRI - VC$ ;  $NP = GR - (VC + AHC + OCC)$ ;  $NPI = GRI - (VC + AHC + OCC)$  and  $RC = NP/X$ ; where  $GR$ =gross revenue,  $VC$ =total variable costs,  $GMI$ =gross margins with intangible benefits,  $GRI$ = gross revenue with intangible benefits,  $AHC$ =annual housing costs,  $OCC$ =opportunity cost of capital,  $NPI$ =net profit with intangible benefits and  $X$ =capital (the monetary value of whole household goat flock).  $OCC$  was estimated by multiplying the average commercial deposit rate by capital.

## Results and discussion

Besides goats, local chickens were the most prevalent livestock specie followed by pigs and cattle. The average tropical livestock units (TLUs) owned per household was 5.3 and goats accounted for the highest proportion (43.0%), followed by cattle (31.5%) and pigs (16.2%), signifying that goats are an important livestock specie among rural communities. The overall mean goat flock size was 13 with the highest mean (20) observed in Magote while Zombwe and Mitundu reported the means of 13 and 6, respectively. Births and transfers-in (goats purchased for stock replacement) were the major routes for stock inflows. Sales of live goats constituted the highest percentage (55.0%) of the total stock outflow (sales, slaughters, transfers-out, losses and deaths) and 79.2% of the total offtake rate (proportion of animals sold, slaughtered and given away per household per year), suggesting that goats are primarily kept for generation of cash revenues.

On average a household sold seven goats per year, five goats in the dry season and two goats during the rainy season. The mean price per goat was MK18,000 (€1=MK830.00), with the highest average price (MK19,800) observed in Zombwe and lowest price (MK15,800) in Magote. The prices did not significantly differ ( $p<0.05$ ) in different seasons. The average gross margins per flock and per goat was MK83,800 and MK14,600, respectively; with highest GM per flock (MK110,900) observed in Zombwe, likely due to the high observed prices and lowest GM (MK42,500) was observed in Mitundu

**Table 1:** Goat revenues, gross margins, net profit and return on capital per flock for tangible and intangible benefits of goats in CBBP study areas. (€1 = MK830.00)

Parameter	Sites			Overall
	Zombwe	Mitundu	Magote	
Average capital (MK) <sup>1</sup>	246,846	99,202	305,431	229,681
Tangible benefits of goats (MK)	127,504	48,494	122,504	99,501
Intangible benefit of goats (MK)	34,228	13,647	47,870	31,915
Total variable costs (MK)	17,638	6,014	23,512	15,722
Annual housing cost (MK)	12,000	12,000	12,000	12,000
Interest on capital (8%) <sup>2</sup>	19,748	7,936	24,435	18,374
Gross margins (per flock) (MK)	109,866	42,480	98,992	83,779
Gross margins with IBG (MK)	144,094	56,127	146,861	115,694
Net profit per flock (MK)	78,118	22,544	62,557	54,406
Return on capital (%)	31.6	22.7	20.5	24.6
Net profit with IBG (MK)	112,346	36,190	110,427	87,050
Return on capital (%)	45.5	36.5	36.2	39.0
% increase of NP by adding IBG	43.8	60.5	76.5	60.3

<sup>1</sup>Malawi Kwacha; <sup>2</sup>The opportunity cost of capital

The average return on capital invested was 24.6%, exceeding the prevailing average commercial deposit rate (8%) by several folds. This suggests that indigenous goat enterprises in smallholder farms are profitable and economically viable.

Inclusion of the intangible benefits of goats increased the net profit by an average of 60.3%, reflecting the importance of socio-economic roles goats play in providing current and future

economic stability to rural households' economy. The percentage increase was higher (76.5%) in Magote than the other study areas. The high intangible benefit of goats observed in Magote is due to the relatively high mean flock size and the number of animals sold. The mean flock size and the number of animals sold are the two factors that determine the size of the benefit of insurance and benefit of financing, respectively. Goats accounted for 61.2% of the total livestock household income representing the biggest contributor, while cattle, pigs and chickens contributed 17.6%, 15.5% and 4.1%, respectively

## Conclusions

The indigenous goat enterprises in smallholder farms are profitable and economically viable. The significance of IBGs, reflects the importance of socioeconomic roles goats play in providing current and future economic stability to rural households' economy. Hence, goat CBBPs are meant to harness the potentials of indigenous goats to optimize their contribution towards reduction of rural poverty and hunger. Therefore, financing and supporting scaling up of such programs is a meaningful and direct investments into the development of rural economy.

## References

- Ayalew, W. (2000). *Do smallholder farmers benefit more from crossbred (Somali x Anglo-Nubian) than from indigenous goats*. Ph.D. Thesis, Tropical Animal Production Georg-August University of Göttingen.
- Gutu, Z., Haile, A., Rischkowsky, B., Annet, A., Kinati, W. and Kassie, G. T. (2015). Evaluation of community-based sheep breeding programs in Ethiopia. Addis Ababa: ICARDA.
- Haile A., Wurzinger M., Mueller J., Mirkena, T., Duguma G., Rekik M., Mwacharo J., Mwai O., Sölkner, J. and Rischkowsky, B. (2018). Guidelines for setting up community-based small ruminants breeding programs Second edition. Beirut, Lebanon: ICARDA.
- Kosgey, I. S. and Okeyo, A. M. (2007). Genetic improvement of small ruminants in low-input, smallholder production systems: Technical and infrastructural issues. *Small Ruminant Research*, 70(1), 76–88. <https://doi.org/10.1016/j.smallrumres.2007.01.007>
- Maganga, A.M., Chigwa, F.C. and Lawrence, D. (2015). Goat and goat meat markets in selected districts of Malawi. *Livestock Research for Rural Development*. Volume 27, Article #97.
- Mayberry, D., Ash, A., Prestwidge, D. and Herrero, M. (2018). Closing yield gaps in smallholder goat production systems in Ethiopia and India. *Livestock Science*, 214(January), 238–244. <https://doi.org/10.1016/j.livsci.2018.06.015>
- Miller, B. A., Dubeuf, J., & Luginbuhl, J. and Capote, J. (2012). Scaling Up Goat Based Interventions to Benefit the Poor : A Report by the International Goat Association based on the IGA / IFAD Knowledge Harvesting Project , 2011-2012, 2011–2012.
- Moll, H. A. J. (2005). Costs and benefits of livestock systems and the role of market and nonmarket relationships. *Agricultural Economics*, 32(2), 181–193.
- Mueller, J. P., Rischkowsky, B., Haile, A., Philipsson, J., Mwai, O., Besbes, B., Valle Zárate, A., Tibbo, M., Mirkena, T., Duguma, G., Sölkner, J. and Wurzinger, M. (2015). Community-based livestock breeding programmes: Essentials and examples. *Journal of Animal Breeding and Genetics*, 132(2), 155–168. <https://doi.org/10.1111/jbg.12136>
- Ouma, E. A., Obare, G. A. and Staal, S. J. (2004). The socio-economic dimensions of smallholder livestock management in Kenya and its effects on competitiveness of crop-livestock systems. *Uganda Journal of Agricultural Sciences*, 9(31), 37.