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Farmers' experiences with rearing pigs, goats and chickens to improve household nutrition and income in Kamuli, Uganda

Agatha Ampaire
Iowa State University

Farmers' experiences with rearing pigs, goats and chickens to improve household nutrition and income in Kamuli, Uganda

by

Agatha Ampaire

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Max. F. Rothschild, Major Professor

Betty L.Wells

Mark S. Honeyman

David G. Acker

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To my mother Aileen N. Buherero

For all the personal sacrifices she made on her children's behalf

To my husband Emmanuel and children Ian, Lisa and Krista

For allowing me to take time from you to do this

To all the kind people who believed in me and gave me a chance

Thank you!

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ABSTRACT

A livestock development program was established in Kamuli district, in 2003, as a collaborative effort between Iowa State University and a Ugandan development organization, to improve the income and nutrition of rural farming households. Interviews were conducted with 113 farmers in the program, to assess the impact of the program. Data were analyzed using descriptive statistics. Relationships between variables were confirmed using Chi square tests.

The farmer's objectives and resources dictated the choice of animal species and number of animals reared. Animal prices varied depending on the farmer's need for the money and what the buyer was willing to pay. Farmers rarely slaughtered their animals to eat; they more frequently consumed eggs and milk. Training and facilitation was of advantage to the farmers, but factors, such as the farmers' resources limited their progress.Men and women farmers sometimes experienced the program differently because of factors such as inequality in education, access to information and time use differences

CHAPTER 1. GENERAL INTRODUCTION

1.1 Introduction

For the very poor people in rural areas with limited options for economic advancement, small scale family livestock operations are an important tool out of abject poverty. Effective rearing of livestock allows farmers not only to 'hang in' but it also provides opportunity to 'step up' and 'step out' of poverty (Doward et al. 2009). Hanging in involves utilization of livestock to maintain the livelihood level, for example rearing livestock for home consumption. Stepping up involves the utilization of livestock for more than just the minimal maintenance functions, thereby improving the livelihoods of the farmers. An example of a stepping up strategy is increasing the number of animals reared so that there is a surplus of products to sell. Stepping out involves utilization of livestock to gain entry into other activities which could be even more rewarding, such as investing the money obtained from sale of livestock. Development organizations that work with livestock farmers aim to support the farmers through these livelihood strategies that the farmers employ. It is extremely important for development organizations to listen to the farmers and work with them closely in order to meet the farmers' needs. Working closely with farmers and asking for their input is a key to sustainability of development programs which seek to create lasting change in the livelihoods of the rural poor. When the farmers find that the program they are a part of does not meet their needs in pursuing what they view as a feasible livelihood strategy, the farmers usually will abandon the program. There are many incidences of situations when a program

was designed and executed without much input from the farmers and as soon as the program support ended, the farmers reverted to their old ways of doing things.

1.2 Statement of the problem

In six parishes of Kamuli district in Uganda, for nearly six years, a livestock development program has been operating. This program (CSRL/VEDCO livestock program) is a partnership between Volunteer Efforts for Development Concerns (VEDCO), a local Non-Governmental Organization (NGO) in Kamuli and the Center for Sustainable Rural Livelihoods (CSRL) at Iowa State University, USA. The aim of the program is to support farmers by giving the farmers animals and ensuring that they are raised effectively so that the farmers achieve their goals of improved nutrition and income, by consuming more animal source foods and earning income from sales. There is need to evaluate the program and assess the impact it has had on the farmers so far. This study seeks to obtain feedback from the farmers on how the program is working for them.

1.3 Objectives, research questions and significance

In order to assess how the farmers who rear small livestock were doing in terms of animal management, program participation and livelihood improvement, the research questions below were asked.

- Are farmers employing good animal husbandry practice?
- What factors hinder farmers from taking care of their animals properly?

- What problems have they faced and what successes have they achieved?
- What do the farmers think of the program and how engaged are they?
- Have the farmers seen an improvement in their livelihoods which they attribute to livestock rearing?

1.3.1 Specific objectives of the Research

To help answer those research questions, the following specific objectives were adopted.

1. Capture the profile of participating livestock farmers, such as age, gender, household size, number and species of animals, duration of livestock rearing, duration with the program, etc.

2. Establish and assess the farmer's management practices in animal feeding, breeding, disease control, record keeping and animal housing, which are some of the pillars of animal production.

3. Identify the factors which limit livestock production (problems faced by the farmers).

4. Investigate if there has been an improvement in the livelihoods of participating farmers because of rearing animals (what farmers think of the program, successes achieved by the farmers).

1.3.2 Significance of the study

Findings from this research could benefit the CSRL/VEDCO program in identifying and meeting the farmers points of need. This will enable the farmers to benefit more from the program. The documentation of the lessons learned could also be a learning event for other development programs in poor rural areas. It is hoped that this work will provide an important background for future work in addressing livestock development constraints.

2. Thesis organization

- Chapter 1 reviews the pertinent literature on why and how rearing livestock, especially small livestock, can get poor rural small holder farmers out of poverty. It also gives information on the CSRL/VEDCO livestock program, which is the subject of the study, and lays out the objectives of the thesis.
- Chapter 2 explores the farmers' objectives, limitations and challenges in rearing livestock. It presents insight gained on why farmers would choose one livestock species and not the other and the farmer's experiences in rearing three species of livestock in light of improving income and nutrition. Areas where the program could intervene to further support the farmers are highlighted.
- Chapter 3 examines the effects of training and facilitation of farmers on livestock development. Differences in performance indicators of three farmer groups are discussed (one group received training and support from a development program, the

- second group received less training and support and the third group did not receive training or support).
- Chapter 4 differentiates between the experiences of men and women farmers to determine if gender plays a role in the farmers' success with the program.The differences between the men and women farmers are described and an attempt is made to explain them.
- Chapter 5 is a 'reality check'. The farmers' experiences with the CSRL/VEDCO livestock program as per the findings of the study are discussed based on the literature which was reviewed in Chapter1. Conclusions are drawn and recommendations issued concerning utilization of small livestock to improve farmer's livelihoods.

3. Background and literature review

3.1 The study area

Uganda is a relatively small landlocked tropical East African country which lies astride the equator. Agriculture is mostly rain fed and there is limited mechanization. The majority of the people depend on small holder subsistence farming. The majority of the farmers in the rural areas are poor and typically own small plots of land of less than two hectares. There exists a custom of sub dividing land so that each child (or at least each male child) in a household gets a share of the property when they reach adulthood (Tripp 2004). Administratively the country is subdivided into smaller administrative units called districts. Districts are further divided into counties; these are subdivided into sub counties which are

divided into parishes, wards and villages. Kamuli district is considered one of the poorer rural districts and it is located in the eastern part of the country.

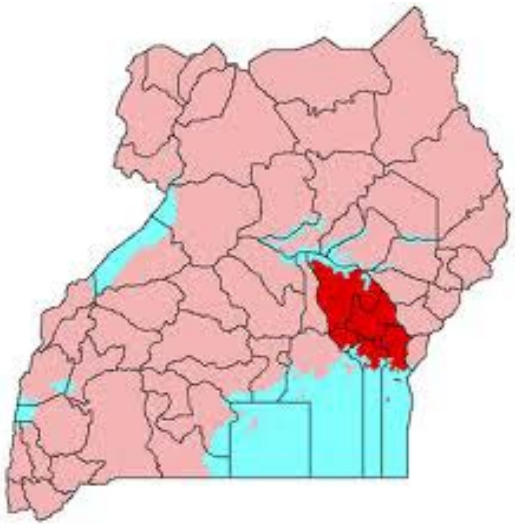

Figure 1. Map of Uganda showing the general location of Kamuli district (from qwiki.com)

3.2 The CSRL/VEDCO program

The Center for Sustainable Livelihoods in the College of Agriculture and Life Sciences at Iowa State University (ISU) collaborates with VEDCO, a non-governmental organization in Uganda, and Makerere University to improve the wellbeing and livelihoods of the people in parts of Kamuli district. The program operates in six parishes Namasagali, Nawanende, Naluwoli, Kasambira, Bwiiza, and Butansi (Sseguya et al. 2009). The livestock development program is one of the components of the CSRL/VEDCO collaboration. Other programs include food security, natural resource management, public health promotion, outreach and

micro finance (CSRL 2011). Involved with the different programs are personnel and students from ISU, staff from VEDCO and some staff and students from Makerere University. Volunteer extensionists are a key component of the program.They are chosen from among the farmers, receive training from the program and help to educate and help other members of the communities They are the ‘go to’ contact persons who link the officers and the other farmers. Farmers are organized in groups. To become part of VEDCO, famers have to already be organized into farmer groups and working towards a development goal. VEDCO therefore supports farmers who have already decided that they need help and are willing to put in the time and effort, to work hard towards achieving their goals. The farmer groups have leaders and rules of operation. Volunteer extensionists are usually the leaders of farmer groups and are chosen by the farmers.

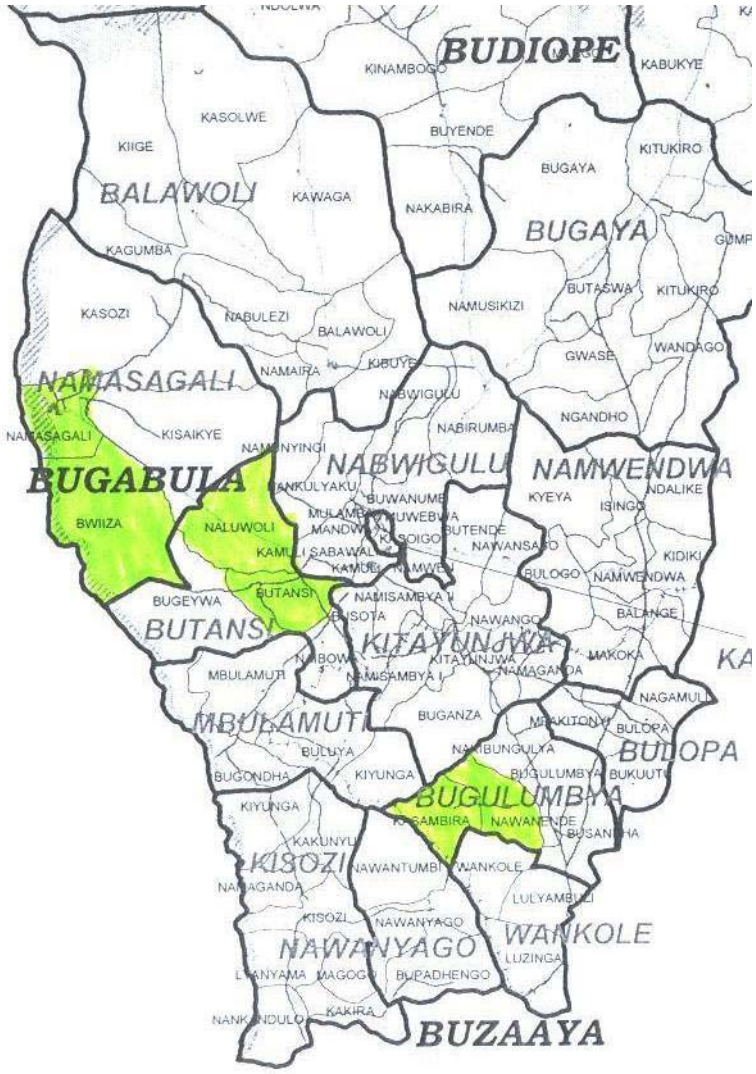

Figure 2. A map showing the areas served by the CSRL/VEDCO program

(Adapted from a map by Kamuli district planning unit)

3.3 Survey methodology

The study was carried out in May and June 2009 after it was reviewed and approved by the Institutional Review Board at Iowa State University (ISU 1RB# 09-154). The study area was the area of operation of the CSRL/VEDCO program (6 parishes in 3 sub-counties in Kamuli

district). The researcher personally interviewed 113 livestock farmers, for a total of 41 men and 72 women, members of various farmer groups who were part of the CSRL/VEDCO program. The farmers of interest were those rearing small livestock (pigs, goats, chicken). Interviews were conducted in Luganda, a local language which was understood by the farmers. The interviews were recorded and a structured questionnaire which guided the interviews was later filled in for each respondent using the voice recordings (see appendix). This was done to mimic a visit by an advisor that the farmers would ordinarily receive, and ensured that the farmers were at ease and not disrupted by the researcher constantly having to fill the questionnaire. Each interview lasted approximately 40 minutes.

The farmers were categorized into 3 groups. Group 1 consisted of Rural development Extensionists (RDE'S) and Community Nutrition and Health Workers (CNHWs), they had been trained by the program and had received animals from the program. Group 2 consisted of secondary beneficiaries who had received animals from members of Group 1, some farmers who were considered model farmers but were not RDEs or CNHWs, as well as some farmers who received animals during an earlier program by VEDCO called the Agricultural trade initiative. The last category, Group 3 was of farmers who were members of VEDCO farmer groups but had not yet received animals from VEDCO.

The sample population was chosen to include as many farmers who were taking part in the CSRL/VEDCO program Monitoring and Evaluation as possible. General monitoring and evaluation is carried out by the program annually, it does not look at the livestock development program specifically. The Monitoring and Evaluation (M&E) list had 304 names that were previously randomly selected from 800 households according to the information obtained from the M&E list. Twelve of the names on the M&E list were removed by the researcher because those farmers did not keep any of the small livestock of interest. Therefore 292 farmers made up the sample population of which 98 farmers were interviewed. An additional 15 farmers who were not on the M&E list were purposively chosen and interviewed to roughly balance out the number of respondents in each of the 3 categories. Of the 113 farmers interviewed, 41 belonged to Group 1, 33 belonged to Group 2, and 39 belonged to Group 3.

On each day, the researcher met with a VEDCO staff member or contact farmer. The contact person led the researcher to RDEs and CNHWs in the area. The RDEs provided the names of the Group 2 farmers who had received animals from them if any. From the M&E list, some Group 3 farmers were chosen randomly from each RDEs area of operation. In Group 1 and Group 2 categories no sample was chosen, all of them who were available while the researcher was in their area were interviewed. Three days were spent in each parish.

The details concerning the farmers interviewed are given below:

Butansi Parish (But)

There were 10 farmers of the Group 1 category on the M&E list, 7 were interviewed, but 3 were not available. Only 4 farmers on the M&E list belonged to Group 2, they were all interviewed. Three other farmers were interviewed in Group 2 because they had received animals from members of Group 1, although they were not on the M&E list. Seven farmers were interviewed in the Group 3 category, they were randomly chosen from the M&E list.

Namasagali Parish (Nam)

There were only 3 people in the Group 1 category who were on the M&E list, two of those were not available for interviews. Five people in the Group 1 category were interviewed who were not on the M&E list. Only 4 farmers, in Group 2 had received animals from members of Group 1 and they were all interviewed. Seven farmers were interviewed in the Group 3 category, they were randomly chosen from the M&E list.

Bwiiza Parish (Bwiz)

All the six Group 1 members on the M&E list were interviewed. Only 2 people in Group 2 category were on the M&E list, and they were interviewed, as well as 3 who were not on the list. Seven farmers were interviewed in the Group 3 category, they were randomly chosen from the M&E list.

Nawanende Parish (Naw)

All the seven Group 1 farmers on the M&E list were interviewed. Five farmers of category 2 were interviewed, 4 of them were on the M&E list, and 1 was not. Seven farmers were interviewed in the Group 3 category, they were randomly chosen from the M&E list.

Kasambira Parish (Kas)

There were ten farmers in the Group 1 category, 8 were interviewed, 2 were not available. Six farmers were interviewed in the Group 2 category, 5 of them were on the M&E list, 1 was not. Four farmers were interviewed in the Group 2 category, they were randomly chosen from the M&E list.

Naluwoli Parish (Nal)

Of the 8 farmers in the Group 1 category who were on the M&E list, two were not available for interviews, 6 were interviewed. There were seven Group 2 farmers, they were all on the M&E list and they were all interviewed. Six Group 3 farmers were interviewed, they were chosen randomly from the M&E list.

Data was entered into Predictive Analytics Software (PASW) Statistics 18 and analyzed by applying descriptive statistics such as frequencies and cross tables. Relationships between variables were measured by chi square tests.

Summary of farmers interviewed in each category

Category			Parish					
			Naw	Nam	Kas	Nal	But	Bwiz
Group 1	Gender	female	5	4	4	5	3	5
		male	2	2	4	2	4	1
	Total		7	6	8	7	7	6
Group 2	Gender	female	3	1	4	5	6	4
		male	2	3	2	1	1	1
	Total		5	4	6	6	7	5
Group 3	Gender	female	4	2	4	5	6	2
		male	3	5	0	1	2	5
	Total		7	7	4	6	8	7
Total	Gender	female	12	7	12	15	15	11
		male	7	10	6	4	7	7
	Total		19	17	18	19	22	18

3.4 Why livestock are important for the rural poor

In the article “Why keep livestock if you are poor?” Kitalyi et al.,(2005) expound on various ways in which livestock are important for food security and rural livelihoods. One of the main reasons for animal domestication more than 12,000 years ago, according to the article, was to address the problem of unpredictability of food supply associated with unpredictable weather. Pigs, and to some extent local poultry, are suitable to sustainable agricultural systems by their ability to convert waste and by products from the human food chain to a valuable product, meat (FAO 2007). Animal source foods such as meat, poultry and eggs help to supplement the mainly starchy diets of the poor with high quality protein rich in micro-nutrients (Murphy et al., 2003).

In developing countries where agriculture is rain-fed, animals are seen as insurance against crop failure.Animals can be sold to purchase grain and other foods when crops fail (Herrero et al., 2010). Animals too are susceptible to the vagaries of weather such as drought, but with supplemental feeding they are able survive longer than crops. In situations when crops fail due to early or late rains, animals are not as affected by the timing. Another way in which livestock are insurance to the farmer is as a source of cash when needed. Crop harvests are not always available when farmers need cash, so farmers keep livestock to be able to sell them later when they need the money and crops are out of season. Rural farmers in developing countries do not regularly utilize formal banking for various reasons; the service may be unavailable in remote areas, they do not have much surplus money to bank as many of them live hand to mouth, and there may be educational and knowledge constraints (Rutherford 2000). Where markets exist, having livestock acting as living banks which farmers can sell for cash is convenient for the farmers (Nwafor 2004).

Small animals and poultry are more appropriate for the poor rural farmers than large animals because they are more prolific and give a faster return to investment by having a higher turnover. For someone who is struggling to get out of poverty and who does not have many alternatives, this is an important quality. In addition to high fecundity, diet flexibility and adaptability to a wide range of housing and management approaches are valued (Lammers et al., 2009). Some poor farmers on their journey to ‘stepping out’ of poverty use small animals

to accumulate wealth. They start with a few animals, when the herd or flock increases, they sell them to purchase more expensive animals, or they exchange a number of small animals for a larger one which they could not afford before (Nwafor 2004). In Ethiopia, poor farmers are able to acquire chickens by poultry sharing, whereby a wealthier farmer gives a poor farmer some poultry to raise and the poor farmer can keep some of the offspring when they return the poultry (Aklilu et al., 2008). Livestock, especially smaller livestock like poultry, goats and pigs, provide a practical and effective first step in alleviating abject rural poverty (Mack et al., 2005). Small animals and poultry also have lower requirements in terms of capital and maintenance costs.They are less risky to keep (IFAD 2001) In case of disease outbreak, some of them are likely to survive and since they are not a big investment to begin with, in case of death the blow to the farmer is not as great as it would be if they had invested heavily in a large animal. Small animals and poultry are easier to sell when there is no means of preservation or when there is no easy access to markets. A farmer can easily tie chickens on a bicycle and ride them to a distant market as opposed to driving a cow on foot to the market. Some farmers have been reported to sell their animals when disease is detected as a means of reducing losses (Alders et al., 2010). It is easier to slaughter a chicken for home consumption than a large animal.

Pastoralism is an endangered livelihood strategy (Rass 2006); mostly because of land shortages.Therefore fewer and fewer poor people rely entirely on livestock. Most poor people

have a mixed crop-livestock system in which livestock are important in improving the productivity of the land, as a source of manure for soil fertility and in some areas as traction animals. In some places, after crop harvests, farmers hire animals to graze or kraal on their crop fields at night to provide manure, which is a source of income to the livestock owners (William 1999). For farmers who grow crops and rear animals, integrating crop and livestock reduces transaction costs for each enterprise. Manure is used to improve soil fertility and crop residues are fed to animals. Where animal traction is used, large animals can be used to cultivate larger areas of land faster and more efficiently. Money from sale of animals can be used to purchase seed and other inputs for the crops and, vice versa, money from sale of crops can be used to purchase animals and other inputs for the animals. Village chicken and goats which are raised on free range have an additional environmental benefit as far as crop agriculture is concerned; they are an effective natural means of pest and weed control (Copland et al., 2003; Coffey 2006).

Livestock are most of the time seen as useful in terms of their contribution to food security and income but there are other benefits of livestock which may be intangible but are important to the livelihood of the farmer (Moll 2005; Ashley et al., 2005). The other uses of livestock are often not included in the calculation of Gross Domestic Product (GDP) figures of poor countries (Turner 2005). In many poor communities, animals serve a social function; they are a means of creating and maintaining social relationships, such as payment of bride

price, slaughter to honor guests, etc. Social relationships serve as social capital and this is important in rural livelihoods (Sseguya et al., 2009). The poor often keep a mix of different animal species as a hedge against risks. Multiple species kept by a household may address different objectives or a species of animal may address different objectives concurrently, therefore sometimes farmers may not necessarily aim to maximize productivity from their animals (Randolph et al., 2007; Anderson 2003).

3.4 Advances and opportunities to improve the benefits of livestock rearing for the rural poor.

The rural poor need livestock to meet diverse needs in their livelihoods. Those who are better off economically need livestock products and they are willing to pay for them (Delgado 2005; Delgado et al., 2008). The need of livestock products by the affluent is a window of opportunity for the rural poor; they have a chance to tap into the demand for livestock products by selling their livestock to earn some money (Peacock 2005). There is a concern that large corporations that mass produce and mass market livestock products are a threat to the livelihoods of small producers (McMichael 2001; Steinfeld 2003). At present there are not many such large corporations in the developing world, therefore there is still opportunity for the rural poor; 80% of global poultry production occurs in traditional family based production systems which contributes up to 90% of the total poultry production in some countries (Mack et al., 2005).

Village poultry are the most numerous livestock species in developing countries but they have been largely neglected in research and development efforts (Aklilu et al., 2008). There is now an increasing appreciation of the importance of livestock especially small holder and family livestock operations to the livelihoods of the poor and the potential of livestock rearing to improve those livelihoods (Singh et al., 2004). Recognizing the importance of livestock, such as the role played by rural poultry allows for policy changes to be made which will enable more funding for livestock projects, livestock research and extension.

Identification of constraints to rural livestock production and finding solutions goes a long way in improving the productivity of animals and hence increased gains for the rural poor. It has been suggested that paying attention to rural livestock and introducing low cost interventions can increase productivity and hence household income (Jensen 1998, Upton 2000). In a study done in Zimbabwe, pig herd sizes were affected by high mortalities due most likely to poor housing, low hygiene and low availability of good quality feed. It was suggested that improvement of the management factors could increase pig production efficiency (Chiduwa et al., 2007). Animal diseases have been identified as a major constraint to animal production in developing countries (Swallow 2000, FAO 2001, Rweyemamu 2008) especially the endemic diseases of tropical regions. New Castle disease is a major constraint to rural poultry production whose mortality rate can go up to 100% and wipe out a farmer's entire poultry unit (Guèye 2010). Rural farmers are often wary of increasing their livestock

enterprises because of the threat of disease. Development of a Newcastle disease thermo-tolerant vaccine to be used in rural areas where facilities such as a cold chain for vaccine storage are often lacking is a promising solution to the poultry production constraint of this disease (Copland et al., 2005). Researching and publicizing the ethno veterinary practices used locally to treat animal diseases is a good strategy to identify low cost interventions especially in very rural areas which may not be adequately supplied with modern medicines (Schillhorn van Veen 1999; Guèye 2002). It is also a good way to ensure that these practices do not die out. Heifer International trains Community-based Animal Health care workers to treat animals in areas where there is scarce veterinary care (Bhandari et al., 2008). Historically in many developing countries, government and veterinary extension departments have provided services to livestock keepers but the public sector reforms of the 1990s led many of the public services to be cut back or withdrawn altogether (Schillhorn van Veen et al., 1995; Owango et al., 1998). The private sector which has emerged typically provides services to the wealthier farmers leaving the poor without these vital services (Peacock 2005). Availing treatment options and animal health interventions to the poor is bound to increase animal production and trade in animal products in developing areas where the need for livestock development is great (Perry et al., 2007; Perry et al., 2009).

The greatest constraint to increased pig and poultry production in many developing countries is inadequate feed resources (Chiduwa et al., 2007; Ovwigho et al., 2009). Feed resources are especially scarce in the dry season, even for browsers like goats (Tolera et al., 2000).

Commercial poultry and pig production are very highly dependent on grain-based commercial feeds which are expensive. Monogastric livestock species compete with humans for food (Rothschild et al., 2008) which is already in short supply in many developing countries.

In rural livestock systems some of the poor let these animals feed on weeds and other herbage.Some farmers cut roadside shrubs and carry them to the animals. In many areas, the planting of fodder crops and leguminous trees which are cut and carried to the animals is encouraged by development organizations (Mekoya et al., 2008)

Because they are cheaper and the initial investment is small most poor people start off by rearing a few small livestock of the native breeds in the free range backyard system but to ‘step up’ and ‘step out’ of poverty, it is common practice for farmers move on to more efficient management systems such as intensification and rearing of exotic breeds of animals as well as large livestock (Kristjanson et al., 2004). To acquire the more expensive animals, farmers may exchange their animals (Kodombo et al., 2003); take part in animal sharing (Aklilu et al., 2008) or get involved in development programs which give out animals to farmers. Many development programs that give out animals to farmers have ‘payment in kind’ arrangements whereby the farmer who receives animals passes on a specified number of offspring to another farmer (Harrison et al., 2001; Mwanza et al., 2000). This is an effective way of reaching farmers who would otherwise not afford to buy their own animals.

These types of credit programs generally rely on group management and peer pressure to ensure timely repayments. The revolving fund managed this way is ‘inflation proof’ and can increase and multiply benefits very widely (Peacock 2005).

There is concern that animal agriculture leads to environmental degradation (De Haan et al., 2001; Pelletier et al., 2010). The developing prejudice against animal agriculture could be a hindrance to livestock development (Lebbie 2003). It can impact the allocation of funding for livestock projects especially those in developing countries (Tanaka et al., 2008). There is evidence to show that animals when managed properly can contribute to sustainable natural resource management (Herrero et al., 2010; Steinfeld et al., 2010). Research publications that counter the stigmatization of livestock production play a crucial role in ensuring that the poor who need livestock continue to receive support.

It is common practice for poor rural farmers to organize themselves into mutually supportive groups, to pool their resources and learn from each other (Peacock 2005). Many development organizations work with and train farmers who have organized themselves in groups (Mahato et al., 2009). It is more efficient for extension workers to work with groups than with individual farmers (Swanson et al. 2002),but some farmers find that individual effort is more rewarding since sometimes groups can have problems that stem from leadership and cohesion issues (Katungi et al., 2008; Pandolfelli et al., 2008). For many poor rural farmers,

joining a farmer group is the way to get support, training, access to resources they would otherwise not have and a chance to get integrated into the society (Davis 2004).

References

Aklilu H A, Almekinders H M J, and Van der Zijpp 2008 How resource poor households value and access poultry: village poultry keeping in Tigray Ethiopia. Agricultural Systems 96(1-3) 175-183.

Alders R G, Bagnol B, Young M P 2010 Technically sound and sustainable Newcastle disease control in village chickens: lessons learnt over fifteen years. World's Poultry Science Journal 66: 432-440.

Anderson S 2003 Animal genetic resources and sustainable livelihoods. Ecological Economics 45: 331–339.

Ashley S and Nanyeenya W 2005 More than income-pro poor livestock development policy in Uganda. In: Rural livelihoods and poverty reduction policies (Editors: Ellis F and Freeman H A) Routledge.New York, USA Pages 215-234.

Bhandari D P and Wollen T S 2008 Community-based animal health care. Annals of the New York Academy of Sciences, 1149: 9-11.
http://onlinelibrary.wiley.com/doi/10.1196/annals.1428.054/pdf

Catelo O M A and Costales C A 2008 Contract farming and other market institutions as mechanisms for integrating smallholder livestock producers in the growth and development

of the livestock sector in developing countries. Pro Poor Livestock Policy Initiative. Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/ag/AGAInfo/programmes/en/pplpi/docarc/execsumm_wp45.pdf

Chiduwa G, Chimonyo M , Halimani T E, Chisambara S R and Dzama K 2007 Herd dynamics and contribution of indigenous pigs to the livelihoods of rural farmers in a semi-arid area of Zimbabwe. Tropical Animal Health and Production 40 : 125-136.

Coffey L 2006 Meat goats: sustainable production. A production of ATTRA-National Sustainable Agriculture information service. http://attra.org/attra-pub/PDF/meatgoat.pdf

Copland J W and Alders RG 2005 The Australian village poultry development program in Asia and Africa. World's Poultry Science Journal, Vol. 61 http://www.fao.org/docs/eims/upload/191344/Copland.pdf

CSRL (Center for Sustainable Rural Livelihoods) 2011 Livestock. Iowa State University. http://www.srl.ag.iastate.edu/Official/about.php

Davis E K 2004 Report on Technology Dissemination by Farmer Groups in Meru Central District of Kenya, University of Florida, Gainesville. http://etd.fcla.edu/UF/UFE0006340/davis_k.pdf

De Haan C, VanVeen S T, Brandenburg B, Gauthier J, Le Gall F, Mearns R, and Simeon M 2001 Directions in development. Livestock development implications for rural poverty, the environment and global food security (Directions in Development). The World Bank, Washington D.C.

Delgado C L 2005 Rising demand for meat and milk in developing countries: implications for grasslands-based livestock production. Grassland: a global resource pgs. 29–39. The Netherlands: Wageningen Academic Publishers.

Delgado L C, Narrod A C, and Tiongco M M 2008 Determinants and implications of the growing scale of livestock farms in four fast growing developing countries. Research Report 157-International Food Policy Research Institute-IFPRI.

http://www.ifpri.org/sites/default/files/publications/rr157.pdf

Doward A, Anderson S, Nava Y, Pattison J, Paz R, Rushton J, Sanchez V E 2009 Hanging in, stepping up and stepping out: livelihood aspirations and strategies of the poor.

http://eprints.soas.ac.uk/6163/1/HangingInDIP.pdf

FAO , Food and Agriculture organization 2001 Economic impacts of Transboundary pests and diseases. Types of economic impacts of Transboundary diseasea.The State of Food and Agriculture 2001.Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/docrep/003/x9800e/x9800e00.HTM.

FAO , Food and Agriculture organization 2007 The state of the world's animal genetic resources for food and agriculture. Edited by Rischkowky R and Piling D. Rome.

Goetsch AL, Aiken G E 2000 Broiler litter in ruminant diets – Implications for use as a low-cost byproduct feedstuff for goats.The Opportunities and Challenges of Enhancing Goat production in East Africa. Proceedings of a Workshop held at Debub University, Awassa, Ethiopia. Debub University, Awassa, Ethiopia and Langston University, Langston, Oklahoma, USA.

Guèye E F 2002 New Castle disease in family poultry: prospects for its control through ethno veterinary medicine. Livestock Research for Rural Development 14(5) http://ftp.sunet.se/wmirror/www.cipav.org.co/lrrd/lrrd14/5/guey145a.htm

Harrison S Rand Moog F A 2001 Livestock dispersal programs in developing countries: Social-economic benefits for human resource development in the rural sector. In: Human resources and gender issues in poverty eradication. Atlantic Publishers and Distributors, New Delhi.

Herrero M,Thornton P K, Notenbaert A M, and Wood S 2010 Smart investments in sustainable food production: revisiting mixed crop-livestock systems. Science. http://www.sciencemag.org/content/327/5967/822.full

Herrero M, Thornton P K, Gerber P, Van der Zijpp A, Steeg J, Van de Notenbaert A M, Lecomte P, Tarawali S and Grace D 2010. The way forward for livestock and the environment. IN: Swanepoel, F., Stroebel, A. and Moyo, S., The role of livestock in developing communities: Enhancing multifunctionality. Cape Town, South Africa: University of the Free State and CTA: 51-76.

IFAD 2001 Livestock assets and the rural poor. IFAD Rural poverty report 2001: The challenge of ending rural poverty. http://www.ifad.org/lrkm/theme/production/assets.htm

Jensen H A 1998 Network for poultry production and health in developing countries. http://www.poultry-development.dk/document/19985HansAskovJensen.pdf

Katungi E, Edmeades S, Smale M 2008 Gender, social capital and information exchange in rural Uganda. Journal of International Development 20(10): 35-52.

Kitalyi A, Mtenga L, Morton J, McLeod A, Thornton P, Dorward A, Saadullah M 2005 Why keep livestock if you are poor? Livestock and Wealth creation; improving the husbandry of animals kept by resource-poor people in developing countries.Nottingham University Press, Nottingham, UK.

Kodombo S R, Nianogo A J, Kwakkel R P, Udo H M Y and Slingerland M 2003 Comparative analysis of village chicken production in two farming systems in Burkina Faso. Tropical Animal Health and Production 35(6): 563-574.

Kristjanson P, Krishna A, Radeny M and Nindo W 2004 Pathways out of poverty in western Kenya and the role of livestock. Pro poor livestock policy initiative working paper No. 14.

http://www.fao.org/ag/AGAinfo/programmes/en/pplpi/docarc/wp14.pdf

Lammers J P, Carlson L S, Zdorkowski A G, Honeyman S M 2009 Reducing food insecurity in developing countries through meat production: the potential of the guinea pig. Renewable Agriculture and Food Systems 24(2) 155-162.

Lebbie S H B 2003 Goats under household conditions. Small ruminant Research 51(2): 131-136.

Mack S, Hoffman D and Ottle J 2005 The contribution of poultry to rural. World's Poultry Science Journal, Vol. 61.

Mahato N S and Bajracharya L S 2009 Can goats be a vehicle in a pathway out of poverty? Tropical and Subtropical Agro Ecosystems 11: 13-16.

Mekoya A, Ooosting J S, Fernandez-rivera S and Van der Zijpp A J 2008 Farmer's perceptions about exotic multipurpose fodder trees and constraints to their adoption. Agroforestry Systems 73(2)141-153.

McMichael P 2001 The impact of globalization, free trade and technology on food and nutrition in the new millennium. Proceedings of the Nutrition Society 60: 215-220.

Moll A J H 2005 Costs and benefits of livestock systems and the role of market and non-market relationships. Agricultural Economics 32: 181-193.

Murphy P S and Lindsay H A 2003 Animal source foods to improve micronutrient nutrition in developing countries. Journal of Nutrition 133: 3932s-3935s.

Mwanza R, and Mapemba J 2000 Crisis mitigation in livestock dependent systems: Concern Universal experiences and challenges in promotion of livestock production in Dedza district.Proceedings of the Regional Conference held at Malawi Institute of Management, Lilongwe.
http://www.ilri.cgiar.org/Infoserv/Webpub/fulldocs/AnGenResCD/docs/SustainableAgriculture/Chapter26.htm#TopOfPage

Nwafor C U 2004: Small ruminant livestock marketing in The Gambia: a socio-economic perspective. Livestock Research for Rural Development. Vol. 16 Art. #24.
http://www.lrrd.org/lrrd16/4/nwaf16024.htm

Ovwingho OB, Mmerede F U C, Udeh L, and Akporhuarho P O 2009 Comparison of constraints to poultry producers in Delta state Nigeria.International Journal of Poultry Science 8(5) 480-484.

Owango M, Staal S J, Kenyanjui M, Lukuyu B, Njubi D and Thorpe W 1998 Diary cooperatives and policy reform in Kenya: effects of livestock services and milk market liberalization. Food Policy 23(2): 173-185.

Pandolfelli L, Meinzen-Dick R, Dohr S 2008 Gender and collective action: motivations, effectiveness and impact. Journal of International Development 20(1): 1-11.

Peacock C 2005 Goats-A pathway out of poverty. Small ruminant Research 60 (2): 179-186.

Pelletier N and Tyedmers P 2010 Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Science of the United States of America 107(43).

Perry B D and Rich K M 2007 Poverty impacts of Foot and Mouth disease and the poverty reduction implications of its control. Veterinary Record160: 238-241.

Perry B and Grace D 2009 The impacts of livestock diseases and their control on growth and development processes that are pro poor. Philosophical Transactions of the Royal Society B 364:2643-2655.

Randolph T F, Schelling E, Grace D, Nicholson CF, Leroy JL, Cole D C, Demment M W, Omore A, Zinsstag J and Ruel M 2007 Role of livestock in human nutrition and health for poverty reduction in developing countries. Journal of Animal Science 85:2788-2800.

Rass N 2006 Policies and strategies to address the vulnerability of pastoralists in sub-Saharan Africa. Pro Poor Livestock Policy Initiative Working Paper No. 37. Food and Agriculture Organization of the United Nations, Rome.

http://www.fao.org/ag/againfo/projects/en/pplpi/publications.html

Rothschild F M and Plastow S G 2008 Impact of genomics on animal agriculture and opportunities for animal health. Trends in Biotechnology 26(1) 21-25.

Rweyemamu M, Roeder P, MacKay D, Sumption K, Brownlie J and Leforban Y 2008 Planning for the Progressive Control of Foot-and-Mouth Disease Worldwide. Transboundary and Emerging Diseases 55: 73–87.

Schillhorn Van Veen W T and De Haan C 1995 Trends in the organizing and financing of livestock and animal health services. Preventive Veterinary Medicine 25(2): 225-240.

Schillhorn Van Veen W T 1999 Sense or nonsense? Traditional methods of animal parasitic disease control.Veterinary Parasitology 71(2-3): 177-194.

Rutherford S 2000 The poor and their money. Oxford University Press. New Delhi.

Singh D P, Johri T S, Narayan R, and Saran S 2004 Impact of constraints minimization on productivity and popularity of traditional backyard poultry production. Proceedings of XXII World's Poultry Congress, İstanbul, Turkey.

http://193.43.36.103/ag/againfo/themes/en/infpd/documents/papers/2004/10impact537.pdf

Sseguya H, Mazur E R and Masinde D 2009 Harnessing community capitals for livelihood enhancement: Experiences from a livelihood program in rural Uganda. Community Development 40: 123-138.

Steinfeld H 2003 Economic constraints on production and consumption of Animal Source Foods for nutrition in developing countries. Journal of Nutrition 138: 4054s-4061s.

Steinfeld H and Gerber P 2010 Livestock production and the global environment: Consume less or produce better? Proceedings of the National Academy of Science of the United States of America 107(43).

Swallow B M 2000 Impacts of Trypanosomiasis on African Agriculture (PAAT Technical and Scientific Series 2), Food and Agriculture Organization, Rome.

Swanson EB and Samy M M 2002 Developing an extension partnership among public private and nongovernmental organizations. Journal of International Agricultural Extension Education 9 (1).

Tanaka K and Bhavsar M V 2008 The role of Southern SARE projects in enhancing the quality of life in rural communities in the south. Southern Rural Sociology 23(1) 23-46.

Tolera A, Merkel C R, Goestsch L A, Sahlu T and Nrgesse T 2000 Nutritional Constraints and future prospects for goat production in East Africa.The opportunities and challenges of enhancing goat production in East Africa.Proceeding of a conference held at Langston University, OK (USA) and Debub Univiversity Awassa (Ethiopia) 10-12 Nov. 2000, Awassa, Ethiopia.

Tripp M A 2004 Women's movements, customary law and land rights in Africa: The case of Uganda. African Studies Quarterly. http://www.africa.ufl.edu/asq/v7/v7i4a1.htm

Turner R L 2005 Livestock liberalization and democracy; constraints and opportunities for rural livestock producers in a reforming Uganda. Pro-poor livestock policy initiative. PPLPI

Working Paper No.29.

http://www.fao.org/AG/AGAINFO/programmes/en/pplpi/docarc/wp29.pdf

Upton M 2000 The 'livestock revolution' implications for smallholder agriculture. A case study of milk and poultry production in Kenya. Livestock policy discussion paper No. 1. Livestock information and policy branch, AGAL. Food and Agricultural Organization,Rome.

http://www.fao.org/ag/againfo/resources/fr/publications/sector_discuss/PP_Nr1_Final.pdf

William O T 1999 Factors influencing manure application by farmers in semi-arid west Africa. Nutrient cycling in Agroecosystems 55(1)19-22

CHAPTER 2. PIGS, GOATS AND CHICKENS FOR RURAL DEVELOPMENT: SMALL HOLDER FARMER'S EXPERIENCE IN UGANDA

A paper published in *Livestock Research for Rural Development.Volume 22, Article#102*

A. Ampaire and M. F. Rothschild

Abstract

Rearing small livestock has been established as a promising pathway out of poverty for rural farmers in developing countries. In this study personal interviews were conducted with 113 owners of pigs, goats and chickens in Uganda to find out why the farmers choose to rear these animals, what opportunities existed and what challenges/limitations they faced regarding livelihood improvement. The data were analyzed using descriptive statistics including frequency tables to summarize the data and cross tabulations to determine relationships between variables. Relationships between variables were examined using Chi square tests.

The major reasons given for why pigs were reared were all financially focused. Goats and chickens were reared for other reasons in addition to money. Only chickens were reared with eating and serving guests as a major reason. The farmer's objectives and resources dictated the choice of animal species and number of animals reared. The marketing structure did not favor the farmers. Many farmers (49.9%) determined the asking price based on size and appearance of the animal. The price varied depending on the farmer's need for the money

and what the buyer was willing to pay. Farmers rarely slaughtered their animals to eat; they more frequently consumed products like eggs and milk. Points where intervention might improve the livelihood of these farmers are highlighted.

Key Words: Africa, livestock, livelihood, poverty

Introduction

Livestock rearing is an important pathway out of poverty (Randolph et al 2007; Peacock 2005), particularly the small livestock such as chickens, pigs and goats which are owned by the poor in rural areas (Kristjanson et al 2004). Poverty in Uganda is described as a rural phenomenon because most of the people (80%) live in rural areas (UBOS 2002), are heavily dependant on rain-fed agriculture, and are poor. Livestock keepers are generally better off than those who depend entirely on crop agriculture (De Haan et al 2001). Small livestock often require less start up capital and can easily be raised even by poor people with limited land resources. Many development organizations in rural areas promote rearing of small livestock to improve the income and nutrition status of the resource poor people (Randolph et al 2007).

VEDCO (Volunteer Efforts for Development Concerns) is one such development organization. VEDCO, in partnership with Iowa State University's Center for Sustainable

Rural Development (CSRL), has set up a livestock development program in Kamuli district, one of the poorer districts in Uganda. The program seeks to improve the livelihoods of the farmers by increasing household income and nutrition status. The program supports farmers by giving to them pigs, goats and chickens, as well as training in animal management. Farmers choose which of the three livestock species to rear (CSRL 2010).

This study seeks to understand why farmers would choose one livestock species and not the other and the farmer's experiences in rearing the three species of livestock in light of improving income and nutrition, hence their livelihood. Understanding farmers' objectives, limitations and challenges in rearing livestock will highlight the areas where the program should intervene to further support the farmers. Working with the farmers and responding to their needs is crucial to the sustainability of any development program.

Data collection and analysis

Open ended questions were used to guide personal interviews which were carried out as informal discussions between the researcher and farmers in the VEDCO/CSRL livestock development program. A total of 113 farmers who reared pigs, goats and/or chickens took part in the interviews at their homes. The interviews were conducted in the local language and recorded so that the researcher could fill in the questionnaires at the end of the day. This was done to mimic a visit by an advisor that the farmers would ordinarily receive, and

ensured that the farmer was at ease, and not disrupted by the researcher constantly having to fill the questionnaire. Each interview lasted approximately 40 minutes. The data were analyzed using descriptive statistics like frequency tables to summarize the data and cross tabulations to determine relationships between variables. Relationships between variables were confirmed by Chi square tests using Predictive Analytics Software (PASW).

Results and discussion

Animal housing as a limitation to the number of animals reared

Many farmers interviewed did not have a housing structure in which to raise their animals. These were 50% of the goat owners, 32.8% of pig owners, and 55% of chicken owners. Of the pig owners who did not have a house for the pigs, 90% tethered the pigs nearby (< 5 minutes walk); the others left them to move freely. All the chicken owners who did not have housing left the chicken to move freely in the neighborhood, while 84% of the goat owners who did not have housing tethered the goats nearby. Only 18.7% of the goat owners tethered the goats far away (> 5 minutes walk) and none of the goats were left to move freely in the neighborhood. For each of the three species of animals, the number reared were related to whether a housing structure was present (P=0.01). The farmers who housed their animals reported that housing their animals saved them from a lot of potential problems. The farmers who did not house their animals had several problems which differed by animal species. The major problems are shown in Table 1.

Table 1. Problems associated with lack of animal housing

Species	Problem	% of farmers per species
Pigs	Hygiene issues e.g. mud, rooting	30.8
	Rope injury	15.4
	Break loose and destroy crops	15.4
	Others	38.4
Goats	Feeding problems e.g. not enough grass nearby, not enough time to cut branches	64.5
	Break loose and destroy crops	23.7
	Others	11.8
Chickens	Loss of chicken through predation, theft and loss of chicks	47.0
	Disease spread	25.0
	Others	30.0

The problems associated with raising pigs without a housing structure are likely to cause poor farmers who cannot afford housing to shun them or to keep just one or two (74% of the farmers had 2 pigs or fewer). It was reported that pigs cause unhygienic conditions when left to roam around, especially in the wet seasons because of mud. The rooting behavior is also a problem as they can uproot crops, destroy the farmer's house, especially the mud and wattle houses. Rope injury is common in tethered pigs and farmers just do not like to see the wound

caused to the leg. Some of the tethered pigs break loose and destroy crops, so do some housed pigs in poorly constructed structures.

Traditionally goats were grazed out in the open fields like cows usually by the young boys in the family. Times have changed and most young boys go to school (Siefert and Opuda-Asibo 1994) so they have to tether the goats, preferably near the homestead where someone at home can keep an eye on them. Many farmers do not have land with enough grass available to them to tether their goats. Some of them tether the goats far from the homestead where they are at risk of being stolen, harmed by dogs etc. Other farmers tether the goats in their housing compound and cut tree branches and bring leaves to them. Many times goats break loose and destroy crops which can cause conflicts with neighbors. These feeding problems limit the number of goats that a farmer can keep.

The major problems caused by not housing chickens i.e. loss of chicken due to predation, theft or disease spread are likely to be tolerated. Rural farmers periodically experience losses of their crops and livestock because of factors like drought, disease and theft, but they seldom give up farming because of them. These farmers are resilient and persistent. They are willing to set free their hens which have chicks knowing that some of them will not return in the evening. Probably that is why backyard chickens are common in rural areas. Chickens are somewhat like pets in rural Africa; they sometimes ride in public transportation buses and are

welcomed in the owner's houses. Some farmers 14.5%, of chicken owners who did not have housing for their chickens shared living quarters with the chickens and 76.4% of the chicken owners who did not have housing for the chickens had then spend the nights in the kitchen.

Why do farmers rear pigs, goats and chickens?

To understand why a farmer would choose one livestock species and over the others, we asked farmers what their reasons were for rearing livestock. The results are summarized in the Table 2. For purposes of this study income was defined as money earned that is not necessarily used to meet an urgent basic need; such as buying an animal, building a house etc. Money for basic needs means that the farmer needs the money from the sale of the animal to meet an urgent and pressing need such as taking an ill family member to a hospital or immediate payment of school fees. There was a relationship between the reasons for rearing pigs and the number of upgraded pigs (P=0.05) but not the total number of pigs which included the local and upgraded. For goats and chickens which were reared for other reasons in addition to money, the relationship was with the total number and not with the total upgraded animals. These results seem to suggest that upgraded pigs are reared mostly for the money, and that local goats and chickens are important for other uses not just the income.

Table 2. Reasons why farmers rear livestock

Species	**Reason**	**% for each species**
Pigs	Income	53.0
	Meet basic needs	33.4
	Fast returns	13.8
	Easy to raise	7.9
Chickens	Eating and serving guests	70.0
	Income	40.0
	Meet basic needs	38.8
	Easy to raise and quick to sell as needed	12.1
	Exchange for goats	3.3
Goats	Meet basic needs	40.7
	Income	39.1
	Easy to raise and to sell as needed	8.6
	Exchange for cows	8.5

The characteristic common to all three species of livestock which the farmers appreciated was that they were easy to raise, requiring few inputs. Most of the animals reared were local; few people had upgraded animals as shown in Table 3.

Table 3. Farmers with upgraded animals (%)

Number	**Pigs**	**Goats**	**Chicken**
0	59.0	90.0	89.4
1-5	36.0	10.0	0.0
6-10	4.0	0.0	0.0
10-50	1.0	0.0	3.6
>50	0.0	0.0	7.0

The local animals are known to be well suited for resource poor households as they are able to produce even with minimal inputs. (Ashley and Nanyeenya 2005). Typically rural farmers do not sell their livestock at maturity; they keep raising them to sell when they get a serious financial need (Ashley and Nanyeenya 2005). They would not be able to do that if they reared high input requiring animals. Many development organizations like VEDCO encourage farmers to rear high producing improved breeds which often require more inputs (Ashley and Nanyeenya 2005). It is imperative that when the farmers are given the improved animals, there is a market strategy in place so that the animals can be sold as soon as they

mature to prevent overspending money on them which would reduce the farmer's profits. The farmers also need to be taught new savings strategies to prepare for and anticipate financial needs since they may not have the option to sell animals when they have a financial need.

Consumption of animal source foods

Consumption of animal source foods provides micronutrients which are important especially in children (Murphy et al 2003, Murphy et al 2007). Focusing on nutrition is one way to develop the human resource for greater productivity (Neumann et al 2003).

Farmers in the study area do not regularly slaughter their livestock for food. When asked what the most frequently consumed animal source food was, the most common responses were; cows milk 50.4%, eggs 19.5% and fish 9.7%. The three most commonly consumed animal source foods are a 'renewable resource'. Milking a cow or eating the eggs from a hen does not kill the goose that lays the golden egg. Analogously, their fishing does not deplete fish from the river Nile and Lake Kyoga where most of the fishing is done (Dolan 2005). The most common reasons given for why cow's milk, eggs and fish were most frequently consumed were; we have it, it is easy to get (61%), we like it (11.5%) and it is cheap (9.7%). Cow's milk was an important animal source food in Kamuli, the study area. Although VEDCO does not support farmers with cows, 8.5% of the goat farmers reared goats so as to exchange them for cows and 2.2% of chicken owners reared chickens so as to exchange them

for goats. About 6-12 chickens could be exchanged for a goat and 6-10 goats could be exchanged for a cow.

Rural farmers generally rarely slaughter their animals, they consider it to be unaffordable except for special occasions, like honoring a special guest, religious festivities and when the animal is sick (Aklilu 2007). It is unlikely that the farmers in the study purchased animal source foods after selling their livestock because many of them reported that they consumed more home grown animal source foods (63%) than purchased animal source foods (37%). Although 62.7% of all the farmers felt that their households consumed enough livestock products, this is likely not the case because of the high incidence of malnutrition among children in Kamuli (Nonnecke et al 2010).This seems to suggest that these farmers are not aware of the levels of dietary intake of protein recommended for good health.

Marketing livestock

Many farmers (87.6%) have sold livestock in the last few years since they joined VEDCO. A total of 56.8% of all the farmers who had sold livestock and /or livestock products sold them to traders who re-sold them in the trading centers or other towns, 3.6% sold them to butchers who owned small roadside butcher shops in towns or trading centers and 39.5% sold them to fellow farmers and other people in the neighborhood who purchased them for home consumption or to raise them. More chickens and eggs (54.1%) had been sold than either

goats (24.4%) or pigs (29.3%). The chickens were mostly sold to traders (43%) and other farmers (25.9%) whereas there was no recognizable preference for where pigs and goats were sold (P=0.01). It was relatively easy to sell livestock, as 44.2%, 61%, 60.8% and 53.9% of the people who had sold pigs, goats, chickens and eggs, respectively, rated the ease to sell between 8-10 on a 1-10 scale with 10 the highest or most favorable rating. However, the conditions of sale did not favor the farmers. The price was subjectively based on the size and appearance of the animal, and it was settled after haggling with the buyer (Table 4).

Table 4. How did you determine the price to sell your animals?

Factor considered	**% of farmers**
Size and appearance of the animal	49.9
Going price for similar animals in the village	19.3
Take buyer's price after haggling	19.3
My current money needs	6.2
The investment in the animal	5.3

Usually farmers sell their livestock because of an urgent financial need; therefore they are prone to exploitation by buyers and often get low prices for their animals (Dolan 2005, Turner 2005). Another problem the farmers faced was, although buyers could be found, they

were not necessarily available to buy at the time the farmers needed the money which was frustrating to the farmers. It was easier to sell a few animals; it was a problem to find buyers who would buy in bulk. Availability of buyers, price, number of animals that could be sold and whether they could get immediate cash were the factors farmers considered important when selling livestock (Table 5)

Table 5. Factors farmers considered important in selling livestock

Factors	**% of farmers**
Availability of buyers	73.0
Price	19.7
Whether they could sell many animals at ago	4.7
Whether they could get immediate cash when they needed it	2.6

Conclusion and recommendations

- Farmers choose the type and number of livestock to rear based on their individual circumstances, their resource base and the needs of the household therefore it is important to consider these factors in dealing with the farmers
- Livestock play an important role not only as a source of long term income but also as a source of quick cash when the household has a financial emergency. Unlike crops which are seasonal, farmers count on livestock to always be there when they need to sell them.

- Improved nutrition did not necessarily result from livestock rearing There is need to determine how much animal source protein the households consume and to educate them on how much they need in order to meet the goal of improved nutrition.There is a need to encourage farmers to purchase more livestock products especially during periods when they do not have eggs or milk at home. Education on the importance of animal source foods and quantities required for improved nutrition status has to be provided before the farmers fully exploit their livestock resource for better health and wellbeing.
- Farmers need organized marketing channels to help them get the best price for their animals. Farmers should be encouraged to sell their animals and save the money for emergencies instead of keeping the animal and selling at the time the money is needed because it is unlikely that they will get a competitive price in the latter scenario. Better marketing strategies than what exist presently could position the farmers to profit more from their activities and their farming would have a greater impact on their lives.

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References

Aklili H A 2007 Village poultry in Ethiopia; Socio-technical analysis and learning with farmers. PhD thesis, Wagenigen University, Wagenigen, The Netherlands. http://library.wur.nl/wda/dissertations/dis4246.pdf

Ashley S and Nanyeenya W 2005 More than income-pro poor livestock development policy in Uganda. In: Rural livelihoods and poverty reduction policies (Editors: Ellis F and Freeman H A) Routledge.New York, USA Pages 215-234

CSRL (Center for Sustainable Rural Livelihoods) 2010 Livestock. Iowa State University. http://www.srl.ag.iastate.edu/News/livestock.php

De Haan C, VanVeen S T, Brandenburg B, Gauthier J, Le Gall F, Mearns R, and Simeon M 2001 Directions in development. Livestock development implications for rural poverty, the environment and global food security (Directions in Development). The World Bank, Washington D.C

Dolan C S 2005 Household composition and rural livelihoods in Uganda. In: Rural livelihoods and poverty reduction policies (Editors: Ellis F and Freeman H A) Routledge.New York, USA Pages 215-234

Kristjanson P, Krishna A, Radeny M and Nindo W 2004 Pathways out of poverty in western Kenya and the role of livestock. Pro poor livestock policy initiative working paper No. 14 http://www.fao.org/ag/AGAinfo/programmes/en/pplpi/docarc/wp14.pdf

Murphy P S and Allen H L 2003 Nutritional importance of animal source foods. Supplement: Animal source foods to improve micronutrient nutrition in developing countries. Journal of nutrition 133: 3932s-3935s

Murphy P S, Gewa C, Grillenberger M, Bwibo O N, Neumann G C 2007 Designing snacks to address micronutrient deficiencies in rural Kenyan school children. Journal of nutrition 137: 1093-1096

Neumann C G, Bwibo N O, Murphy S P, Sigman M, Whaley S, Allen L H, Guthrie D, Weiss R E and Demment MW 2003 Animal source foods improve dietary quality, micronutrient status, growth and cognitive function in Kenyan school children; Background, study design and baseline findings. Journal of Nutrition 133: 3941s-3949s. http://jn.nutrition.org/cgi/reprint/133/11/3941S

Nonnecke E, Musasizi B, Schalinske K and Reddy M 2010 Assessing the nutritional status of pregnant women in rural Kamuli District Uganda. A poster in; Establish and Grow student projects: Assessment of children in Kamuli District of Uganda. http://www.ag.iastate.edu/students/service_learning/establish_and_grow/studentprojects.html

Peacock C 2005 Goats-A pathway out of poverty. Small Ruminant Research 60:179-186

Randolph T F, Schelling E, Grace D, Nicholson CF, Leroy JL, Cole D C, Demment M W, Omore A, Zinsstag J and Ruel M 2007 Role of livestock in human nutrition and health

for poverty reduction in developing countries. Journal of Animal Science 85:2788-2800 http://jas.fass.org/cgi/reprint/jas.2007-0467v1.pdf

Siefert L and Opuda-Asibo J 1994 Intensification of goat production in Uganda and associated health risks. Ruminant Research and development in Africa. Proceedings of the second biennial conference of the African small ruminant research network. AICC, Arusha, Tanzania

Turner R L 2005 Livestock liberalization and democracy; constraints and opportunities for rural livestock producers in a reforming Uganda.Pro-poor livestock policy initiative.PPLPI working paper No.29. http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp29.pdf

UBOS (Uganda Bureau of statistics) 2002 Population and housing census. http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/2002%20Census%20Final%20Reportdoc.pdf

CHAPTER 3. EFFECTS OF TRAINING AND FACILITATION OF FARMERS IN UGANDA ON LIVESTOCK DEVELOPMENT

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A. Ampaire and M .F .Rothschild

Abstract

Development efforts in lower income countries generally aim to improve the income and nutrition of rural farming households. Frequently development programs train farmers and give them livestock so that those farmers in turn train other farmers and pass on the livestock in the form of offspring. The paper examines the effects of training and facilitation of farmers on livestock development by discussing the differences in performance indicators of three farmer groups. The first group received training and support from a development program, the second group received less training and support from the program and the third group did not receive training or support.Results show that in some ways training and facilitation is of advantage to the farmers, but sometimes other factors such as the farmers' resources are limiting to the farmers' progress.

Key words: Farmer to farmer extension, poverty reduction, rural livelihoods

Introduction

Farmer training is an important tool widely utilized by development programs in developing countries (Birkhaeuser et al 1991, Van den berg et al 2007, Delia et al 2008). In Uganda, government and privately run extension services as well as non- governmental organizations offer training packages to their farmers. Training procedures vary from one or two day workshops and seminars, on farm training and demonstration, to field visits.

Many rural households in Africa have some experience in rearing animals, especially small livestock such as goats and chickens, which are ubiquitous in the region (Adams et al 2010). Training in animal management is desirable to farmers as they are often eager to improve their knowledge and practices and to have their knowledge affirmed by professionals. Therefore, training sessions are usually well attended. Trainings are an avenue for development workers to pass on new information and to correct miss-conceptions concerning animal management, as well as re-assure the development workers that the animals will receive adequate care. Organizations that give animals to farmers usually require that the farmers receive some training before they are given the animals.

One of the popular extension strategies in developing countries is a ‘farmer to farmer approach’. Farmers chosen to be model farmers are selected based on criteria that is

determined by the development organization. Usually the criteria include qualities such as; education level, leadership position, success at the enterprise, and personality traits (Muok et al 2001). The model farmers are trained and given inputs such as animals and tools. Other farmers are encouraged to learn from the model farmer and the model farmers are required to encourage and train their peers by generously sharing their knowledge (Muok et al 2001).

Volunteer Efforts for Development Concerns (VEDCO), a non- governmental organization in Uganda and the Centre for Sustainable Rural Livelihoods (CSRL) at Iowa State University (ISU) in the United States of America have set up a livestock development program in Kamuli district, Uganda. The CRSL/VEDCO livestock development program seeks to help resource poor farmers in that area to improve their household income and nutrition and hence their livelihoods (CSRL 2010). In this program, farmers receive training in animal management before they are given livestock. The farmers who receive livestock are expected to train other farmers in their farmer groups and pass on a predetermined number of offspring when the animals they receive reproduce.

VEDCO utilizes a version of the 'model farmer' extension strategy as well. Certain farmers are chosen, trained and given some inputs. These Rural Development Extensionists (RDEs) volunteer to assist other farmers to run their livestock enterprises and Community Nutrition and Health Workers (CNHWs) volunteer to assist fellow farmers concerning health and nutrition issues (CSRL 2008).

This study seeks to examine the effects of training and facilitation of farmers on livestock development. The paper discusses the differences in performance indicators between three farmer groups; Group 1 members were the RDEs and CNHWs, most of whom have received animals and training from the CSRL/VEDCO program. Group 2 members had received animals and some training from members of Group 1 or from the program; Group 3 members had not received animals or special training.

Although other aspects of farmers' livelihoods may improve when they receive animals and training, such as improved social standing in community which opens for them leadership and networking opportunities (Randolph et al 2007), we have restricted the paper to performance indicators that directly relate to income and nutrition.

Data collection and analysis

Data were collected from all the sub counties in Kamuli District, Uganda where the CSRL/VEDCO program currently operates. Open ended questions were used to guide personal interviews which were carried out as informal discussions between the researcher and farmers in the VEDCO/CSRL livestock development program. A total of 113 farmers who reared pigs, goats and/or chickens took part in the interviews at their homes. Farmers were categorized into 3 groups, Group 1 were RDEs and CNHWs, most of whom had received animals and training from the program; Group 2 had received animals and some

training from members of Group1 or from the program, included in this group were farmers who had reared animals specifically for sale, as part of an earlier project. Group 3 members had not received animals or special training from the program.There were 41 farmers in group 1, 33 farmers in group 2 and 39 farmers in group 3. The interviews were conducted in the local language and recorded so that the researcher could fill in the questionnaires at the end of the day. This was done to mimic a visit by an advisor that the farmers would ordinarily receive, and ensured that the farmer was at ease, and not disrupted by the researcher constantly having to fill the questionnaire. Each interview lasted approximately 40 minutes. The data were analyzed using descriptive statistics like frequency tables to summarize the data and cross tabulations to determine relationships between variables. Relationships between variables were tested by Chi square tests using Predictive Analytics Software (PASW).

Results and discussion

Size of livestock enterprise

The size of a livestock enterprise is often related to its profitability and the bigger the livestock operation the lower the cost of operation per animal (Delgado et al 2008). Training and facilitating farmers did not impact the size of the farmers' livestock enterprises. There was no difference in the total number of pigs, goats or chickens reared by members of group 1, group 2 or group 3. Most of the farmers in all the groups owned 1-5 pigs, 1-5 goats

and 1-10 chickens (Table 1). Uganda, like many other poorer African countries suffers from under-production and under-consumption of animal source foods (Speedy 2003).

Table 1. Percentage (%) of farmers of each group who rear the different species of livestock

Species	Number of animals	Group 1, %	Group 2, %	Group 3, %
Pigs	0	48.1	36.4	59.0
	1-5	41.4	51.5	41.0
	6-10	7.9	9.1	0.0
	>10	2.6	3.0	0.0
Goats	0	13.3	7.1	7.1
	1-5	69.9	75.0	75.1
	6-10	13.5	14.3	17.8
	>10	3.3	3.6	0.0
Chickens	0	7.3	17.2	16.2
	1-10	46.3	58.7	60.3
	11-50	29.3	24.1	18.1
	>50	17.1	0.0	5.4

The country's livestock production just about supplies domestic demand for meat, there are no significant meat exports but the country is strategically placed to supply the regional

market (King 2002).There is need to increase the number as well as the productivity of animals in order to increase profits and to have enough animals so that the farmers can afford to slaughter some for food. Currently, the farmers do not often consume their livestock because they cannot afford to sacrifice the few that they have (Ampaire et al 2010).

Some farmers were interested in increasing the number of animals they owned. When asked about their animal breeding plans, some farmers planned to increase the size of their herd, while some planned to sell the young since they could not afford to keep many animals. Among the advice given to VEDCO to better meet the farmers' needs, 12.8% of the farmers asked VEDCO to provide loans and inputs so that the farmers are able to put to use the knowledge they had acquired during trainings.

Animal health

To achieve improved nutrition and higher income the animals have to be kept healthy. Disease reduces animal productivity and market access (Maitima et al 2010, King 2002) Many farmers (40%) decide the price to sell their animals based on the appearance of the animal; healthy looking animals fetch better prices (Ampaire et al 2010). All farmers irrespective of group were concerned about the animal disease. When asked what aspects of animal production they felt they needed more training in, 47.7% of all the farmers mentioned

training in disease management and treatment (Table 2). There was no difference between the groups in disease occurrence among goats and chickens in the six month period preceding the study.

Table 2. Areas of animal production where the farmers felt they needed more training (% per group)

Responses	**Group 1**	**Group 2**	**Group 3**	**% of total**
Disease management and treatment	47.7	56.6	38.8	47.7
Improved animal management (intensive animal management, management of upgraded animals)	38.6	33.4	52.8	40.3
Animal feeding, mixing of cheap feed	13.7	10.0	8.4	12.0

However, fewer members of Group1 than Group2 or Group 3 had sick pigs in the six month period preceding the study ($P<0.05$). This is probably because more farmers who received animals from the program received pigs not goats or chickens, therefore farmers have had more training in pig management. Although more members of Group 2 had received pigs than members of Group 1, members of Group 1 had the pigs for a longer period and therefore were more experienced and better trained in pig management than members of Group 2.VEDCO carries out follow up visits and other farmer support activities, therefore the

farmers who had received animals for the longest time are likely to have had their learning reinforced through these activities.

Record keeping

Record keeping is an important tool in livestock production and is important for the farmer to be able to evaluate the performance of the enterprise and as a basis for management decisions such as animal selection for breeding. Record keeping at the farm level is also important for research, policy development and extension (Abegaz et al 2008). Lack of farm records is a limitation to livestock development in poor countries (Ergano and Nurfeta 2006). The lack of records has been attributed to low levels of education of the farmers. In this study, more members of Group 1 (61.6%) had more than primary level education, compared to members of Group 2 (28.1%) and Group 3 (26.3%) ($P<0.01$) (Table 3).

Table 3. Farmers' education level per group

Education level	Group 1	Group 2	Group 3
Primary	30.7	53.1	65.8
Secondary	59.0	28.1	15.8
Junior	2.6	0.0	10.5
Other	5.1	18.8	7.9
None	2.6	0.0	0.0

Record keeping was associated with education level (P<0.01),in that all the farmers who had no formal education had no records irrespective of farmer group and more members of Group 1 than Group 2 and Group 3 thought it was important to keep records (P=0.05). There was no difference however in the reasons why records were not kept by farmers of different education levels and only 4.1% of the farmers did not keep records because they did not know how to write (Table 4).

Table 4. Reasons why farmers did not keep records (% responses per group)

Reason	**Group1**	**Group 2**	**Group 3**	**% of total**
I have not taken the time	20.0	30.5	29.5	27.4
I do not need records (small operation, local animals, no expenses to track)	26.7	26.0	20.5	24.7
I do not understand the value of keeping records	13.3	13.0	26.5	19.1
I do not know how	6.7	8.7	23.5	15.1
Others (started and gave up, got discouraged)	20.0	17.5	0.0	9.6
I cannot write	13.3	4.3	0.0	4.1

Many farmers at each education level thought it was important to keep records (P<0.01). These findings seem to suggest that lack of education is not the major reason why farmers do

not keep records. We found that the main reasons for not keeping records as shown in Table 4 were; farmers had just not taken the time to keep records (27.4%), farmers thought that they did not need to keep records because they had only a few animals or had a low input system (24.7%); they do not understand the value of keeping records (19.1%) and they did not know how to keep records (15.1%). Although more members of Group1 than Group 2 or Group 3 of the same formal education level thought it was important to keep records ($P<0.01$), more members of Group 2 than Group1 or Group 3 of the same formal education level kept records ($P<0.05$). This attests to the nature of livestock rearing in rural households where under subsistence farming, livestock rearing is not considered to be a business enterprise. Probably if the farmers kept records they would be able to see trends in their enterprise and make strategic plans to improve where they are not doing well which would help them to see their enterprise as a business venture. Members of Group 1 had been taught the importance of record keeping in their training but they did not act on the knowledge as much as members of group 2. This is probably because Group 2 had some members who were commercially oriented and therefore saw their livestock enterprise as a business. Development workers need to work more with the farmers by teaching them the value of farm records and showing them how to do it. The assumption that rural farmers are not educated and therefore not able to keep records limits efforts in this regard, thus undermining livestock development. Almost all the farmers who had received animals from the program kept a visitor's book because the program emphasized that they do. The same could be true

for farm records if their importance was stressed to the farmers by the program. Some farmers only kept records for the animals they had received from the program and not for their other animals because they felt that they were not accountable to anyone for their other animals.

Livestock consumption and sale

More members of group 1(82.9%) than group2 (61.3%) or group 3 (42.1%) felt that their households consumed enough livestock products ($P<0.01$). Also, more members of group 1(97.6%) than group2 (84.8%) or group 3 (79.5%) had sold some of their animals or livestock products ($P<0.05$).The higher consumption of livestock by group 1 members could be attributed to the fact that some members of group 1 are CNHWs who have received training in proper nutrition and volunteer to assist their fellow villagers to properly feed malnourished children (Mazur 2010). Eating and serving guests was by far the major reason why members of group 1 reared chickens whereas members of group 2 and group 3 reared them both for money and to eat ($P<0.05$) (Table 5).

Table 5. Reasons for rearing chicken (% per group)

Reason	Group 1	Group 2	Group 3
Income	25.9	30.1	23.1
Petty cash for daily needs	24.1	32.0	32.6
Eating and serving guests	43.2	33.1	34.7
Easy to raise and quick to sell	5.1	2.8	9.6
Exchange for goats	1.7	2.0	0.0

Probably more members of group 1 have sold livestock than members of Group 2 and Group 3 because they have had more training from the program hence they likely have embraced the concept of rearing animals for sale when the animals mature instead of rearing animals as a 'living savings account' like it is commonly practiced in developing areas (Randolph et al 2007). They have also had the animals from VEDCO for a longer time.

Conclusion and recommendations

Farmer training and facilitation did not have an impact on the size of livestock enterprise. The main limitation to expansion of the farmers' livestock enterprises was availability of resources to be able to manage the animals.

- Farmer training and support seem to have had an impact on animal health, livestock consumption, and sale. Farmers who had received more training and support had less disease in pigs in the six months preceding the study than those who had not been trained or who had the animals for a shorter period of time. The farmers who had more training and support also consumed more and sold more livestock.
- Probably because of the small size of livestock enterprises which were not run as businesses, many farmers did not see the need or the value of record keeping.
- Finding ways to pool resources could help the farmers to overcome the limitation of inadequate resources so that they are in a better position to rear more animals and hence have more to eat and more to sell. The program could also explore the possibility of extending micro credit to the farmers.

- Since record keeping is an important tool for livestock development, the program needs to encourage the farmers to keep records. Keeping records might encourage the farmers to see the profit potential of their enterprises and begin to manage them as businesses. For the farmers who cannot write, other members of the household such as children who attend school might be able to help.

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References

Abegaz S, Awgichew K, Yami A, Abebe G, Zewde S and Hirpa A 2008 Records and record keeping. Chapter thirteen in: Sheep and goat production handbook for Ethiopia.Editors: Yami A and Merkel R.C http://www.esgpip.net/HandBook/Chapter13.html

Adams E R, Hamilton P B and Gibson W C 2010 African Trypanosomes; celebrating diversity. Trends in Parasitology. Article in press.

Ampaire A and Rothschild M.F 2010 Pigs goats and chickens for rural development; Small holder farmers' experience in Uganda. Livestock Research for Rural Development 22(6) http://www.lrrd.org/lrrd22/6/ampa22102.htm

Birkhaeuser D, Everson R.E and Feder G 1991 The economic impact of Agricultural extension: A review. Economic development and cultural change 39 (3)

CSRL (Center for Sustainable Rural Livelihoods) 2010 Livestock. Iowa State University. http://www.srl.ag.iastate.edu/News/livestock.php

CSRL (Center for Sustainable Rural Livelihoods) 2008 CSRL-Agricultural Training. http://www.srl.ag.iastate.edu/News/agtrainging.php

Delia G, Randolph T, Oumar D and Peter-Henning C 2008 Training farmers in rational drug use improves their management of cattle trypanosomosis: A cluster randomized trial insouth Mali. Preventive Veterinary Medicine 83 (1): 83-97

Delgado L C, Narrod A C, and Tiongco M M 2008 Determinants and implications of the growing scale of livestock farms in four fast growing developing countries. Research report 157-International Food Policy Research Institute-IFPRI. http://www.ifpri.org/sites/default/files/publications/rr157.pdf

Ergano K and Nurfeta A 2006 Economic performance of case study diary farm in southern Ethiopia. Livestock research for rural development 18 (1) http://www.lrrd.org/lrrd18/1/erga18008.htm

King A 2002 Annex to case study on livestock and livestock products. Joint Donor agencies study on the performance of and growth prospects for strategic exports in Uganda. Delegation of the European Commission Uganda

http://www.finance.go.ug/docs/livestocknnexes.pdf

Maitima M J, Rakotoarisoa A M, and Kang'ethe K E 2010 Responding to changing markets in a context of increased competition for resources.In:Livestock in a changing landscape, volume 2. Experiences and regional perspectives. Editors:. Gerber P, Mooney A H, Dijkman J, Tarawali S and De Haan C. Island press, Washington, DC.

Mazur R E 2010 Sustainable rural livelihoods-experience in Uganda. TSCS 220 Global sustainability. Powerpoint presentation.

http://econ2.econ.iastate.edu/classes/tsc220/hallam/MazurTSC220Presentation2010.pdf

Muok B, Kimondo J, and Atsushi I 2001 Farmer to farmer extension; experience in drylands Kenya.Publication of Forest Extension.International union of forestry research organizations http://www.regional.org.au/au/iufro/2001/muok.htm

Randolph T F, Schelling E, Grace D, Nicholson C F, Leroy J L, Cole D C, Demment M W, Omore A, Zinsstag J and Ruel M 2007 Role of livestock in human nutrition and health for poverty reduction in developing countries. Journal of Animal Science 85: 2788-2800

http://jas.fass.org/cgi/reprint/jas.2007-0467v1.pdf

Speedy W A 2003 Global production and consumption of Animal source foods.Supplement: Animal source foods to improve micronutrient nutrition in developing countries.Journal of Nutrition 133: 4048s-4053s http://jn.nutrition.org/cgi/reprint/133/11/4048S

Van den berg H and Jiggins J 2007 Investing in farmers-The impacts of farmer field schools in relation to integrated pest management. World development.35 (4): 663-686

CHAPTER 4. DIFFERENCES BETWEEN MEN AND WOMEN FARMERS' EXPERIENCES WITH A LIVESTOCK DEVELOPMENT PROGRAM IN KAMULI, UGANDA

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A. Ampaire and M. F. Rothschild

Abstract

Women and rural dwellers are in greater poverty than men and people living in urban areas in Uganda. Development programs are therefore increasingly focusing on the rural poor. A livestock development program was established five years ago in the rural district of Kamuli, as a collaborative effort between Iowa State University and a local development organization. A survey was carried out to assess the impact of the program on rural farmers. Gender disaggregation of the data indicated that men and women farmers experienced the program differently because of factors such as inequality in education, access to information and time use differences. These results showed how important it is to consider rural farmers not as a uniform category. It is important to pay attention to gender roles, strengths, and limitations in program implementation. The paper attempts to explain the apparent differences in the experiences of men and women farmers.

Key words: animal management, gender, small-holder, small livestock

Introduction

In Uganda, the majority of the people live in rural areas and many of the rural dwellers (90%) are dependent on small scale farming (Datta-Mitra 2001). In 2002, poverty in rural areas in Uganda was estimated at 41.7% while that in urban areas was estimated at 12.2% (Kappel et al 2005). Women comprise 70-80% of the agricultural workforce yet at least a third of the women in Uganda live in absolute poverty (Lucas 2001). In order to improve the plight of the rural poor the government and many non-governmental organizations are prioritizing the smallholder farmer in the rural areas, especially women farmers in their development efforts.

Livestock rearing has been shown to be a pathway out of poverty (Ehui et al 2005, Randolph et al 2007). Most of the small livestock such as pigs, goats and chickens in Uganda, like in most parts of Africa, are kept at home and raised in free-range, backyard or semi-intensive systems. It follows from this that the bulk of the labor of taking care of the small livestock falls on the shoulders of women who, culturally are expected to take care of the homestead. Since small livestock are generally within the domain of women, they are more likely to be owned by women than larger livestock. Development organizations generally consider rearing small livestock a good way to improve the livelihoods of rural women.

It is generally accepted that improvements in the well-being and incomes of women translate into improvements in the livelihoods of the household and the society at large

(Ferreira et al 2005). Empowerment of women is an important aspect of economic development in developing nations. Women are recognized as development partners and increasingly, various organizations are focusing on women and their potential to contribute to their society's development. The World Bank advocates for measuring of women's empowerment as a variable in International Development (Malhotra et al 2002). Improving women's equality and empowerment is not only just, it is necessary for successful development (USAID 2010). There is a need to, in some way, measure the impact of development programs on both men and women. Development programs need to be seen not only through an economic lens, but also through a gender lens. Inclusion of women in development programs needs to go hand in hand with evaluation of how the programs impact them and there is a need for gender-disaggregated data (Guèye 2003). Inequalities between men and women in society need to be examined closely in order to find ways of correcting them and not perpetuating them. For example, sometimes livestock projects that distribute animals to families do not necessarily benefit the women in the household. Women usually provide most of the labor but may not realize the entire benefits from the activity (Miller 2001) which could reduce their eagerness to participate. In order to have women fully on board as partners in economic development, care has to be taken to create an enabling environment for them to participate.

Volunteer Efforts for Development Concerns (VEDCO), a non- governmental organization in Uganda, and the Centre for Sustainable Rural Livelihoods (CSRL) at Iowa State University (ISU) have set up a livestock development program in Kamuli district, Uganda. The CRSL/VEDCO livestock development program seeks to help resource poor farmers in that area to improve their household income and nutrition and hence their livelihoods (CSRL 2011). In this program, farmers receive training in animal management before they are given livestock. The farmers who receive livestock are expected to train other farmers in their farmer groups and pass on a certain number of offspring when the animals they receive reproduce. Women play an important role in this program and there are slightly more women than men in the program.

The CRSL/VEDCO livestock development program in its approach treats ‘farmers’ as a uniform category and assumes that men and women experience the program the same. This study differentiates between men and women farmers to determine if gender plays a role in the farmers’ success with the program. This paper seeks to describe and to explain the findings which were found to be different between the men and women farmers.

Data collection and analyses

Open ended questions were used to guide personal interviews which were carried out as informal discussions between the researcher and farmers in the VEDCO/CSRL livestock development program from all the six sub counties in which the program operates. A total of

113 farmers who reared pigs, goats and/or chickens took part in the interviews at their homes 72 of the farmers interviewed were women and 41 were men. The interviews were conducted in the local language and recorded so that the researcher could fill in the questionnaires at the end of the day. This was done to mimic a visit by an advisor that the farmers would ordinarily receive, and ensured that the farmer was at ease, and not disrupted by the researcher constantly having to fill the questionnaire. Each interview lasted approximately 40 minutes. The data were analyzed using descriptive statistics like frequency tables to summarize the data on women and men farmers, and cross tabulations to determine relationships between other variables and gender. Relationships between variables were confirmed by Chi square tests using Predictive Analytics Software (PASW).

Results and discussion

Profile of farmers

There were more women (63.7%) than men (36.3%) in the sample (Table 1), but an equal proportion of men and women in the sample had received animals from the program (59.2% of the women and 58.5% of the men). More than half of the farmers of each gender had been with the program for five years, 63.9% of the women and 56.1% of the men. Almost all the farmers irrespective of gender (98.6% of the women and 95.1% of the men) had reared animals before they joined the program. Farmers in the program can choose between pigs,

goats and/or chickens and there was no difference between men and women on the animal species received from the program.

Table 1. Profile of farmers in the study

Characteristic	Women (%)	Men (%)
Received animals from the program	59.2	58.5
Been in the program 5 years	63.9	56.1
Reared animals before joining the program	98.6	95.1
Primary caretakers of the animals	91.1	65.7
Were married	82.9	95
Had no formal education	14.9	2.6

This study was unable to establish if these farmers owned the animals they had reared at the time of joining the program. More women (91.1% of the women) compared to men (65.7% of the men) were the primary persons taking care of the animals ($p<0.05$). This was in agreement with findings in other developing countries that women are primarily involved in taking care of small livestock within the homestead in rural areas. Most of the farmers of

either gender were married (82.9% of the women and 95% of the men). Of the women, 17.1% were unmarried, either they had not married, were separated or were widowed. This is an important group of women as concerns development efforts since it has been established that unmarried women are often the poorest of the poor due to lack of access to resources (Chant 2007) and female headed households are usually in greater poverty than male headed households. Women had less formal education than men ($P<0.05$), most of the women (58.6%) had only some primary education, while most of the men (56.4%) had some secondary education. More women (14.9%) compared to men (2.6%) had no formal education at all.

The data were suggestive that more women than men did not have any upgraded pigs (66.2% of the women compared to 48.5% of the men), and men had a higher number of upgraded pigs than women (Table 2, $p= 0.05$). This finding could be an indicator that men farmers are better off economically than women farmers. In Uganda upgraded pigs (crosses between exotic and indigenous pigs) are commonly kept for commercial purposes. Poor farmers generally start with indigenous livestock which are considered to require low or no input as well as less risky in terms of disease susceptibility (Anderson 2003), and later upgrade to crosses and pure breeds as they become more economically secure. Differences in education and financial resources are likely to lead to unequal access to material resources and information, which is likely to impact the day to day choices that the farmers make in running their enterprises. There is a concern that more financially secure and more educated

members of groups tend to dominate the others in participatory community programs. It is therefore important that development workers pay attention to the needs of the less educated and poorer women farmers.

Table 2. A higher percentage of men rear upgraded pigs

Number of pigs	Women (%)	Men (%)
0*	66.2	48.5
1-3	30.6	28.3
4-7*	1.6	18
8-12	1.6	5.2

**The data are suggestive that more men than women have upgraded pigs and they have higher numbers of them, p- value=0.053*

Animal management practices

Several indicators of the level of animal management such as animal housing, animal disease occurrence, animal feeding, animal reproduction practices, record keeping and areas in which farmers felt that they needed more training were investigated during the interviews. There was little difference in animal management practices between men and women. This seems

to suggest that animal management practices in Kamuli are generally homogeneous as far as gender is concerned. Some studies in other places have found animal management practices to differ based on gender. The sameness in animal management practices could also be due to the fact that women do the actual day to day work of managing the animals even when some men think that they are the primary caregiver. There is a possibility that giving instructions to family members to manage the animals and playing a supervisory role is interpreted by the men as their part in care giving. Among the animal reproduction practices most of the farmers irrespective of gender (57.4% of the women and 61.8% of the men) let their animals breed freely at home, there is no controlled or intentional mating planned by the farmer. However, more women (34%) than men (12.9%), if they do not have a mating male of their own, depend on their female animals mating when they meet other animals in the neighborhood during free range foraging (Table 3, $p<0.05$).

Table 3. Differences in animal reproduction practices by women and men farmers*

Reproduction practice	**Women (%)**	**Men (%)**
Animals breed freely at home (I have male and female animals)	57.4	61.8
I take the female to a neighbor's male or borrow a male for a few days	5.6	26.4
Animals bred by random neighborhood animals during free range foraging	37.0	11.8

***If the farmers do not own a breeding male animal, more men than women farmers are likely to borrow or take their female animal to a neighbor's male, p-value=0.036*

The explanation for this could be the fact that women in rural settings spend more time working within the household than men. Therefore the women are less likely to go to a neighbor to borrow a male animal or take their female animal to the male animal if they do not have a male animal at home and if they have to walk considerably long distances. One of the major problems which the farmers, men and women, generally found in animal reproduction was the difficulty to access a male animal and the long distances that are traveled to access one (Table 4).

Table 4. Difficulties faced concerning animal reproduction

Difficulty faced	**Women (%)**	**Men (%)**
It is not easy to access a male animal	41.1	71.4
Long distances travelled to get a male animal	41.2	28.6
Diseases	11.7	0
No good breeding animals in the neighborhood	5.6	0

More women than men did not keep records and this cannot be attributed only to the education level difference between men and women. It was previously found that at the same

level of education whether a farmer had received training in animal management or not, made a difference in whether the farmer kept farm records or not (Ampaire et al 2010a). The amount of time a farmer has could also be a factor that determines whether the farmer keeps records or not. Women are generally busier than men since they do more household chores, including raising the children. They are thus more likely to neglect taking records as this is an additional demand on their time. Not having time and not seeing the need for records were among the major reasons why the farmers did not keep records (Ampaire et al 2010b)

Although there was no difference based on gender in how comfortable the farmers felt in their ability to raise pigs or chickens, there was a difference in the farmer's comfort level in their ability to raise goats. More women, 51.3% rated their comfort level between 8-10 on a 1-10 scale where 10 was the highest comfort level, compared to 36.8% of the men ($p<0.05$). More men (21.0%) than women (8.1%) were not comfortable with their ability to raise goats. This was surprising since traditionally it was the boys who herded goats (Siefert et al 1994). Many farmers currently have less land to herd goats and the young boys are in school so the goats are tethered near the homestead if they have no housing structure. The goats need to be monitored since they tend to break loose and can destroy neighbor's gardens and hence create quarrels (Ampaire et al 2010b). Probably because men tend to spend less time at home than women, they feel ill at ease to raise goats when they will not be home to monitor them, whereas women who mostly work at home can easily do that.

The greater importance of the CSRL/VEDCO program to women

Most of the men and women farmers felt that the CSRL/VEDCO livestock program was relevant to their needs and met their expectations (90.1% of the women and 92.3% of the men). There was a difference however between women and men in their perception of the program. The majority of the women (72%) rated the program highly whereas the majority of the men (58.8%) rated the program moderately (8-10 and 5-7 respectively on a 1-10 scale, with 10 being the highest rating) ($p<0.05$).

Table 5. Importance/relevance of the CSRL/ VEDCO livestock program to farmers

Rating*	**Women (%)**	**Men (%)**
1-4	10.3	10.4
5-7	17.7	58.8
8-10#	72.0	30.8

** Rating 1-4 is low, 5-7 is moderate, 8-10 is high*

#The majority of the women gave a high rating while the majority of the men gave a moderate rating, P-value=0.001

These data were suggestive that more women than men (53.5% of the women compared to 28.1% of the men) thought that rearing livestock contributed highly to their livelihoods, a rating of 8-10 on a scale of 1-10 with 10 being the highest rating ($p=0.05$, Table 5). More

women than men rated themselves as being very active in VEDCO activities (75.7% of the women and 53.8% of the men, $p<0.05$). More women (19.4%) than men (2.5%) were unaware of other programs in their locality which catered to livestock farmers ($p<0.05$) and fewer women (37.5%) than men (74.4%) ($p<0.05$) were members of other development organizations other than VEDCO. The women probably rated the importance/relevance of livestock to their livelihoods higher than the men perhaps because most rural women have less mobility and hence less access to opportunities outside the home compared to men. The fact that women are more restricted to the domestic sphere than men could also explain why more women are unaware of other programs and why fewer women are members of other programs. One of the reasons that farmers gave for why they thought that VEDCO was better than other programs they knew of or which they were members of was that it did not discriminate against members in that it was easy to join. This is probably why some women were able to join this program and not other programs. The fact that the women rated the program more highly and they were more active in it could be an indication that the CSRL/VEDCO livestock program is a real opportunity for the women and because of that, they have committed themselves and put much effort into it.

Conclusion and recommendations

- Gender disaggregation of data which was collected in a general assessment of the impact of the CSRL/VEDCO Livestock development program on farmers indicated

- that women and men farmers in some instances experienced the program differently because of different life situations.
- Inequality in education, access to information and time use are some of the factors which bring about different outcomes for men and women farmers.
- There is need for development workers to specifically pay attention to how gender roles, strengths and limitations might impact the outcomes of the development programs.

References

Ampaire A and Rothschild M F 2010a Effects of training and facilitation of farmers in Uganda on livestock development. *Livestock Research for Rural Development. Volume 22, Article #130.* Retrieved November 23, 2010, from http://www.lrrd.org/lrrd22/7/ampa22130.htm

Ampaire A and Rothschild M F 2010b Pigs, goats and chickens for rural development: Small holder farmer's experience in Uganda. *Livestock Research for Rural Development. Volume 22, Article #102.* Retrieved January 21, 2011, from http://www.lrrd.org/lrrd22/6/ampa22102.htm

Anderson S 2003 Animal genetic resources and sustainable livelihoods. Ecological economics Vol. 45 Issue 3

Chant S 2007 Gender, generation and poverty. Exploring the "feminization of poverty" in Africa, Asia and Latin America. Edward Elgar publishing, Cheltenham, UK

CSRL (Center for Sustainable Rural Livelihoods) 2011 Livestock. Iowa State University. http://www.srl.ag.iastate.edu/News/livestock.php

Datta-Mitra J 2001 Uganda: Policy, participation, people. Operations Evaluations Department, World Bank, Washington DC.

Ehui E and Pender J 2005 Resource degradation, low agricultural productivity and poverty in sub-Saharan Africa: Pathways out of the spiral. Agricultural Economics, Volume. 32

Ferreira H G F and Walton M 2005 World development report 2006: Equity and development, World Bank, Washington DC

Guèye E F 2003 Gender issues in family poultry production systems in low-income food-deficit countries. American Journal of Alternative Agriculture, Volume 18, Issue 4

Kappel R, Lay J and Steiner S 2005 Uganda: No more pro-poor growth? Development policy review, Volume 23(1)

Lucas E Linda 2007 Locating women: structure and work in the Ugandan macro economy. Unpacking globalization: markets gender and work. Lexington books, Lanham, MD

Malhotra A, Schuler S R, and Boender C 2002 Measuring women's empowerment as a variable in International Development. Background paper prepared for the World Bank workshop on poverty and gender: new perspectives, Washington, DC

Miller B A 2001 Rights to livestock; empowering women to achieve food security .International Food Policy Research Institute. http://www.ifpri.org/sites/default/files/publications/focus06_04.pdf

Randolph T F, Schelling E, Grace D, Nicholson CF, Leroy J L, Cole D C, Demment M W, Omore A, Zinsstag J and Ruel M 2007 Role of livestock in human nutrition and health for poverty reduction in developing countries. Journal of Animal Science 85:2788-2800 http://jas.fass.org/cgi/reprint/85/11/2788.pdf

Siefert L and Opuda-Asibo J 1994 Intensification of goat production in Uganda and associated health risks. Ruminant research and development in Africa. Proceedings of the Second Biennial Conference of the African Small Ruminant Research Network. AICC, Arusha, Tanzania

USAID 2010 United States Agency for International Development; Women in Development http://www.usaid.gov/our_work/cross-cutting_programs/wid/

CHAPTER 5. GENERAL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

General discussion

In chapter 1, the review of literature focused on why livestock are important for the poor and what advances and opportunities existed to ensure that the poor benefit more or continue to benefit from livestock rearing. Chapters 2, 3 and 4 reported on the experiences of poor farmers in the rural Kamuli district of Uganda in rearing pigs, goats and chickens to improve their household income and nutrition with the support of a livestock development program. This final chapter discusses the farmers' experiences with respect to the literature reviewed in chapter1. Recommendations and conclusions are drawn.

One of the reasons that village livestock are considered important, especially for the poor, is their ability to convert household refuse and other waste into byproducts (meat, milk and eggs) for human consumption (FAO 2007). Many of the farmers in the study fed their household left overs and agricultural produce that they did not want, such as very small potatoes, to chickens and pigs. They also cut potato vines and cassava leaves and other tree branches to feed to their animals. There was no mention by the farmers of growing fodder crops and leguminous plants to feed animals and apparently there is little use of manure to feed the soil in the study area. In an era where there is concern about the environmental

effects of rearing livestock (De Haan et al., 2001), there is need for more vigilance in making concerted efforts to return to the environment what animals get out of it. It is a good opportunity that poor farmers can feed household refuse and agricultural waste to animals instead of having to buy expensive feed all the time. However if that waste was left in the field it would have decomposed and improved the soil, so the farmers need to use the manure to improve the soil. Growing fodder crops and leguminous plants would be another way of positively impacting the environment.The CSRL/VEDCO program has a component that deals with environmental and natural resource management (CSRL 2011a), livestock farmers need to be integrated in it.

Some of the farmers viewed their animals as insurance against crop failure, as a living bank, in that they could sell the animals when they needed cash anytime during the year since the animals are always there unlike crops.The most important reasons for rearing animals were source of income and source of money to buy basic needs. For all the three species (pigs, goats and chicken) the farmers appreciated the faster return to investment. This is one of the reasons why rearing small livestock is appropriate for the rural poor (Nwafor 2004). The size of the livestock enterprises were limited by the farmer's resources, farmers only reared few animals because that was all they could afford to manage. Rearing livestock is a good way to step up and improve nutrition and income (Randolph et al., 2007) but in order to step out of poverty, farmers need more resources to expand and to be able to apply what they learn during training. Pooling resources in the form of group savings, such as rotating savings and

credit associations (Biggart 2001; Naraj et al., 2009) could enable the farmers to expand their enterprises. Rearing animals provided opportunity for the farmers to 'step up' by selling them to pay school fees for the children. The 'pass the gift' arrangement employed by the CSRL/VEDCO program allowed farmers to acquire animals who did not have any before or who would have found it difficult to acquire upgraded breeds of pigs. In the literature small livestock like pigs goats and chickens are considered ideal for the poor because of the lower requirements and maintenance costs as well as less risk in owning them (IFAD 2001). The farmers in the study felt that it was a substantial investment on their part to own even small livestock unless they were rearing local breeds in a back yard free range system without much input. Rearing upgraded better producing breeds of animals gives farmers more products, but this may be out of the reach of very poor farmers who cannot afford to feed the upgraded animals adequately to realize increased production. In areas where there is no ready market to sell the upgraded animals when they are ready to be sold, the farmer who continues to purchase feed for the animal past the sale date experiences financial loss. The CSRL/VEDCO program in cognizance of the fact that some farmers have a hard time feeding the animals they receive gives the farmers some bags of feed to start the farmers off. Local animals produce better when their management is improved (Chiduwa et al., 2007), teaching farmers how to improve animal management and giving them local animals may be an alternative for farmers who cannot afford to feed upgraded animals.

In the literature animal diseases were identified as one of the major constraints to animal production in rural areas (FAO 2001). The farmers in the study were frustrated by animal disease, they felt that it was a risk to rear animals since they could die in case of disease. Many farmers treated the sick animals themselves using home made concoctions though it was not clear whether the treatments worked on not. Some Rural Development Extensionists were treating animals and giving advice on animal diseases. Farmers requested more training in animal disease management. At the time of conducting the study the CSRL/VEDCO was in the process of hiring a Veterinarian, which could help farmers in dealing with the constraint of animal diseases.

The farmers in the CSRL/VEDCO program did not mention that they used livestock to improve the land. Only one or two farmers reared livestock for the manure and none of the farmers sold manure to other farmers. Although some farmers fed their livestock weeds and herbage, none of the farmers saw their livestock as a means of weed control. It is probably not part of the culture of the people in this area and it needs to be taught to the farmers for them to appreciate and practice land improvement by rearing animals. Some literature shows that women farmers are more likely than men farmers to include in their farming practices that care for the environment (Buckingham-Hartfield 2000; Wells et al., 2006). This is probably a strength that can be tapped into.

Livestock are reared by the rural poor to serve some social functions (Ashley et al., 2005). The main social function served by the livestock was serving guests. Many farmers reared chickens specifically for that purpose. It is a custom in this area that when an honored guest arrives, a chicken is slaughtered to eat in the guest's honor. Rural farmers often rear multiple species to hedge against risks (Anderson 2003). The farmers who reared multiple species did not articulate the need to hedge against risks as their reason for rearing them. Each species had its function, chickens were raised mostly for consumption and petty cash for basic needs and goats were raised for cash for basic requirements that needed a little more money than a farmer could get from selling chickens whereas pigs were a source of income to help step out of poverty, such as send children to school, build a house, etc.

For many poor rural farmers, joining a farmer group is the way to get support, training, and access to resources (Davis 2004). Farmer groups were a source of support to the farmers especially the women farmers since they have less opportunity in general to acquire knowledge and get support outside the household.

Conclusions

The overall objective of the study was to assess how the farmers who rear small livestock were doing in terms of animal management, program participation and livelihood improvement. The research questions below were asked.

- Are farmers employing good animal husbandry practices?

- What factors hinder farmers from taking care of their animals properly?
- What problems have they faced and what successes have they achieved?
- What do the farmers think of the program and how engaged are they?
- Have the farmers seen an improvement in their livelihoods which they attribute to livestock rearing?

To help answer those research questions, the following specific objectives were adopted.

1. Capture the profile of participating livestock farmers, such as age, gender, household size, number and species of animals, duration of livestock rearing, duration with the program, etc.
2. Establish and assess the farmer's management practices in animal feeding, breeding, disease control, record keeping and animal housing, which are some of the pillars of animal production.
3. Identify the factors which limit livestock production (problems faced by the farmers).
4. Investigate if there has been an improvement in the livelihoods of participating farmers because of rearing animals.

Answers obtained to the research questions and objectives of the study are as follows:

Farmers' profile: There were few young people in the program; most of the farmers were above 25 years of age and most of them were married and had families. Almost all the farmers had reared some animals before they joined the program although it was not

established if the farmers had owned the animals. More than half of all the farmers interviewed had been in the program for at least 5 years. Few farmers did not have any formal education; most farmers had some primary education.

Animal husbandry practices: Many farmers employed fairly good husbandry practices as far as available resources allowed. For example, where the farmers lacked a housing structure for the animals, pigs and goats were tethered near the homestead and some food brought to the animals. However, more could be done to further improve the management practices with more urging and encouragement by VEDCO personnel and RDEs. For example, most farmers who did not have a housing structure for chickens left them to roam around in the neighborhood exposing them to diseases, theft and predation. Low cost day-time housing for chicken could be easily constructed using locally available materials. Many farmers did not keep farm records. More emphasis on the importance of records by VEDCO trainers could improve the situation.

Hindrances to livestock production and problems faced by farmers: One of the hindrances to livestock production was lack of resources. Some farmers reported that they did not have the means to put what had been taught them during training into practice. Commercial animal feed was expensive, so farmers reared few animals to which they fed agricultural by-products such as potato vines and cassava leaves. Many chickens were left to

scavenge for their own food in the neighborhood, which exposed them to diseases, theft and predation. Another hindrance was lack of knowledge. Many farmers requested more training in animal disease management and management of upgraded breeds of animals. Lack of time was a hindrance in that farmers did not view livestock rearing as a business. Livestock rearing was something they did in addition to something else. Women farmers had to take care of the household and the homestead so they felt that they did not have enough time to devote as much attention to rearing animals. For example, more women farmers did not keep records compared to men farmers. The marketing system in place was a hindrance in that farmers were not able to get as much money as they thought their animals were worth and there were no buyers who bought in bulk. Just a few animals or eggs could be sold at a time, so farmers tended to keep few animals.

Successes achieved by farmers, improvement in farmers' livelihoods and farmers' perception of the program: Many farmers reported that they had learned a lot from the experience of rearing animals with support and training from the CSRL/VEDCO program. One of the reasons why farmers rated the CSRL/VEDCO program highly was because they felt that they had learned a lot. The farmers had gained the understanding that consuming animal source food was good for them. Some of the farmers had seen their malnourished children's health improve by including more protein, especially milk and eggs to the children's diets. Many farmers had sold livestock and expressed that their level of poverty

had reduced and they had more money for day –to- day living expenses than they did before they started rearing animals. Many farmers, especially women farmers rated themselves as very active in the activities of CSRL/VEDCO.

In general, the farmers in the CSRL/VEDCO program have benefited from livestock rearing and they have income options and knowledge which they did not have before, for which they are grateful. They have experienced some problems such as losses due to animal diseases and losses due to feeding upgraded animals for too long because of lack of a coordinated marketing avenue. The farmers have high regard for the CSRL/VEDCO program. They feel that it has been attentive to their needs and it has delivered on its promises. The farmers are hopeful for an even brighter future as they continue to work with the program.

Recommendations for future research

- Women farmers seem to be very enthusiastic about the CSRL/VEDCO program. With the current world wide trend in increased focus on women's empowerment and increased recognition of women's involvement in development, a study on what livestock rearing and the opportunity to participate in the program means to women in their relationship to men and to society is needed.
- Rural farmers have non conventional treatment methods for their animals which may be lost as modern medicine becomes easier to access. However, these methods may

- be cheaper and probably healthier. There is a need to study the ethno-veterinary practices and evaluate their efficacy.

References

Anderson S 2003 Animal genetic resources and sustainable livelihoods. Ecological Economics 45: 331–339

Ashley S and Nanyeenya W 2005 More than income-pro poor livestock development policy in Uganda. In: Rural Livelihoods and Poverty Reduction Policies (Editors: Ellis F and Freeman H A) Routledge.New York, USA Pages 215-234

Biggart W N 2001 Banking on each other: the situational logic of rotating savings and credit associations. Advances in Qualitative Organization Research 3: 129-153

Buckingham-Hartfield S 2000 Gender and environment. Routledge. New York, USA

Chiduwa G, Chimonyo M , Halimani T E, Chisambara S R and Dzama K 2007 Herd dynamics and contribution of indigenous pigs to the livelihoods of rural farmers in a semi-arid area of Zimbabwe. Tropical Animal Health and Production 40: 125-136

CSRL (Center for Sustainable Rural Livelihoods) 2011 Livestock. Iowa State University. http://www.srl.ag.iastate.edu/Official/about.php

CSRL (Center for Sustainable Rural Livelihoods) 2011a Livestock. Iowa State University. http://www.srl.ag.iastate.edu/News/resource%20management.php

Davis E K 2004 Report on Technology Dissemination by Farmer Groups in Meru Central District of Kenya, University of Florida, Gainesville http://etd.fcla.edu/UF/UFE0006340/davis_k.pdf

De Haan C, VanVeen S T, Brandenburg B, Gauthier J, Le Gall F, Mearns R, and Simeon M 2001 Directions in development. Livestock development implications for rural poverty, the environment and global food security (Directions in Development). The World Bank, Washington D.C

FAO, Food and Agriculture Organization 2001 Economic impacts of Transboundary pests and diseases. Types of economic impacts of Transboundary diseases. The State of Food and Agriculture 2001.Food and Agriculture Organization of the United Nations, Rome http://www.fao.org/docrep/003/x9800e/x9800e00.HTM.

FAO, Food and Agriculture Organization 2007 The state of the world's animal genetic resources for food and agriculture. Editors Rischkowky R and Piling D. Rome

IFAD, International Fund for Agricultural Development 2001 Livestock assets and the rural poor. IFAD Rural poverty report 2001: The challenge of ending rural poverty. http://www.ifad.org/lrkm/theme/production/assets.htm

Naraj N, Chandrakanth M G, Acker D, Chengappa P G, Shruthi H R, Yadava C G and Kanwar R 2009 Economic performance of self help groups in Karnataka with special reference to Venkatenahalli in South India. Indian Journal of Agricultural Economics 64(4). http://indiaenvironmentportal.org.in/files/Self%20Help%20groups.pdf

Nwafor C U 2004 Small ruminant livestock marketing in The Gambia: A socio-economic perspective. Livestock Research for Rural Development. Vol. 16 Art. #24. http://www.lrrd.org/lrrd16/4/nwaf16024.htm

Randolph T F, Schelling E, Grace D, Nicholson CF, Leroy JL, Cole D C, Demment M W, Omore A, Zinsstag J and Ruel M 2007 Role of livestock in human nutrition and health for poverty reduction in developing countries. Journal of Animal Science 85:2788-2800 http://jas.fass.org/cgi/reprint/jas.2007-0467v1.pdf

Wells L B and Gradwell S 2006 Gender and resource management: Community supported Agriculture as caring practice. Agriculture and Human Values 18(1):107-119

APPENDIX ISU/CSRL-ANIMAL AGRICULTURE QUESTIONAIRE

ISU IRB #1	09-154
EXEMPT DATE	31 March 2009
Initial By:	jlc

Farming operation

How many years have you been with the VEDCO/CSRL program? ----------

Did you have small livestock at the time you joined the program? Yes No

Are you the primary caregiver for the animals? Yes No

Type	How many?								
	Current total			Breeding age Total		Starting total			years with livestock
	F	M	upgrade	F	M	F	M	upgraded	
Pigs									
Goats									
Chicken									
Others									

What was the goal for starting this livestock enterprise?

Has the goal changed since? Yes No

If yes please explain how ----------

How much experience did you have in livestock farming before you started this enterprise? Please rate this on a scale of 1 to 10, with 10 being the highest
1 2 3 4 5 6 7 8 9 10

Animal management

Housing

housing structure						
present			Rain gets in		type	
pigs	Yes	no	yes	no	temporary	permanent
goats	yes	no	yes	no	temporary	permanent
chicken	yes	no	yes	no	temporary	permanent

Description observed on site by interviewer ----------

Do you separate your animals from each other?						
pigs			Chicken		goats	
By species	yes	no	yes	No	yes	no
By age	yes	no	yes	No	yes	no
By sex	yes	no	yes	No	yes	no
When sick	yes	no	yes	No	yes	no

Where do the animals stay for the night? (if no housing structure)

Goats ----------
Pigs ----------
Chicken ----------

Day time housing				
	All day	Part of the day	Some times	Not at all
pigs				
goats				
chicken				
Management if not housed				
	Tethered nearby	Tethered far off	Left to move freely	Someone watches them
pigs				
goats				
chicken				

What difficulties have you experienced as regards the issue of animal housing?
Pigs .....

Goats .....

Chicken ----------

Health and disease
Considering all the problems you experience in rearing animals, how important is disease? Please rate this on a scale of 1 to 10, with 10 being highest

Pigs 1 2 3 4 5 6 7 8 9 10

Goats 1 2 3 4 5 6 7 8 9 10

Chicken 1 2 3 4 5 6 7 8 9 10

What is the most important health problem to you?
Pigs ----------
Goats ----------
Chicken ----------

Do you treat animals using traditional methods? Yes No

If yes, do the traditional animal treatment methods work? Yes No

Do you have access to someone who has been trained to treat sick animals? Yes No

In terms of distance, is that person near or far from you? Near Far

Do you have regular contact with that person? Yes No

Health issues noted on the farm by the interviewer ----------
---

Animal feeding

What do you most commonly feed your animals?
Pigs ----------
Goats ----------
Chicken ----------

Are there feedstuffs which are only available seasonally? Yes No

What feedstuffs and when are they available? (give the most important)

Feedstuff	when available	when unavailable
---	---	---
---	---	---
---	---	---

Do you feel that all your animals have enough feed through out the year? Yes No

If No, please explain----------

Do you feel that you have enough water for all the animals through out the year? Yes No

If No, please explain.----------

Before you started rearing animals, did you have a plan for a source of feed? Yes No

If yes, how has your plan worked out? Please explain ----------
---

Before you started rearing animals, did you have a plan for a source of water? Yes No

If yes, how has your plan worked out? Please explain ----------
---

General body condition score of the animals observed by the interviewer ----------
---

Animal breeding

Here are some of the breeding practices carried out by farmers. Which of these apply to you?

	Own males breed own females freely	I borrow someone's male for breeding	I lend someone my male for breeding	I take my female to someone's male for breeding	I pay for breeding service	I have a breeding plan
pigs						
goats						
chicken						

What plan do you have for your animal as far as breeding is concerned?

Pigs ----------
Goats ----------
Chicken ----------

From your breeding practices, how likely is it to mate a male animal to his close female relatives (mother, daughter, grand daughter, sister)? Use a scale of 1 to 10, with 10 being very likely.

Pigs 1 2 3 4 5 6 7 8 9 10

Goats 1 2 3 4 5 6 7 8 9 10

Chicken 1 2 3 4 5 6 7 8 9 10

What problems do you have as regards animal breeding?

Record keeping

Do you keep a record of any of the transactions on your farm? Yes No

If yes, what is the most important reason why you keep records?

Do you think it is important to keep record of what transpires on the farm? Yes No

If No to part 1, have you ever tried to keep records on your farm? Yes No

Why do you not keep records? ---

Livelihoods

What are the major sources of income for this household?

Of these sources of income, which do you consider to be the most important? ---

---

Why do you consider this source of income to be the most important? ---

---

On a scale of 1-10, with 1 being the least and 10 the highest, how do you rate the contribution of livestock to your livelihood? ---

Have you experienced an improvement in your livelihood since you joined the program? Yes No

Do you feel that your household consumes enough livestock products (any)? Yes No

What is the most frequently consumed animal product by your household at home? ---

Please give a reason(s) for your answer---

What does your household consume more of?

--- purchased livestock products
--- Home grown livestock products

Have you sold any of your animals or products from the animals such as eggs? Yes No

If yes what animals or products have you sold? ----------

Where do you sell your animals and / products?
Pigs----------
Pork ----------
Goats ----------
Goat meat ----------
Chicken ----------
Eggs ----------
Others (specify) ----------

How easy is it to market your animals or products such as eggs and meat in general? scale of 0-10,10 is very easy,1 is very difficult,.0 is I have no idea

Pigs 0 1 2 3 4 5 6 7 8 9 10

Pork 0 1 2 3 4 5 6 7 8 9 10

Goats 0 1 2 3 4 5 6 7 8 9 10

Goat meat 0 1 2 3 4 5 6 7 8 9 10

Chicken 0 1 2 3 4 5 6 7 8 9 10

Eggs 0 1 2 3 4 5 6 7 8 9 10

Please explain your answer.

Pigs ----------

Pork ----------

Goats ----------

Goat meat ----------

Chicken ----------

Eggs ----------

How do you get market and price information? ----------

Do you feel that rearing small livestock is a worthwhile venture if one's goal is to reduce poverty and improve livelihoods? Yes No

PART II Attitudes and perceptions of participating farmers

How many other programs which cater to livestock farmers are you aware of? ----------

How many other programs which cater to livestock farmers are you a member of?

How long have you been a part of any other development program? ----------

Why did you join the VEDCO program?

Do you feel that this program meets your individual expectations? Yes No

Please explain your answer----------

How active would you say you are in taking part in the VEDCO activities compared to other members? Use a scale of 1 to 10 with 10 as the highest. ----------

Overall how would you compare another program which you have been a member of to the VEDCO program?

VEDCO is better VEDCO is about the same VEDCO is worse

Please explain your answer. ----------

In order for this program to better help you reduce poverty and improve the livelihood of your household, what do you think needs to change?----------
---

Family

Household number ---------- Village ----------

Gender male female
Age ----------
Education level completed primary secondary other (specify) ----------

Marital status single married separated widowed

Household size --------

No. of children ----------

Children's ages

How many adults live in the household at least half of the year? -----

-The End-

Thank you for your time and patience in answering the questions

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