

An Analytical Framework for Assessing the Costs and Benefits of a Volunteer Farmer Trainer Programme in Meru, Kenya: Can Trainers Cover Their Extension Costs by Selling Inputs and Services?

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Steven Franzel, World Agroforestry Centre

Abstract. The decline of government extension systems in Africa has led to the introduction of alternative and complementary dissemination approaches, such as the use of volunteer farmer trainers. This study assesses the costs and benefits of a farmer trainer program implemented in Meru, Kenya, for disseminating information about dairy goats. An analytical framework was drawn up for assessing costs and benefits from the perspective of three stakeholders: farmer trainers, farmers (called trainees) who were trained by the farmer trainers, and the project itself. The assessment reported in this study was conducted during the first year of implementation so results are preliminary. We found that important benefits accrued to all three types of stakeholders. Trainees earned substantial returns from their goat enterprises. Farmer trainers reaped important non-financial benefits, particularly enhanced social status. Moreover, considerable potential was found for them to cover their extension costs, mostly their time, by earning financial benefits from providing complementary services, such as buck servicing or selling fodder seed. The project's financial benefits were very high, relative to its cost. More research is needed for understanding how to improve the effectiveness of the farmer trainer approach as well as rigorous comparison with alternative extension approaches.

1. Introduction

- Government extension programs are in decline across Africa. Main causes are
 - budgetary limitations
 - concerns over effectiveness and the weaknesses of particular extension approaches such as "Training and Visit," and
 - the rise of alternative approaches, e.g., private sector extension.
- As a result, new methods for diffusing agricultural information and technology are being introduced. One such approach is the volunteer farmer trainer program, as exemplified by the Farmer to Farmer Extension project for dairy goat production in Meru, Kenya. The project was introduced by the non-governmental organization, FARM Africa in 2004, using funds provided by the UK Department for International Development.
- Farmer trainers are not necessarily experts per se, rather they are selected by their peers on the basis of their ability to communicate with and train their fellow farmers. Gladwell (2002) and Nanok et al. (2006) have shown that experts in a particular subject are not necessarily the persons most effective in disseminating new ideas.

- The costs and benefits of extension approaches are rarely analyzed. The objective of this paper is
 - to draw up a analytical framework for assessing the costs and benefits of a farmer trainer programme from the perspective of three participating stakeholders: trainees (the farmers receiving training), farmer trainers, and the project.
 - determine the costs and returns faced by each of the three main stakeholders
 - Draw conclusions on the extent to which farmer trainers can cover the costs of their voluntary extension activities by selling inputs and services.

2. Analytical framework

In order for the program to be sustainable, benefits need to exceed costs for each of the three types of stakeholders: the trainees, the farmer trainers, and the project. The analytical framework for the cost-benefit analysis (Table 1) shows that each of the three main project stakeholders face different costs and benefits.

- The trainees must find that adopting dairy goats is profitable.
- The farmer trainers must find that the benefits of engaging in extension activities exceeds the costs of their involvement.
- The project must find that the benefits to society of implementing a farmer trainer programme are greater than the costs.

A key feature of the framework in Table 1 is that many of the benefits of farmer trainer programmes are not measurable or cannot be monetized. These include

- the generation of knowledge and lessons at the project level that may be of global significance,
- the building of “social capital” among farmer trainers and trainees. Social capital refers to the social resources that people draw upon through networks and groups in pursuit of their livelihood objectives (DFID, 1999)
- enhanced social status for the farmer trainer. These non-monetary benefits may be more important than the monetary ones in motivating farmer trainers to participate.

3. Methods

3.1 Background on the site and project

- Farmers in Meru Central and Meru South Districts of Eastern Province, Kenya, operate small, mixed farms, cultivating maize, beans, and coffee.
- Increasing population pressure and reduced size of land holdings have reduced options for grazing local breeds of cattle and goats. Poor farmers cannot afford improved breeds of milk cows.
- In 1994, FARM Africa initiated a project to introduce dairy goats to poor farmers. Farmer groups composed of 20 members (1) maintain breeding stations with bucks to service members’ dairy goats (2) earn money for the group by providing breeding services to non-member farmers, and (3) facilitate the exchange of information among members and access to outside services. By 2004, the project was assisting over 100 groups with over 1,000 members in 50 communities (Garforth et al., 2006; DFID 2009).

- In 2004, FARM Africa started the Farmer to Farmer Extension model to test the effectiveness of a volunteer farmer trainers, called community extension workers, in promoting dairy goats to other communities in Meru Central and Meru South Districts. Sixteen farmer trainers, including six women were recruited (Garforth et al., 2006; Amudavi, 2006; DFID 2009).

Table 1. Analytical framework: Benefits and costs of a Farmer Trainer Programme from the perspective of different stakeholders

Item	Stakeholders		
	1. Project	2. Farmer Trainers	3. Trainees
Benefits	<p>1. Benefits to farmers acquiring dairy goats or improving management of the ones they have (see column 3)*</p> <p>2. Benefits to economy in terms of increased income and employment</p> <p>3. Lessons learned, knowledge generated “international public goods”</p> <p>4. Enhanced food and nutritional security and health of beneficiaries</p>	<p>1. Empowerment, knowledge, which help Farmer Trainers to increase economic benefits from their own enterprises.</p> <p>2. Higher social status</p> <p>3. Economic benefits from extension activities (e.g., Sale of fodder shrub seed and seedlings)</p> <p>4. Economic benefits to members of their groups (from sale of group-owned seed, seedlings, etc.)</p> <p>5. New contacts with other institutions</p>	<p>1. Increased benefits from dairy goat enterprise (from getting a dairy goat and/or managing it better): in terms of increased flock size and value, goat sales, milk and manure.*</p> <p>2. Empowerment, knowledge that farmers use in improving other enterprises.</p> <p>3. Enhanced social capital provides benefits to group members, e.g., through group involvement in economic activities other than dairy goats</p>
Costs	<p>1. Training Farmer Trainers</p> <p>2. Monitoring Farmer Trainers</p> <p>3. Managing project</p>	<p>1. Time spent being trained, including travel to and from the training*</p> <p>2. Time spent conducting training, including travel to and from the training*</p> <p>3. Time spent linking with other projects/institutions</p>	<p>1. Costs associated with having a goat or improving management of it (e.g., buying fodder shrub seed, minerals, veterinary costs)*</p>

* denotes the benefits and costs that were measured in monetary terms in this study.

3.2 Survey design and data collection

Data on costs and returns of the dairy goat enterprise are based on Mukhebi (2002). Prices were updated to those prevailing in Meru District during 2005. In some cases, coefficients were also modified, according to expert opinion and farmer interviews (Table 2)

Data on costs incurred by farmer trainers were collected from monitoring records of fifteen randomly selected farmer trainers. The trainers kept records of the time they spent in extension activities and the costs they incurred over a three month period. Data were also available from ten of the farmers on the number of farmers they trained over a five month period.

Data on the costs incurred by the project were taken from project records.

There are several factors that may introduce inaccuracy or biases:

- Evaluating an extension approach is always problematic because a single extension method, e.g., farmer trainers, is never independent of other methods, e.g., radio shows, flyers, posters, etc.
- Farmer trainers may over-estimate the time that they spent in extension activities and the number of people they train in order to please project staff. On the other hand, they may underestimate the number who adopt as a result of their activities. For example, they will likely not be aware of “second-generation” trainees, that is, those trained by the farmers they train.
- The assessment reported in this study was conducted during the first year of implementation so results are preliminary.

4. Results

4.1 Will farmer trainers work on a volunteer basis?

- The data strongly support the hypothesis that farmers will practice extension on a volunteer basis. The farmer trainers received no compensation for conducting training; the only materials they received were items (e.g., seed) for demonstrations on their farms. Yet over a five month period, they each trained an average of 15.8 farmers (st.dev. 9.6) per month, spending about six hours per week.
- Similarly, Franzel et al. (2004) found that volunteer farmer trainers in central Kenya each helped 13 to 100+ farmers plant fodder shrubs over a three year period.

4.2 Cost-benefit analysis: trainees’ perspective

Interviews with farmer trainers showed that the benefits they generate are almost exclusively in helping new farmers to adopt dairy goats. There were almost no cases where they provided technical advice to farmers who already had dairy goats. The trainers explained that assisting farmers who already had dairy goats was not worthwhile, and somewhat sensitive. They claimed that farmers were familiar with improved practices but could not afford them or had decided not to use them.

In Table 2, we show gross margins, that is, revenues minus variable costs, for the dairy enterprise. These indicate the levels of returns that trainees can earn from adopting dairy goats. Gross margins amounted to \$US 19 per goat in 2000 and \$US 47 in 2004. Higher values in 2004 were largely due to changes in assumptions about the length of lactation period, increased milk prices, milk yields and goat

values. The rapid spread of dairy goat groups, which increased from 40 in 2000 to 113 in 2004, is indicative of the profitability of the enterprise.

Table 2. Gross margins for a cross bred dairy goat

Revenues and costs (\$US/goat)	2000	2004	Explanation for changes in benefits from 2000 to 2004
Revenues			
Revenue from goat sale	5.31	7.28	50% increase in goat values
Flock value	5.21	7.13	50% increase in goat values
Milk value	15.21	49.84	Incr. in price/litre from 20 to 25, incr. in yield from 0.5 l/day to 0.75, and increase in milking days/yr from 110 to 210
Manure value	0.19	2.03	USD 0.02/kg, assuming 3% N and N valued at USD 0.65/kg, 91 kg manure/goat/yr
Revenue per goat	25.93	66.09	
Variable costs			
Minerals	0.99	1.27	
Veterinary costs	3.85	6.28	
Supplies	0.22	0.20	
Interest	1.42	1.54	
Labor	0	10.12	Not costed in 2002. 2004: estimated at 10 days/year and costed at USD 1/day, the average daily wage rate.
Gross margin	19.46	46.67	
Exchange rate (KSh/USD)	72	79	

4.2 Cost benefit analysis: Farmer trainers' perspective

The time that farmer trainers spent in extension activities ranged from 8-100 hours per month. In the analysis we used the median number of hours per month: 24 hours. Farmers' time spent on extension activities was valued at USD 1.5/7-hour day. We valued their labor at 50% higher than the going agricultural wage rate in the area in order to account for the higher opportunity cost of their labor relative to that of other farmers.

Three types of farmer trainers receive monetary benefits from their extension activities: community animal health workers, buck keepers and fodder shrub seed sellers. The two buck keepers obtain new customers who wanted to have their goats served. The five health workers and one seed seller got access through being a farmer trainer to new customers for their products.

The number of farmers trained per farmer trainer averaged 15.8 per month. But there was considerable variation; the numbers ranged from 3 to 33 per month. Nearly all were trained in groups, as the trainer would engage a

group that was interested in acquiring dairy goats.

Table 3 shows that an animal health worker could cover his/her costs of being a farmer trainer by gaining just two customers per month while a buck keeper would need eight customers and a fodder shrub seed vendor, 21 customers. The analysis thus suggests that it is likely to be very profitable for a health worker to become a farmer trainer but considerably less profitable for a buck keeper or a seed seller.

Table 3. Number of new customers required to cover the costs of farmer trainer activities

Farmer trainer	Cost (USD) per month of time spent training other farmers	Revenue per customer (USD)		No. of customers/month required to cover costs of farmer trainer activities	Average number of farmers trained per month	No. of customers/month required as a percentage of average number trained per month
		Gross	Net			
Community animal health worker	5.9	6.28	3.75	1.6	15.8	10%
Buck keeper	5.9	0.82	0.82	7.2	15.8	46%
Fodder shrub seed vendor	5.9	0.57	0.29	20.3	15.8	130%

Farmer trainers also have important non-financial benefits from being a farmer trainer (Amudavi, 2006):

- improved social status,
- satisfaction in engaging in altruistic activities,
- new contacts they make with other institutions, and
- knowledge acquired from the training they receive, which may help increase income from their own farms

These may be more important to them than the financial benefits

4.3 Cost-benefit analysis: Project perspective

The costs and benefits of the farmer trainer programme, based on actual costs and projected benefits, are shown in Table 4. Staff costs involve an MSc level researcher, a technician and a driver each employed half-time in the first year and one-quarter time per year over a period of nine years. A project leader provides two months of services in the first year and one month per year thereafter. The team uses a 4 wheel drive pick up truck, a motorcycle, and computer and office facilities.

On the benefits, side, 16 farmer trainers each train 192 farmers per year, half of whom adopt dairy goats. Costs and benefits are discounted at a rate of 15% per year. The results show that the benefits accrued are far greater than the costs. The net present value is USD 1,129,000 and the internal rate of return, 287%. We also computed the break even number of adopters that each farmer trainer would have to train in order to cover project costs. Even if each trained only 10 farmers and 5 of them adopted dairy goats per year, the project would still be profitable. These lower numbers would be very easy to achieve.

Table 4. Economic analysis from perspective of the project

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Costs										
Vehicles (fuel, maint., and depr.)										
4-wheel drive pickup	5000	2500	2500	2500	2500	2500	2500	2500	2500	2500
Motorcycle	420	210	210	210	210	210	210	210	210	210
Staff										
Project leader	6000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Researcher	9000	4500	4500	4500	4500	4500	4500	4500	4500	4500
Data assistant	4200	2100	2100	2100	2100	2100	2100	2100	2100	2100
Driver	1800	900	900	900	900	900	900	900	900	900
Supplies and services	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Costs	28420	15210	15210	15210	15210	15210	15210	15210	15210	15210
Benefits: Goats acquired	0	71677	143354	215030	286707	358384	430061	501737	573414	645091
Net benefits (Benefits minus costs)	-28420	56467	128144	199820	271497	343174	414851	486527	558204	629881
Net present value	1129211									
Internal Rate of Return	287%									

5. Conclusions

The volunteer farmer trainer program assessed in this paper has important benefits for all three stakeholders examined: trainees, farmer trainers and the project. Trainees earn substantial returns from their goat enterprises. There is potential for volunteer farmer trainers to cover their extension costs by selling inputs and services. This is especially true for those selling other services, such as animal health or breeding services. They also accrue important non-monetary benefits, such as improved social status. Financial benefits to the project are very high.

Nevertheless, research is needed to improve the benefits accruing to all three stakeholders. A first critical area is research on farmer trainers and, in particular, how to select, support and motivate them. Another key research area is to assess the dissemination process; who do the farmer trainers train and what is the quality of information disseminated to them? Research is also needed to compare the costs and benefits of the farmer trainer program to other extension approaches, such as conventional government extension programs and farmer field schools.

Finally, it is important to note that farmer trainers need periodic backstopping; there is therefore always a need for Government, NGO, or private extension staff to support farmer trainers. Farmer trainers are therefore not a substitute for these other types of extension but rather a means for making them more effective (Amudavi, 2006).

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