

Working Papers

9. The Goat Model

A proven approach to reducing poverty among smallholder farmers in Africa by developing profitable goat enterprises and sustainable support services

Working Version I for
comment: June 2007

FARM-AFRICA WORKING PAPERS

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FARM-Africa Working Papers

FARM-Africa's new strategy (2006) aims to scale-up the impact of our work in Eastern and South Africa; enabling many more rural Africans to benefit from our solutions to poverty reduction.

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FEEDBACK

We would like to know what you think about this Working Paper. Please complete the feedback sheet on page 53 of this publication and send it to us by post to the above address or email to info@farmafrica.org.uk.

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Christie Peacock wrote this publication and has overseen the development of the goat model since 1988.

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
AHA	Animal Health Assistants
ASAL	Arid and Semi-Arid Lands
CAHW	Community Animal Health Worker
DFID	Department for International Development
EAGODEN	East African Goat Development Network
GOE	Government of Ethiopia
GOK	Government of Kenya
HIV	Human Immunodeficiency Virus
ILCA	International Livestock Centre for Africa
ILRI	International Livestock Research Institute (formerly ILCA)
IPAL	Integrated Project on Arid Lands
MAHWG	Meru Animal Health Workers' Group
MGBA	Meru Goat Breeders' Association
ODA	Overseas Development Administration
SR-CRSP	Small Ruminant Collaborative Research Support Program
TAU	Training and Advisory Unit
WAC	World Agroforestry Centre

1. Introduction

FARM-Africa's strategy is to develop models of good practice in agricultural development that other organisations can adopt and apply in their own situations. In this way FARM-Africa seeks to have greater impact on rural poverty in Africa than it could do by working alone (FARM-Africa, 2007). FARM-Africa has been implementing goat projects in East and South Africa since 1988. Over that time FARM-Africa has learned a great deal about how to design effective goat improvement programmes that really work and have a significant and lasting impact on the lives of smallholder farmers and their families. This experience, together with the experience of others, has been distilled into what FARM-Africa terms *The Goat Model* — described in this publication. FARM-Africa has tested the model in four countries and five different situations and has refined the approach to what is presented below.

The purpose of this document is to give readers enough information to lead them to consider adopting the Goat Model themselves, or for the readers to persuade others to consider adopting the model in their own programmes.

2. The goat model in a nutshell

At the heart of the model is an approach to improving the productivity and economic returns of goats kept by families on small farms. This is achieved by enhancing the management, health and breeding of goats. Critical to the sustainability of the improved performance is basing all the necessary support services and inputs – veterinary care, breed improvement and training – in the hands of farmer groups, or private service providers trained from the community. Farmer-managed organisations are established to co-ordinate and extend services before and after the intervention period. The approach has been tested in four countries in East Africa since 1988 and has been found to generate significant and sustained economic, social and environmental benefits to both households and communities. The model may be targeted at vulnerable households such as those affected by HIV/AIDS or households headed by women. The model has generated sufficient economic benefits to enable families to invest in new on- and off-farm enterprises. However, the model is not a

quick-fix solution, but takes two-five years to yield the full range of substantial benefits.

3. The major problems confronting smallholder farmers – how the Goat Model can help

The problems facing farmers farming small plots in Africa are manifold. Most farmers continue to rely on growing staple crops for survival mixed with a few crops for sale. The decline in the real prices of many traditional cash crops, e.g. coffee, tea and tobacco, combined with uncertain markets, all contribute to the growing and deepening poverty seen in rural Africa today. Child malnutrition rates continue to rise in many parts of Africa despite increased investment in health services and, in many countries, despite the benefits of wider economic growth¹. HIV/AIDS is taking its toll, leaving behind dislocated and impoverished families, many of which are nursing sick family members. The stark reality is that smallholder farmers have few options to improve their lives and the lives of their children. Many demands are placed on family incomes for food, clothing, school fees and healthcare. If the cash is not there people suffer and do not reach their human potential.

A decline in farm size with each generation inheriting land further decreases available household options. Intensification of crop production may be an option for some farmers but many farm plots used for generations are experiencing declining yields from over use, and if not protected, loss of soil through soil erosion. Farmers are increasingly being pushed to farm land unsuitable for cultivation - at lower altitudes under lower and less reliable rainfall or on steeper slopes unsuitable for cultivation. This cultivation on the margins leaves more and more families increasingly vulnerable to the vagaries of the weather. The impact of climate change is only likely to make a difficult situation worse.

Livestock play a critical role in supporting families in most parts of rural Africa. In pastoral societies they are fundamental to the livelihoods of people. In mixed farming areas livestock support families in many different and often unrecognised ways. Livestock are often the only asset of the family sold in times of trouble or for cash to

¹ Reference not available at time of production

pay school fees or medical bills (Heffernan, 2006). Furthermore improving the production and marketing of livestock and their products offers rural producers and opportunity market high-value products to urban consumers (Delgado, Rosegrant, Steinfeld, Ehui and Courbois, 1999).

There is much misunderstanding about the environmental impact of goats. Goats are frequently and conveniently blamed for the environmental damage caused by past overgrazing by other ruminants, particularly cattle and overuse by man. The goat is often found in degraded environments, because it is the only species able to survive on the few bushes and shrubs that remain after the grass has been grazed out by cattle and sheep or ploughed out by man, or where the trees have been cut down by man (Field, 1978). Found 'at the scene of the crime' goats are often erroneously blamed for it. This simplistic thinking does nothing to solve the underlying problems of environmental mismanagement. The FARM-Africa Goat Model offers significant environmental benefits and is an example of how well managed livestock can have a beneficial effect on the environment.

Farmers in most parts of Africa also receive little support in the form of advice, training and inputs from their government. The decline in agricultural support services in recent years has left a vacuum in most rural areas, only filled by the private sector in high potential areas, which offer larger and more reliable markets. NGOs are not the answer, and are only able to offer very variable support and a patchy coverage.

Major problems addressed by the Goat Model

In the above environment the Goat Model specifically addresses;

- Low farm incomes
- Child malnutrition
- Vulnerability of households due to owning few assets
- Poor soil fertility
- Environmental degradation
- Low self esteem, management skill and group cohesion of smallholder farmers

4. Situations suitable to apply the model

The goat model is most suitable in densely populated areas where families are intensively farming small plots of land. Typically farmers may have small farms of 0.25-2ha and grow a variety of crops, including a few cash crops. Rainfall is likely to be above 500mm p.a. A small number of livestock — cattle, goats, sheep, pigs or chickens — may also be kept. The lack of communal grazing areas and intensive cropping means that livestock are often confined in some way by tethering or stall-feeding, for all or part of the year. Crop residues, e.g. sweet potato tops, maize stalks, will often make up the bulk of the diet of ruminant livestock. This situation is the ideal starting point to develop the intensive, housed, goat enterprise, which is the basis of the goat model.

Most people in Africa drink goat's milk, when it is available. However most local goat breeds only produce 200-300ml/day for a very short period 90-120 days (Peacock, 1996). As a result many Africans have not had the chance to consume goat's milk extensively but would do so if given the opportunity. There are a very small number of ethnic groups that have a cultural taboo against drinking goat's milk and the Goat Model should not be used in those places.

Mahatma Ghandi described the goat as 'the poor man's cow' and there is no doubt that the goat has supported poor families in Africa for thousands of years. The goat represents an asset — sometimes the only asset — of the family and may be the only means of survival during drought and famine. In Ethiopia the sale of one goat can feed a family of five for two months (Zewdu Ayele, 1999). Many families in desperate poverty aspire to own livestock and the goat is often the first animal they are able to buy. Enabling families to own goats through a credit programme, an optional component of the model, will help to lift families out of poverty and place them on the first step out of poverty. However, goats should never be given to poor families without training in improved management and health care. In situations where management, particularly feeding and health care, can be improved, families that receive goats can then crossbreed their goats through the breed improvement component of the model, and go on to develop an intensive profitable goat enterprise.

Farmers in densely populated highland areas are finding that cattle are becoming more difficult and risky to keep because of scarcity of feed as well as the lack of veterinary and Artificial Insemination (AI) services. In some situations, e.g. the Central Highlands

of Kenya and western Uganda where cattle were used for ploughing, plots are often so small that cattle are no longer needed as cultivation can be done by hand. As a result there is a growing interest to keep dairy goats even among cattle keepers, many of whom are switching from cattle to goats. A larger number of goats offers less risk than a small number of cattle.

For the model to succeed it is essential that there is the potential to feed goats well, either through the collection and conservation of locally-available feeds including crop by-products, and/or through the growing of forage crops. Waste ground (around the edges of fields for example) can often be used for forage production. Keeping dairy goats also requires sufficient labour to look after them, particularly to cut and carry feed to them.

Situations suitable to apply the model

- Densely populated areas with small farm sizes
- Places where goat's milk is culturally acceptable
- Rainfall above 500 mm p.a.
- Sufficient labour for feed collection
- Supply of feed for goats
- Small sites possible for forage development

5. Situations not suitable to apply the model

The Goat Model is not suitable for dry areas where goats are out grazing. In this situation of low rainfall (<500mm p.a.), high temperatures and disease challenge, it would not be possible, or appropriate, to develop a sedentary intensive goat system using exotic dairy breeds.

The Goat Model should not be used in places where there is a taboo against goat's milk. However it is worth exploring the depth of the taboo as the consumption of goat's milk is often considered a sign of poverty and may not be admitted to in public, particularly by men.

The Goat Model should not be used in situations where there is very limited or weak labour as it will only place a burden on the family members. Some HIV/AIDS affected household may fall into this category.

Situations not suitable to use the model

- Areas of low rainfall below 500mm p.a.
- Areas of poor feed quality or high disease challenge
- Places where there is a taboo against drinking goat's milk
- In households with limited or weak labour

6. Key elements ensuring success – learning from the past

FARM-Africa has learned a great deal from the successes and failures of its own grassroots projects during the last 20 years. It has also learned from the experience of other goat development programmes through visits, workshops and the literature. FARM-Africa is an active member of the International Goat Association and founded the East Africa Goat Development Network (EAGODEN) to promote learning and good practice across the region. FARM-Africa builds its learning into the design of each successive goat project developing a solid core of knowledge about what works and what doesn't.

Past goat development and research programmes have focused, almost exclusively, on improving local breeds of goats. There have been very few successful livestock improvement programmes that only focus on improving management. Most interventions fall into two broad categories:

- a) improvement programmes promoted by government institutions, such as Ministries of Livestock or Agriculture or National Agricultural Research organisations; and,
- b) those promoted by non-government and church-based organisations.

Examples of government programmes

In Kenya the USAID- supported Small Ruminant Collaborative Research Support Program (SR-CRSP) (1980-1992), implemented by the Government of Kenya, tried to develop a new breed called the 'Kenya Dual-Purpose Goat' (KDPG) designed to be

suitable for smallholder systems in East Africa. To develop this new 'synthetic' breed, a complicated breeding plan was followed using a four-way cross between two local breeds (Small East African and Galla) and two European breeds (Toggenburg and Anglo-Nubian) on a government breeding station in Naivasha (Fitzhugh, 1982). A small number of the new breed was developed and tested on farms in western Kenya. Its performance was generally disappointing (Okeyo, personal communication). It was planned to contract commercial farmers to multiply the breed for sale and some were sent to a farm in Kilifi. The ending of donor support, amounting to several million US dollars, effectively terminated the programme and few, if any, KDPGs can be seen today.

The Ministry of Livestock Development, supported by the British Government's Overseas Development Administration (ODA) looked at developing a different type of dual-purpose goat more suitable for arid and semi-arid lands (ASAL). The approach taken at the Marimanti Breeding Station in Tharaka-Nithi District (1983-1989) was to acquire several hundred Galla goats from northern Kenya and select for growth and mothering ability (Skea, 1989). The station was well-funded and as soon as this ended the manager left and the farm quickly fell into disrepair. The goats unfortunately developed beznoites, a disease which is hard to control, forcing many goats to be culled. Eventually all the goats were sold or stolen and the buildings are now used as a district headquarters.

Goat research in East Africa flourished in the late 1970s and 1980s and much valuable information about the characteristics of goat production systems was generated at that time through the UNESCO-Integrated Project on Arid Lands (IPAL) in northern Kenya (Field, 1981) and the International Livestock Centre's (ILCA) system study of the Maasai production system (Bekure, de Leeuw, Grandin and Neate, 1991). The SR-CRSP work at Maseno was particularly useful in generating knowledge in feeding, forage and health.

The German Government made significant investments in goat development in Burundi and Kenya in the 1980s and 1990s. The Burundi project at Ngozi pioneered the use of the buck station as a cost-effective means of crossbreeding in smallholder systems (Rey and Jacob, 1991). However the source of the breeding bucks was a breeding station managed by the project. The project imported German Alpine goats and unfortunately introduced the disease, Caprine Arthritis Encephalitis (CAE) into Burundi. This

complicated the management of the breeding unit and reduced its output. While significant numbers of crossbred goats were produced, once the project ended farmers were not able to replace their bucks, inevitably leading to the gradual dilution of Alpine blood levels and reduced performance (Rey, 1992). The Ministry of Livestock Development in Kenya was supported by GTZ to establish a dairy goat project in Nyeri, Kenya. However, only German Alpine bucks were imported into Kenya for use in buck stations without any females, until the very end of the project when 10 females were imported. Many thousand local or 'grade' goats have been 'upgraded' and farmers have enjoyed many benefits, but the sustainability of the improvements must be in doubt without a secure supply of locally-bred replacement bucks.

Community level goat development

Many NGOs, such as Heifer Project, Send a Cow and church groups have introduced European dairy breeds into villages across East Africa over many years. These relatively small-scale breeding programmes will have had some beneficial impact wherever the introduction of the breed is accompanied by improvements to feeding and health care. However often this training is not given, in which case the breeds are unlikely to perform anywhere near their potential, making the intervention wasteful and frequently disappointing to farmers. All these interventions suffer from the major weakness of not being able to ensure a secure supply of the improver breed. Countless introductions of European breeds have disappeared without trace once the initial breeding stock get too old to breed or simply die.

Many NGOs have distributed local goats as part of their rehabilitation or development programmes in East Africa. This is often part of a support programme to families following drought or displacement due to war or other disaster. Many of these schemes have benefits providing vulnerable families with assets but are seldom accompanied with much training on how to improve performance of the goats distributed.

Key lessons

It is clear that the major weakness of most past goat efforts, which has led most of them to diminish after a few years, has been the failure to develop a sustainable supply of breeding stock. In addition few projects have genuinely lifted the skills of farmers to really get the best out of the new breeds, or developed reliable health care systems

outside the under-funded patchy delivery of government veterinary systems. It is these challenges that FARM-Africa has been working on over the last 19 years and believes can be solved through the application of its Goat Model.

Where and when the Goat Model has been tested and the lessons learned

FARM-Africa has been implementing goat projects for nearly 20 years. During that time it has learned a great deal from its own projects as well as from the experiences of others. The goat projects described below have all contributed to what FARM-Africa now terms its 'Goat Model' which has been developed from practical experience of what is possible in rural Africa.

Ethiopia 1988-2000

The design

FARM-Africa's first goat project was in Ethiopia implemented in partnership with the Government of Ethiopia's Ministry of Agriculture and two academic institutions, Alemaya University of Agriculture and Awassa College of Agriculture (now part of Debub University) and several NGOs. It specifically targeted women-headed households in the relatively dry, drought-prone, highlands of east and southern Ethiopia over 1200km apart. It focused on the poorest households, organised into groups of 25-30, and gave each woman two local goats on credit. The women had to repay the credit received in-kind by returning a weaned kid to the group for lending to another poor woman. A training package was developed and women were trained in improved goat management and fodder growing. After a long period of negotiation with the Director of Veterinary Services, women were allowed to be trained as CAHWs and earn money treating the sick goats of group and non-group members. This was the first time women were trained in this way in Ethiopia. A small number of drug shops were set up under the project but the government veterinary service continued to offer a subsidised service undermining the private drug shops and forcing their closure. Cross-breeding was planned to take place at two breeding stations at Alemaya and Awassa College using the Anglo-Nubian breed.

The benefits

The project generated many benefits to over 5,000 households. It genuinely helped the poorest of the poor to gain self respect and some level of household food security. Women were able to sell goats during periods of drought and avoid receiving food aid (Zewdu, 1999). Many households benefited from the increased milk supply and children flourished. Cross-bred male goats were in great demand and commanded high prices, particularly during Moslem holidays. The women Community Animal Health Workers earned income and their status grew in their communities as they treated sick animals belonging to men. The fodder component was particularly successful in Hararghe where forage strips helped prevent soil erosion and the manure from goats supported vegetable production. Each of the 120 women's groups set up their own savings and credit association or *ekub*, which they used to invest in small businesses and petty trading activities. The mutual support women derived from group membership empowered women to develop skills and confidence they would otherwise not have acquired. Lessons learned from this project formed the basis of FARM-Africa's Women's Enterprise Development Project

The project also carried out a great deal of research on goats in Ethiopia, producing three PhDs, 11 MScs and many publications. It carried out the first survey to identify the indigenous goat breeds of Ethiopia (FARM-Africa, 1996) and worked with the ICRW on a research project looking at the potential for goats to reduce Vitamin A deficiency (Ayalew, Wolde Gebriel and Kassa, 1999). It helped to establish goat research and development as a credible subject in the country.

Lessons learned

The project was severely constrained in the breed improvement component by basing it on cross-breeding in breeding stations at two academic institutions with little interest in community development. This conflict of interest and bureaucracy meant that managing the breeding units was extremely difficult and production of cross-breds for distribution to farmers was very slow and inefficient. However women showed themselves to be extremely capable of managing the cross-breds that were distributed and milk yields rocketed from 200ml/day to over 2 litres/day. Lactation length extended from two-three months to over 12 months in some cases. After visiting the GTZ project in Burundi and being impressed at the performance of the buck stations,

it was eventually agreed to introduce the approach into the project and buck stations were established in some parts of the project area. Most buck stations performed to an acceptable standard and some were outstanding, producing over 200 kids per annum. FARM-Africa realised that the only way of ensuring a sustainable supply of breeding bucks in the long term was to place breeding stock in the hands of private farmers or community groups. Ethiopia does not have a strong commercial farming sector and there are few Ethiopians with experience of managing commercial farms to a high standard. Pure breeding units (three females and one male) were placed with one outstanding commercial farmer in Dire Dawa and one just outside Addis Ababa. The Dire Dawa farmer is still producing cross-bred stock, whereas all the goats on the other farm died, as did the pure stock supplied to farmer groups. The problem of ensuring a continuous supply of breeding stock remains to this day.

Tanzania, Babati District, 1991-2006

The design

FARM-Africa had a small goat component as part of its broad-based agricultural programme, the Babati Rural Development Project. The goat programme targeted women in the poorest households and provided pure Toggenburg goats on credit to groups of four women who took it in turns to look after the female and keep a female kid. Farmers were given a lot of training and the developed good forage plots.

The benefits

The Toggenburg Breeders' Association (TOBRA) was set up in 1999 to manage the breeding stock and organise the very popular goat shows, which continue to this day. From a very small start, TOBRA, remarkably, continues to be the main supplier of pure Toggenburg goats in Tanzania. FARM-Africa also initiated the Tanzanian Goat Network (TAGONET), which continues to link goat practitioners together. FARM-Africa has been particularly successful, with others, at influencing the change in legislation in Tanzania approving the training of CAHWs.

Lessons learned

This system of credit was very slow and did not make the best use of the valuable Toggenburg goats.

Table I. Case study of John — a goat keeper of many years in Babati District, Tanzania

In addition to crop farming, I also practice goat and cattle farming. I was trained by FARM-Africa on dairy goat management and breeding of my local goats for milk. I am the buck keeper of the Upendo Dairy Goat Group. The buck has in many ways changed my life for the better.

I have been crossing my local goats with the Toggenburg buck, and every year I get an average of 16 kids. I sell some every year, and have used the money to buy an ox cart and two bulls for tilling my land, iron sheet and bricks to rehabilitate my house, improved banana seedlings and equipment for spraying my animals against ticks. I also produce about eight litres of milk a day. I use the milk for making tea, ghee and butter for my family, and sell the surplus to my neighbours. The bulls have reduced the time for tilling my one-acre farm from three days to literally two hours. I use the manure from the bulls and the goats on the farm, which has improved my crops. Benefits from goat sales and improved field crops have helped me to build a modern house and good sheds for my goats, rabbits and poultry, and construct beehives.

I regularly slaughter a goat, chicken or rabbit for meat for my family, which I could not afford to do before.

My neighbours are mostly Maasai people who have shown a lot of interest in what I am doing. Some have started zero grazing and bringing their goats here to be served. One among them is Olemito who has now joined Upendo group. Two new groups have formed in the village and they have visited me to see what I am doing. My two married sons have started dairy goat farming at their households.

I get support from TOBRA, an association that brings together Toggenburg breeders, of which the Upendo Group is a member.

My future plans are to expand dairy goat farming and my crop fields by using more manure. I beg my fellow farmers to form more dairy goat groups and to use goat milk, meat and manure to improve their household's nutrition and income.

Kenya, Meru and Tharaka-Nithi Districts 1996-2004

The design and its evolution

At the request of the Ministry of Agriculture and Livestock Development, FARM-Africa planned a Dairy Goat and Animal Healthcare Project in Meru and Tharaka-Nithi districts of Kenya in 1994. This project benefited from the lessons learned in Ethiopia and Tanzania as well as from visits to the GTZ project in Burundi and various small goat projects in Tanzania and Kenya. The project design, which is the basis of the Goat Model, set out to ensure that all the key inputs needed in the long term were delivered by farmer-managed enterprises (breeding stock) or through private sector suppliers (veterinary services) recruited from the community. This would ensure that at the end of the project farmers would have everything they needed to ensure the sustainability of all project interventions and would not be reliant on the government or any outside provider for any key inputs. This is the distinctive feature of this project and forms the basis of the design of the Goat Model.

Implementing partnerships

The project was implemented in a productive and mutually beneficial partnership between FARM-Africa and MALDM extension staff. This was important to ensure that farmers received the support they needed from staff already based in the field, and reduced the overall cost of the project by harnessing under-used government staff.

Beneficiary selection and group formation

Great effort was made to work with community leaders to define poverty in their communities and use these indicators to identify the poorest of the poor. The selected farmers (61 per cent women 39 per cent men) were formed into groups of 20-25 members that elected a committee and registered with the Ministry of Social Affairs. Those members who did not already own goats were provided with two Galla goats purchased from northern Kenya.

Breed improvement

Breed improvement was through cross-breeding local goats owned by group members at buck stations keeping a pure Toggenburg buck. The first cross-bred — or F1 — would be crossed again with a pure Toggenburg to produce a 75 % Toggenburg goat,

which would be named the Meru Goat, and stabilised at that blood level. Replacement bucks were bred at a small number of Breeding Units consisting of four females and one Toggenburg buck, managed by a farmer nominated by their group. It was agreed that non-members could also use the services of the buck for a higher fee than that charged to members. The foundation stock of 130 British Toggenburg goats was imported in three batches from the UK during the first three years of the project.

The group selected individuals to be trained to become buck keepers and CAHWs. Training was provided to farmers on improved goat management, group dynamics, breed improvement and goat health. Buck keepers were trained how to manage the Toggenburg bucks, use them effectively, record their performance and promote their use in their community.

Animal health care

Health care would be provided through a pioneering community-based private veterinary system. The system consists of a network of CAHWs (33 per cent women, 67 per cent men) treating goats and other species supervised by Animal Health Assistants (AHAs) — 50 per cent women — supported to obtain loans from the Co-operative Bank to establish rural drug shops in local market centres. In each of the two districts a young newly qualified veterinarian (one woman, one man) was helped to obtain a loan from Barclays Bank to establish a private veterinary practice, consisting of a drug shop at the district headquarters, transport, drugs and equipment. These veterinarians would oversee the network in their district, supply drugs and treat cases referred to them. It was not easy to obtain loans from Barclays Bank — they were reluctant to lend money for a new enterprise to young vets without collateral. This was surprising as they were the main conduit for EU funding to support the privatisation of veterinary services at that time. FARM-Africa was forced to act as guarantor for part of the loan.

Farmer organisations

A farmer organisation — the Meru Goat Breeders' Association (MGBA) — was established and registered as an association to oversee the breeding programme. In time, the Meru Animal Health Workers' Group (MAHWG) was set up. MAHWG

established a savings and credit association for its members to support the development of members' businesses.

Research

Two staff from the project carried out their doctoral research as part of the project. One looked in detail at the performance of local, cross-bred and pure Toggenburg goats. The second looked at the movement of information between farmers involved and not involved. A doctoral student attached to the World Agroforestry Centre (WAC) carried out research on the performance of the groups to identify the key elements of success. Good links were established with various research institutions during the course of the project, including KARI, ILRI and WAC.

The benefits

The project has been astonishingly successful and generated huge interest from farmers within the project area and increasingly from all over Kenya and East Africa (Olubayo, 2003; Hendy, 2003). Farmers 'outside' the project far out-number those originally targeted and the technology has spread rapidly and continues to do so (Davis, 2000). For example, in the project area the technology has spread spontaneously from the original five divisions to 13 divisions, and breeding goats have been sold to 71 districts in Kenya, as well as to Uganda, Tanzania, Burundi and Rwanda. It is therefore hard to measure the total impact and benefits from the original project investment because it has passed from farmer to farmer so rapidly, and continues to do so, that it has become impossible for the project team to track the adoption and performance of 'adoptees' outside the project area (Laker and Omore, 2004).

The benefits reported below, though remarkable, are those that the project has monitored of its own performance or have been found by independent consultants. Table 2 summarises the performance of the project within its designated project area.

Table I. Summary of project performance 1996-2006	
Output	Number
Groups	162
Direct project beneficiaries	8,235 households
Pure Toggenburg	130 -> 1000 +
Buck stations	162 (including 48 with 75% bucks)
Buck services	62,000
Cross-breds	56,741
Breeding units	124
Fodder trees distributed	200,000
CAHWs trained	44
AHAs	8
Veterinarians	2
Breed Associations established	1
Divisions covered	5->13
Districts in Kenya received goats	71

Household level impact

Over 8,235 families have benefited directly from the project. Every farmer gained knowledge on goat husbandry and forage development with over 200,000 fodder tree seedlings distributed.

Housing goats provided farmers with an easily collectable supply of high quality manure, which is highly valued in the area, particularly by coffee and vegetable farmers. A 16 litre 'debe' of goat manure can be sold for KShs 65 (US\$1). Milk production increased dramatically and mortality rates fell to acceptable levels (Table 2).

Table 2. Performance of different breed types 1996-2006					
Breed	Mean milk yield (ml/day)	Mean lactation length (days)	Mean total lactation (litres)	Mortality rate before weaning (%)	Adult mortality (%)
Local	0.2	0 70	0 14	15-20	10
Toggenburg	2.7	186	503	9	6
50% Toggenburg	2.6	200	520	7	5
75% Toggenburg	2.8	193	536	8	5

Source: FARM-Africa: Camillus Ahuya, personal communication (2007)

The growth rates before weaning of local goats increased from 78g/day for local goats to 127g/day for 75% Toggenburg crosses (Ahuya, 2007). The pure Toggenburg, and its crosses, all command a high price for both their meat and breeding value (Table 3).

Table 3. Goat prices for different breed types in 2007		
Breed type	Price/kg + premium for breeding value (US\$)	Total price (US\$)
Local	1	25
75%	3 (+ \$31 for breeding value)	154
Pure Toggenburg	9 (+ \$46 for breeding value)	415

Source: FARM-Africa: Camillus Ahuya, personal communication (2007)

The impact of the improved performance on farmer's incomes is quite dramatic, increasing them from \$93 per annum to \$995 per annum. The value of the goat stock owned increased in value from \$156 to \$918. This tenfold increase in incomes and asset value represents a significant step out of poverty for the thousands of families benefiting from the project. Many farmers have been able to invest in their farms, for example by buying land, and some have invested in small businesses in rural centres (Laker and Omore, 2004).

Table 4. Typical local goat enterprise performance (4 females producing 5 kids of which 3 are sold)

	Quantity (per year)	Price (US\$)	Total value income and stock (US\$)
Manure	130 kg	1	8
Milk	14 litres	0.5	7
Sales	3	26	78
Total			249
COSTS			
Labour		184	184
Total			184
Net benefit			65
Stock value	6	26	156

Source: FARM-Africa: Camillus Ahuya, personal communication (2007)

Table 5. Typical 75% Toggenburg goat enterprise (4 females producing 5 kids of which 3 are sold)

	Quantity (per year)	Price (US\$)	Total value of income and stock (US\$)
INCOME			
Manure	260 kg	1	16
Milk	2144 litres	0.5	1,072
Sales	3 (75% Toggenburg)	153	459
Total			1.547
COSTS			
Mineral licks	4	2.5	10
Veterinary costs			180
Labour	1	369	369
Total			559
NET BENEFIT			988
STOCK VALUE	6	153	918

Source: FARM-Africa: Camillus Ahuya, personal communication (2007)

Buck keepers

The buck keeper keeps detailed records of services given. The average number of services per buck per year was 120, with the record held by a buck that served 547 times in a year. Average income from buck service charges was \$79/year and from manure \$55/year, making a total income of \$134/year. The buck keeper becomes a focal point of village life and source of advice for farmers bringing their goats for mating which gives them great status in their community and other social benefits.

Breeding unit

Over 120 breeding units have been established under the project. They serve as the engine of the project producing pure Toggenburg goats for new buck stations and new breeding units. Their performance is crucial to the success of the whole project. The number of Toggenburg goats has grown from the original 130 imported as foundation stock to over 1000 in 2006. Breeding units need to be managed by outstanding livestock keepers as they place a great demand on labour and skills early in the project and they are expected to keep performance records. However, breeder unit managers derive significant benefits early in the project as they quickly have a significant supply of milk for home consumption and sale.

CAHWs' performance 1997-2003

Most CAHWs continue to perform a hugely valuable service to livestock keepers in their community. CAHWs are farmers working part-time as CAHWs treating an average of 11 cases per month and charging an average of \$2/case. Annual incomes amount to \$264 p.a. on average with some CAHWs earning much more than this. CAHWs not only offer treatment for sick animals but also offer advice and training on how to keep livestock healthy, becoming valuable extension workers in their communities. CAHWs also help to organise vaccination campaigns. A summary of their overall performance is given in Table 6.

Table 6 Summary of overall CAHW performance

Characteristic	Number
Households using CAHWs	19,812
Species treated	
Cattle	39%
Goats	32%
Poultry	22%
Other	8%
Total treatments per month	1,500-2,000

Source: FARM-Africa (2003)

Animal Health Assistants

Animal Health Assistants (AHAs) are the vital link in the animal health system and are the main source of drugs for CAHWs and farmers. Of the eight AHAs, most earn their income from clinical services (41 per cent), drug sales (27 per cent) and AI (31 per cent). All AHAs successfully repaid their loans obtained from the Co-operative Bank and are investing in their businesses mainly to obtain motorbikes to increase their mobility and coverage (FARM-Africa, 2003).

Veterinarians

Veterinarians are based in urban centres and serve as the main supplier of drugs, provide treatment, including surgery, mainly to cattle, provide AI services and oversee the AHAs and CAHWs. Both vets were supported by FARM-Africa to set up their veterinary business repaid their loan to Barclays Bank on time without defaulting. After FARM-Africa's departure, one vet recruited from government service returned to it, while the other, who was unemployed at the time of recruitment, has built a good house and is expanding her business. Vets obtain most of their income from drug sales (48 per cent); clinical services (25 per cent) and AI services (23 per cent).

The Meru Goat Breeders' Association (MGBA)

The MGBA serves many functions that are growing in number with time. The current functions are summarised in Table 7. The demands placed on the leaders of MGBA are immense with the level of interest generated by the project. MGBA has recently started charging \$60 to groups wishing to visit them.

Table 7. Functions and activities of Meru Goat Breeders' Association

Functions	Activities
Maintenance of breed improvement services	Performance recording Setting breed standards Supply breed information Judging and inspection Registration with the Kenya Stud Book
Marketing	Identification of breeding stock marketing outlets Milk marketing and processing Organising shows, field days and auctions Publicity and advertising
Training/PR/networking	Training officials/managers of MGBA on breed inspection and judging Showing visitors around

Goats have been sold from the MGBA to at least 71 districts in Kenya and to purchasers in Uganda, Tanzania and Rwanda.

The Meru Animal Health Workers' Group (MAHWG)

In 2000 the health care providers – Vets, AHAs and CAHWs - set up the Meru Animal Health Workers' Group (MAHWG) to:

- Act as a forum for all service providers working in the project area to exchange ideas;
- Organise training for their members;
- Represent members in scientific meetings and workshops and inform members of latest practice;
- Develop linkages with important partners – drug suppliers, government bodies.

In the absence of finance institutions willing to invest in MAHWG members at a reasonable interest rate, they set up their own savings and credit group to lend money to members to develop their businesses. MAHWG is thriving and each member has developed his or her business in some way. Some examples of expansion include: one vet who has opened a second drug shop and one AHA who has paid for a (or his/her) drug shop attendant to train as a AHA themselves. MAHWG itself has won a contract

from the government to deliver AI services throughout Meru district. MAHWG plans to build its own diagnostic laboratory in the future.

Milk marketing

In 2003 it became clear that there was surplus milk to the needs of the households. FARM-Africa and MGBA started a small milk processing plant in Nkubu a district centre with a capacity of 800l/day. The plant makes fresh pasteurised milk and flavoured yoghurts. The milk bar run by MGBA is very popular with town residents. Markets have been found locally and in a supermarket in Nairobi. Hospitals and children's homes have also expressed interest in buying the milk and the Kenya Bureau of Standards is currently determining standards for goat milk and its products.

Environmental benefits

Significant benefits to the environment have accrued from the project. Goats are housed and are not out grazing making the collection of urine-enriched manure easy. This manure is highly valued as fertiliser by coffee and vegetable growers. Over 200,000 leguminous trees, mainly Calliandra, have been planted, together with several miles of elephant grass strips on the edges of farmers' fields. All this amounts to a significant benefit to the environment.

Benefits to the nation and region

MGBA is currently the only supplier of pure Toggenburg goats in East Africa, which presents an immense challenge for such a small and relatively inexperienced farmers' organisation. The MGBA officials are under huge pressure to sell breeding stock and possibly jeopardise the viability of the Toggenburg goat population in Meru itself. MGBA currently has a waiting list for over 1000 goats.

The Government of Kenya, FARM-Africa's main implementing partner has 'mainstreamed' the Goat Model into its programmes. Extension staff now encourage any organisation involved in goat development to follow the breeding plan and structure laid out in the breeding component of the FARM-Africa model.

FARM-Africa staff has worked hard to gain official legal recognition and acceptance of the animal health care system pioneered in the project and FARM-Africa drafted what has been accepted as the national curriculum for CAHW training in Kenya. New

legislation making the necessary legal provisions for CAHWs to deliver basic veterinary services remains in draft form awaiting review in parliament.

NGOs and staff from the Ministry of Livestock Development have requested training to help them implement the Goat Model. FARM-Africa is now able to do so through its experienced staff in its Training and Advisory Units.

Research results

The three doctoral research projects carried out by staff and a collaborator generated valuable data on goat performance, farmer-to-farmer spread of technology and knowledge and the characteristics of groups spontaneously set up by enthusiastic farmers outside the project (Davis, 2003).

Lessons learned

The main lesson learned from implementing the project over 10 years has been that the design works. It is practical and delivers real benefits to a wide range of beneficiaries that can be sustained in the long term by the beneficiaries themselves. The need for MGBA and MAHWG to play a key role in sustaining vital services was known from the start of the project but FARM-Africa underestimated the scale of the role they would be forced to play. The original project was designed to supply breeding stock to farmers in Meru and Tharaka-Nithi districts. not to the whole of Kenya and the rest of East Africa. The success of the project could prove its downfall unless others copy the design of the breeding programme in a systematic way, ensuring that Toggenburg goats are bred in viable units throughout East Africa. This is a matter of very great urgency if the gains of the project are not to be eroded.

The project would have been enhanced if the key actors — buck keepers, CAHWs and AHAs — had been trained in adult learning techniques. This would have helped them pass on their knowledge in an even more effective manner (Kaberia, 2007).

Lessons continue to be learned about the evolving role of MGBA and how to support them to become a financially secure and effective farmer organisation.

Many other lessons have been learned which have been built into the design of the Goat Model.

Uganda, Mbale District 2003-ongoing

FARM-Africa's project in Mbale in eastern Uganda was modelled on the Meru project design. Originally it was planned to implement the project through the private sector but restrictions to funding of this project prevented it from being implemented in the original manner. The project is implemented in Eastern Uganda in the districts of Mbale, Sironko, Manafwa, Bududa and Kapchorwa with partnership of the local governments in the respective districts and regular consultations with the Ministry of Agriculture, Animal Industry and Fisheries, National Animal Genetic Resource Centre and Data Bank, National Agricultural Research Organisation and Makerere University. To date the project supports about 1,500 farmers organised into 39 farmer groups in nine sub-counties. The project also works with The Aids Support Organisation (TASO) to provide support to families affected by HIV/AIDS. The initial breeding stock was imported from FARM-Africa Kenya and Tanzania but the project continues to be severely hampered by the Government of Uganda's continued ban on the importation of breeding stock from anywhere outside Africa. The enthusiastic Elgon Dairy Goat Breeders' Association is currently working closely with the project in implementation and monitoring of the activities.

Benefits

The project has already started to generate significant benefits at both the household and community level (Alokit-Olaunah *et al.*, 2007). There have been 3,181 buck services recorded among members and non members with 1,144 FI cross-breeds born. The main benefits to farmers have been income from sale of castrates, goat manure and goat milk, in addition to improved nutrition among farmers already consuming goat milk. The goat manure has been used by farmers to improve their coffee, banana and vegetable gardens' productivity.

The project faces an overwhelming demand for Toggenburg goats and cross-breeds, and several district councils are adopting the model in order to support more farmer groups and are incorporating this into their district budgets.

The Government extension staff work closely with the project team and are part of the animal health delivery referral system. Many requests for assistance from the project have been referred by the Director, Animal Resources at the Ministry of Agriculture.

Role of the Elgon Dairy Goat Breeders' Association

The Elgon Dairy Goat Breeders' Association (EDGBA) is an umbrella organisation that aims at ensuring post-project sustainability of dairy goat production in the Mount Elgon region. The purpose of the Association is the development and promotion of the Toggenburg dairy goat and its crosses through the encouragement of close fellowship among members through meetings, correspondence and cooperation with other organisations so as to economically empower and improve household nutrition in Mt. Elgon region through 75 per cent Toggenburg breeding.

The association has registered 39 groups with about 35 members in each group. There is a hierarchical leadership structure ensuring representation of groups from each district.

The Uganda Project uses the same breeding approach as the Meru project with the aim of producing a stabilised 75 per cent Toggenburg cross and a continuous supply of pure Toggenburg goats to replenish the buck stations. Some farmers in the older groups have already got 75 per cent crosses and have set up of 75 per cent buck stations and breeding units from the selected 75 per cent is ongoing.

Animal health

There is a vibrant animal health service delivery referral system in the project area composed of the 39 Contact Farmers (15% women and 85% men) operating as Community Animal Health Workers (CAHWS). Each CF handles about 50 cases per month, including referral cases. The system is providing an animal healthcare service to livestock owned by farmers who had previously not had access to such a service. This is a significant achievement and it is hoped that the Government of Uganda will begin to recognise the potential role played by a community-based system animal health system soon.

The vet loan scheme for private vet service providers in the referral system has been established in Sironko District only with 1 practice comprising 3 vets. The vets were financed through a Micro Finance Institution, recommended by the Eastern Private Sector Development Foundation.

Kenya, Mwingi and Kitui Districts (in drier area) 2004 – ongoing

It was decided to test the Goat Model in a harsher environment and see if it could be adapted to drier environments and still work. To this end a project was prepared for Mwingi and Kitui districts of eastern Kenya. To date the project has shown that the model works well in drier areas and has been able to develop practical forage conservation techniques, including hay and silage making, to enable farmers to cope with the long dry season. Farmers' groups have also dug several shallow wells to provide water. A very dynamic Mwingi and Kitui Goat Breeders' Association has been established. The mobile phone company Safaricom supported the distribution of mobile phones to CAHWs, AHAs and veterinarians. 'Community Phones' are set up at the drug shops to provide a service to the community and from which the animal health worker can earn additional income.

Case study of Theresia a Community Animal Health Worker in Mwingi, Kenya

Theresia is a 30-year old widow and mother of three children. She was left desperately poor after her husband died of AIDS. She has been scraping a living by begging casual work from neighbours and making sisal rope. With this work she was just able to give her children one meal a day. She was selected by her community to receive a goat and be trained as a Community Animal Health Worker (CAHW). This is when her life changed.

She said "I received a drug kit, mobile phone and bicycle on credit and I realised I was no longer the 'beggar Theresia', people knew, but a doctor! Look at me now! I used to look like a 50 year-old widow with rough hands, now I look more like my real age and have smoother hands. I have nice clothes, although second-hand, and my children now have three meals a day, as do I. You can see my face is shining! I am no longer the village pauper, see I can even afford to buy a front door to replace the sack that hung there before, now that I have things of value inside. I no longer work as a casual labourer but work for myself. Of course I have to bicycle long distances to serve my clients and I keep consulting the Animal Health Assistant for advice and read books. I handle my work professionally and even the Area Chief has come to my house for veterinary services".

In one year Theresia has treated 1,187 cases including 250 cattle, 857 goats, 33 donkeys, 1 cat, 4 chickens and 42 dogs, earning nearly \$500 from clinical fees. She also has 6 well-fed and well-housed goats and has even hired men to terrace her land, from which has obtained 15 bags of maize, 3 bags of beans and 2 bags of sorghum; the kind of bumper harvest she never dreamed of before.

8. The Goat Model - implementation procedure

Overview

The components

The FARM-Africa Goat Model consists of several inter-linked components that should be implemented together for the model to have full impact. The success of the model would be greatly restricted if, for example, the breed improvement component is implemented without the farmer training. The real value of the model lies in the integration of its components. The model is not a one-size-fits-all approach. Within each component participatory techniques are used to make sure that the way each component is implemented is suited to local circumstances.

The only component that could be properly implemented by itself is the animal-health component which would, if implemented entirely, establish an effective animal health care system of immense value to livestock keepers in the area covered.

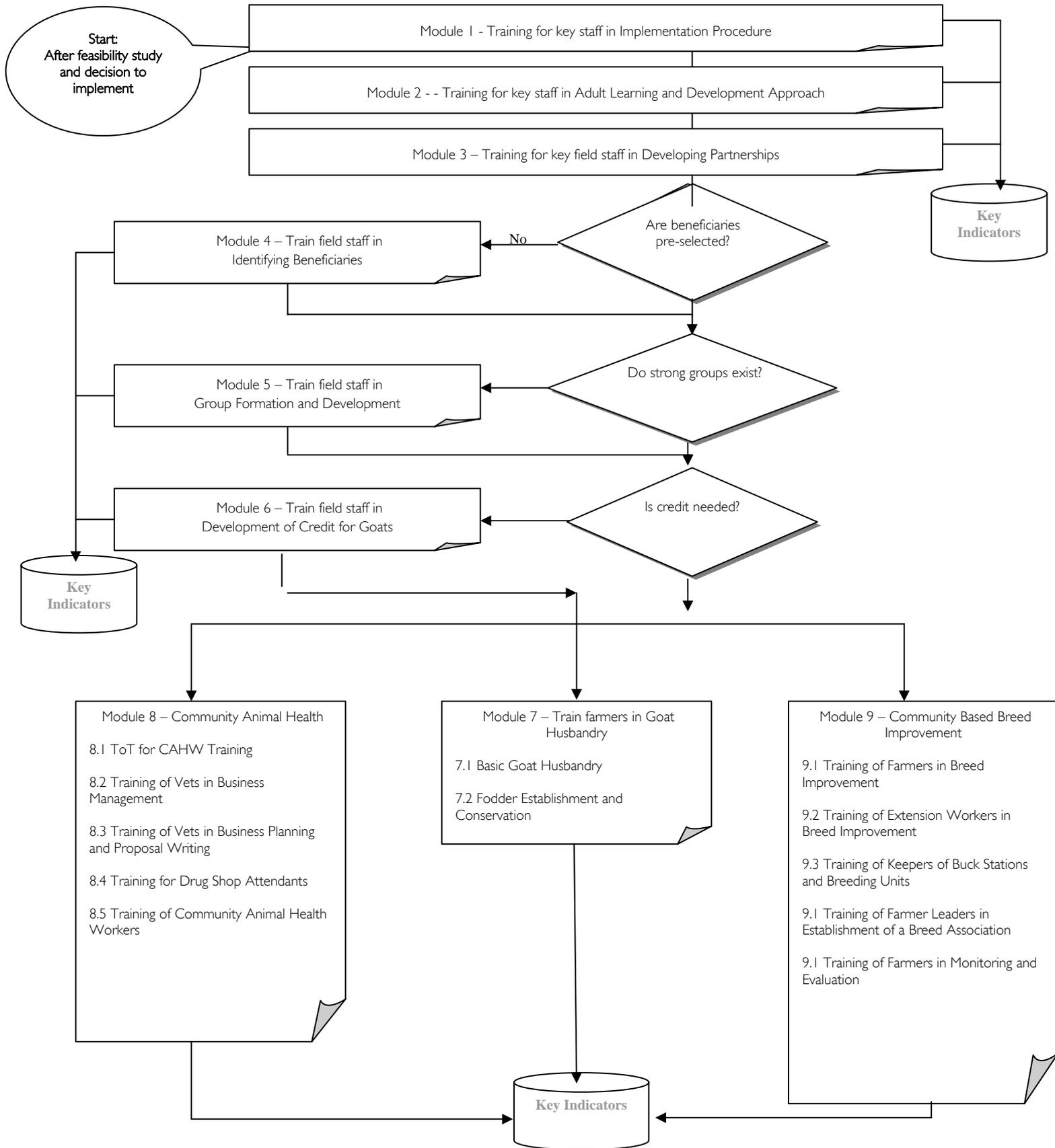
The model is flexible and adaptable, with each component commencing with participatory entry techniques that ensure they are tailored to suit local circumstances. In particular, three optional components at the start of the model make sure the model fits local circumstances – beneficiary identification, group formation and goat credit. If the model is applied in situations where groups already exist and members already own goats, then these components need not necessarily be applied. In the absence of these three modules, tailoring is achieved with the implementation of each subsequent component.

The Goat Model without breed improvement?

In some circumstances it may be beneficial to provide goats on credit to families in particular need, without implementing the breed improvement component of the model. However any goat intervention should be accompanied by training in goat husbandry including feeding and some provision for healthcare.

An overview of the implementation steps and accompanying training package modules is given in Figure 1.

Figure I. The Goat Model: Implementation steps and training package modules



FARM-Africa has prepared a comprehensive Training Package for staff of organisations wishing to implement the goat model. FARM-Africa has also published a reference manual, “Improving Goat Production in the Tropics. A manual for development workers” (Peacock, 1996). Field staff from agencies wishing to implement the model can be trained in using the package by staff from FARM-Africa’s Training and Advisory Unit.

Implementing the goat model - Establishment phase

Step 1: Feasibility Study

It is important before implementing the goat model to carry out a feasibility study to make sure the model is appropriate in that location. Key considerations are:-

- Farmer interest
- Cultural attitude to goat milk consumption
- Potential to adapt current goat management systems
- Potential to develop community-based animal health care system
- Availability of feeds and/or potential to grow fodder crops
- Attitude and capacity of potential implementing partners – government, NGO, local government, traditional leaders etc.

Step 2: Planning and sensitisation

Planning the intervention with key stakeholders is very important to make sure that all those involved are behind the concept and that all necessary resources will be available at the time required. As part of the process of consultation and planning the goat model needs to be explained and the roles of potential partners discussed and negotiated.

Step 3: Establish implementation partnerships and operational roles and responsibilities

The Goat Model requires partnerships to be developed at different levels for effective implementation. The implementing agency will need to work with district-level government officials, including technical staff, as well as formal and traditional community leaders. It is essential that time is taken to inform all partners about the model and agree the roles and responsibilities of all parties.

The planning and sensitisation phase will help to identify the key partners that need to be involved in implementing the Goat Model. If it is an NGO implementing the model they will need to link with government staff, particularly veterinary staff, to support the implementation of the model. Veterinary officers are key to supporting the implementation of the animal health component and will need to understand what is planned in their district. If it is government staff who are implementing the model they will need to involve NGOs and CBOs already working with communities in their implementation.

The key to successful implementation is jointly planning the work right from the start so that all partners feel involved and develop a sense of ownership and responsibility for implementing the model. Government staff may need to be enabled to work effectively through the provision of transport, for example. This needs to be carefully negotiated from the start and communicated to all concerned.

Step 4: Training of implementers

The implementation team will need to be trained how to implement the components of the model. FARM-Africa will train a team of essential resource people from the implementing organisation in management and operation of the model. If required, FARM-Africa can also help train field staff as well. A visit to an ongoing project will be helpful at the start so that the team have a vision of the future towards which they will work.

Underlying the model is a participatory approach to development and it is essential that all members of the implementing team believe in, and are conversant with, the participatory techniques embedded in the model. In some cases attitudinal changes may

need to take place among staff of implementing partners. Methods of encouraging this change in attitude are built into the FARM-Africa Training Package.

Step 5: Beneficiary targeting and selection (Optional)

The Goat Model can be applied to help families of particular concern to the implementing agency; for example, 'the poorest of the poor', women-headed households or HIV/AIDS affected families. The Goat Model is particularly suitable for women who, in many societies, traditionally look after goats, and can be trained to serve in all the service-provider roles - CAHWs, buck keepers, breeding unit managers etc.

It may be that the implementing agency already works with farmer groups and wants to introduce the Goat Model to them, in which case this step can be omitted.

In order to ensure that families that fall into the particular category of interest are genuinely selected and there is no room for manipulation or capture of the selection process. It is important that local leaders and the implementing team are clear about the objectives of the targeting and selection. If the objective is to select the poorest members of the community a meeting involving community and government leaders should be convened to identify indicators of poverty within that community.

Agreement needs to be reached by all parties what these indicators are so that the same people can apply those indicators during the beneficiary selection process.

Typical indicators of poverty are:-

- livestock ownership
- landholding size
- quality of house
- single headed family
- off-farm employment
- number/health of dependents

Once families have been selected, visits should be made to the household itself to verify their status and ability to participate, before they are finally selected. This visit

provides an opportunity to collect data on individual households that can be used to track changes to the status of the family over time.

Step 6: Group formation (Optional)

Cohesive action by the selected households is important to the operation of the health and breeding components of the Goat Model. For this reason, once participating households have been selected group strengthening activities are initiated. A group size of 20-25 has been found to be ideal. Strong farmer groups:-

- Provide a focus for farmer training
- Identify from amongst members a buck keeper and in some cases a breeding unit manager, with the group as a whole responsible for ensuring that the buck station and breeding unit are managed properly
- Elect one of their members to be trained as a Community Animal Health Worker
- Are responsible for, and manage, the credit provided to the group
- Manage any other issues concerning the group

If the implementing agency is working with existing cohesive groups, this step can be omitted.

The members of the group will need to develop their constitution and rules governing the group, elect leaders and, if possible, register with the appropriate government authority.

Step 7: Goat Credit (Optional)

In many communities in Africa, lack of ownership of livestock is a key indicator of poverty. Where this is the case, it will be necessary to provide local goats on credit to families in order for them to participate in the Goat Model.

The breed improvement component of the Goat Model also involves goat credit procedures and will supply a buck on loan to a breeding unit (as part of the buck rotation system) along with breeding stock on credit (with the same number of male and female goats returned to establish a new breeding unit in another group).

It has been found from experience over many years that it is important that families receive goats on credit leading them to value the animal because they have to repay the loan in some way. It is never appropriate to provide goats freely to families, however tempting this may be to organisations with a strong humanitarian motivation. What is received for free is never valued and looked after in the same way as when a payment is made, however modest. This is fundamental to successful development. Organisations that give away inputs to farmers do nothing but undermine the self-respect, initiative and sense of responsibility of the individuals they are trying to help.

Repayment can be in the form of repayment 'in kind' whereby a similar goat is repaid to that received or 'in cash' where the value of the goats is repaid in small instalments over an agreed time period. In most cases repayment in kind is preferable as it does not require literacy to manage and reduces the potential for corruption. The terms of repayment can vary from situation to situation and should be negotiated and agreed by all parties, cognizant of the principles of sound goat credit outlined above.

Step 8: Group established and developed to support Goat Model

Once a new group is formed or an existing group has decided to adopt the goat model all the members of the group need to be made fully aware of their roles and responsibilities. The group will need to select members for training as a buck keeper, a breeding unit manager and a Community Animal Health Worker.

The group will need training to improve their functioning as a group, and the group leaders will need training in leadership skills, responsibilities, stewardship of group resources, record keeping and conflict resolution.

Step 9: Farmer Training

The Goat Model assists farmers in developing their individual and collective skills in goat management. Most farmers will have some understanding of how to look after goats under traditional management and some may be excellent at looking after their local breeds of goats. However cross-bred goats require better feeding, housing and health care and in most cases these aspects of goat husbandry will need to be learned. Farmers receiving goats under a credit programme may not have much experience of goat keeping and will need to learn.

For the Goat Model to succeed and have widespread benefits to families it is essential that all farmers also receive training in the structure and functioning of the goat model.

The structured training package prepared by FARM-Africa starts with an assessment of the local situation and gathers information on the way goats are managed, their levels of production (numbers, kidding, milk, sales etc.) and the problems farmers face in keeping goats (feeding, health, marketing, theft etc). This information provides valuable baseline data against which to track changes. The package then investigates ways to improve the feeding of goats, guidance how to keep goats healthy, and how building a goat house will improve the health and welfare of the goat.

Housing goats reduces the amount of energy they waste looking for food and redirects that energy into production. Housing goats keeps goats healthier by reducing their contact with other goats, which may be carrying diseases, and considerably reducing their exposure to internal parasites from grazing on common land contaminated by other livestock. Infection with internal parasites is probably the single biggest health problem, reducing their production, of goats in Africa.

The ways in which farmers can improve the feeding of goats using local feeds as well as growing fodder crops need to be explored and tested by farmers. Good experience needs to be shared among the group. Conserving feed, through hay or silage-making, during the wet season to use during the dry season, will be new to most farmers and will need to be explained clearly and tested by farmers.

Step 9: Community-based animal health system

A strength of the goat model is the development of a reliable health care system to which farmers can turn for guidance to prevent their goats getting sick, and help if they do fall ill. In most countries in Africa the government veterinary system is under-funded, under-staffed and over-stretched. As a result the service offered to farmers, particularly away from urban centres, is very poor or non-existent. Owners of valuable cows may make use of the limited government veterinary service offered, but farmers keeping goats or chickens can expect little service.

Overall structure

FARM-Africa has pioneered a three-tiered community-based animal health care system that is financially viable and delivers affordable health care to even the poorest livestock keeper. Qualified veterinarians, running their own private practices, train a network of farmers called CAHWs to treat simple diseases. The training covers diseases affecting both goats and other species of livestock so that CAHWs can offer advice to farmers on how to prevent their livestock getting ill by vaccination, good feeding, and management. In order to supply these CAHWs with drugs, a middle tier of veterinary para-professionals, often called Animal Health Assistants or Animal Husbandry Officers, are helped to set up small rural drug shops, normally in market centres, easily accessible to CAHWs and other farmers. The AHAs purchase their drugs from the private veterinarians who are helped to establish good links with reliable drug companies. The volume of drugs purchased by the veterinarian on behalf of their 'network' helps to ensure a good discount on the price of drugs, keeping costs low and prices affordable to farmers. The veterinarian and AHAs can be recruited by word-of-mouth or through an advertisement in the newspaper. Ideally they originate from the project area. They should be able to obtain loans from financial institutions. The implementing agency may, in some cases, need to act as guarantor for part of the loan.

This linked network of animal health care has proven to be financially viable for the service providers and offers a means by which farmers can have access to affordable treatments and reliable advice. It also offers a referral system whereby CAHWs can refer difficult cases to AHAs, and AHAs can consult a qualified veterinarian for the most difficult cases. As mobile phone coverage expands, this system can become extremely efficient with each member of the network having a mobile phone to facilitate rapid communication.

The significant added advantage of this system is the role CAHWs can play in reporting notifiable diseases to the relevant government authorities thus helping them to take appropriate control measures in an extremely timely manner.

Ideally, the veterinarians should be identified, helped to obtain finance, and have their veterinary practice established before farmers are selected for training as CAHWs.

They would then be able to carry out the training of the CAHWs, supply their kits and establish a relationship with them. If this is not possible then they should be used for refresher training of CAHWs and re-supply of their kits.

Veterinarians and AHAs will need training in business planning and management to help them obtain their loans. They will also employ drug shop attendants to look after the drug shops in their absence. In most cases, these attendants will have insufficient knowledge in animal health and will therefore require training in basic animal health.

CAHWs require training from a qualified veterinarian and equipping with a kit of drugs and basic equipment. Careful consideration needs to be given to the level of fees they will charge to make sure they have sufficient incentive to be active and yet charge a price that is affordable to farmers. In Kenya and Tanzania there is a CAHW training curriculum approved by the relevant professional bodies. Where a national standard exists it should be followed. The FARM-Africa training package not only conforms to, but also exceeds, all the national standards currently found in East Africa.

Step 10: Breed improvement

Motivation

Gaining access to a new 'improver breed' is the main incentive for farmers to become involved in the goat model. Farmers are no different from anyone else and are attracted to new things that look different from what they have previously known. FARM-Africa strongly recommends using the Toggenburg breed which it has tested in three counties and found to be ideal for most situations in East Africa. Other breeds that might be available are the Saanen, Alpine, Anglo-Nubian. The Toggenburg goat is twice the size of local goats in Africa and looks very different from local breeds. It is novel, offers massive increases in production, and farmers all over East Africa that have heard about them want to get hold of them. This excitement and motivation is excellent to have at the start of the application of the goat model but needs to be tempered with the understanding that these new goats will only perform if fed and managed significantly better than the normal level of management of local goats.

Practical breed improvement

FARM-Africa has found by far the most practical method of breed improvement for Africa to be the cross-breeding of local goats with an improver breed, such as the Toggenburg, to produce a 50% cross which is bred again, to a different Toggenburg buck, to produce a goat which is 75% Toggenburg. The 75% goat has been found to have a good mixture of characteristics from both breeds. It retains the hardiness of the local breed but offers significantly better milk production and faster growth rates. The 75% female can then be mated with a 75% male to produce 75% kids and so on, stabilising the breed at 75% level.

It is important that as the proportion of Toggenburg, or `improver breed, increases the management of the goats also improves.

Buck stations

The most cost-effective method of organising this system is to place Toggenburg bucks in buck stations where a group lives and in a location accessible to all group members. A fee is charged for each mating and if the female does not conceive the owner is allowed to bring their goats again for a free service. Bucks can mate with up to two-three females/day if well fed, but in practice mate with a female every other day. To maximise its potential, the buck can also mate with goats belonging to farmers who are not members of the group who are charged a higher fee, generating income for the group. To avoid inbreeding the bucks do not stay at one station for longer than 18 months so there is no danger that they will mate with their daughters. This buck rotation is an essential part of the model and needs to be well co-ordinated. This is a role for the breed association.

The buck station keeper who feeds and manages the buck is trained to record its services, collect fees, and promote its use in the community. It is also worth training the buck keeper in basic training skills so they can act as a source of advice and training to the whole community.

Breeding Units

Breeding Units are established at the community level to ensure a continuous supply of bucks for buck stations. A breeding unit comprises three females and one male Toggenburg. It is not necessary to have a Breeding Unit for every farmer group. They should be located strategically and managed very well because they contain extremely

valuable breeding stock of benefit to the whole community for generations to come. The goats provided to the breeding unit are given on credit and the same number and sex ratio are repaid as weaned kids to enable new breeding unit to be set up in a new location.

Breed Association

It is important that there is a farmer organisation formed to oversee the breed improvement component, to co-ordinate the buck rotation, establishment of new buck stations, breeding unit credit repayment, and setting up new breeding units. The size and scope of this organisation will depend on the scale of the application of the goat model. It may be that a Breed Association will be established at the district level or at a more localised level. The association will need representatives from each farmer group and will need to prepare a constitution and elect a committee to manage its affairs.

Table 8 Goat Model implementation timeline		
Time line (months)	Activity Key events	Considerations for implementing agency
1-6	Establishment phase Feasibility study Planning and sensitisation Establish implementation partnerships Training of implementers Beneficiary targeting Group formation Goats distributed on credit Groups established	Feasibility study Planning and sensitisation of potential partners Train own staff Negotiate partnerships Train implementing team Source and buy goats for credit
6-8	Veterinarian trained and set up in business AHAs set business CAHWs trained and equipped Farmer training Buck keepers trained buck station established Breeder unit established Training in growing fodder	Ensure farmers are trained and practice training Train vets and AHAs in business planning and support their application to finance institution Enable vet to train CAHWs and equip them Ensure supply of fodder planting material ready for start of wet season
8-10	Breed Association established	Begin training Breed Association officials in leadership, management
14	First cross-bred kids born First Toggenburg kids born	Make sure farmers are trained to look after crossbreds and know what to expect
18	First cross-bred (50%) kid mated to Toggenburg buck	
24	First cross-bred kid gives birth to 75% kid Cross-bred milked for first time	
48	First 75% female gives birth and is milked	Look at milk marketing potential

Implementing the Goat Model – Ongoing support phase

Once the key components of the Goat Model have been established and the initial training has been carried out there will need to be some ongoing support and supervision provided. How long this lasts and what form it takes will depend on each situation. FARM-Africa encourages any agency implementing the Goat Model to be sensitive to local conditions, learn from farmers and their experience and support farmers to find solutions to problems they encounter. In this way farmers individually and as a group will learn to solve their own problems rather than being reliant on outsiders. There will be need for innovation and adaptation of the model during its application to make sure it fits local circumstances and implementing agencies need to support farmers to learn.

There are certain critical phases that will need to be passed through and farmers will need support when first encountered. These include:

- First mating with buck
- First cross-bred kids born
- First dry season experienced
- Milking pure Toggenburg
- Raising cross-bred kids for first time
- Milking cross-breds
- Organising the first goat show

Milking, milk marketing and processing

The first cross-bred goat will be milked after about two years of model implementation. Farmers will need to be trained in milking, milk handling and hygiene before this happens. Farmers will relish the amount of milk produced and at the start will use most of the milk at home to feed children or the sick. Once the amount of milk produced by farmers in the community increases, as it will after three-four years, consideration will have to be given to options for developing new milk markets for fresh or processed milk. In most cases there will be a local demand for goat milk from neighbours, local markets and local hospitals. Hospitals have found that goats' milk is more easily consumed than cows' milk and is useful for treating sick patients,

particularly AIDS patients. In most countries in Africa goats' milk has a higher price than cows' milk.

Processing milk can add to its value increasing its price tenfold in the case of yoghurt, for example. Goat milk can be processed into pasteurised fresh milk, flavoured milk, hard and soft cheese, ice cream and yoghurt. If the numbers justify investment in a small milk processing facility this may be managed by the Breed Association, for example or another milk marketing organisation could be set up.

Marketing males

Cross-bred males should be castrated to stop them breeding, and fattened for sale. Cross-bred males grow very fast and can attain 35-40kg within 10 months. They will normally command a higher price than local breeds of goats and the meat has been found to be very tender and desirable. There is also the potential to add value to selling males goats through groups setting up their own butcher's shop, or roasting meat for direct sale to consumers. As the number of males grows, there is also the potential to process meat into burgers or sausages, perhaps selling these products to supermarkets thus adding considerable value to the meat.

Development of the Breed Association

As the model is implemented the role of the Breed Associations will change and evolve. They will be responsible for helping to set up the breeding components and managing the buck rotation and breeding units. They should register and record all cross-bred goats born. The Breed Associations should be responsible for selling breeding stock on commission, and might also organise goat shows at which farmers can show off their goats and win prizes. The Breed Association could also develop links with other breed associations to exchange breeding stock. The income of the breed association will be based on group and individual membership fees, commission from sales, commission on awards won at shows, and entrance fees at goat shows.

The association may also develop market outlets for goat milk, breeding stock and fattened stock, and consider ways in which they can add value to the goat products through processing or direct selling.

It is essential that the association is transparent and follows good practice in governance and management. The implementing agency will need to provide training to the officers of the association from the start to lay the foundations for good behaviour and practice.

Adopting the Goat Model

Likely adopters of model

The Goat Model can be adopted by any organisation working with rural communities. It is not necessary for them to have specialist skills in animal production or veterinary science, although it would be helpful if they did. Adopters should have basic skills in community development and capacity to implement field activities and work with farmers and development partners. The Goat Model is likely to be adopted by local and international NGOs, including church and similar small community groups, as well as government departments.

Scale of adoption

The Goat Model can be adopted at different scales depending on the interest and capacity of the adopting agency. It could be applied at a district level or at a smaller scale. Table 10 (page 45) gives some indicative costs of some of key inputs required to implement the Goat Model at 2007 prices. It also indicates the minimum scale at which implementation could be carried out.

Requirements in order to adopt model

To successfully implement the Goat Model the adopting agency would need to have or have access to:-

- Staff trained in using the model
- Veterinarian to train and certify CAHWs
- Supply of local goats (if required)
- Supply of sufficient numbers of an improver breed to establish a foundation herd (ideally Toggenburg)
- Drugs and equipment to stock and re-supply CAHW kit

- Supply of forage planting material (if required)
- Ear tags and records books

Conclusion

The Goat Model offers a tried and tested approach to improving the lives of smallholder farmers in Africa and a means to lift their annual incomes from \$100 to over \$1,000. This is a significant improvement and, if widely applied across Africa, would have a significant impact on rural poverty across the continent.

Benefits of adoption

The benefits of adoption are summarised in Table 9. The benefits of adopting the model are many and are both quantitative and qualitative.

Table 9. Benefits of adoption of the Goat Model		
BENEFITS		
Individual	Group & wider community	District
Increased: Ownership of assets Manure Milk for home use Improved child and adult nutrition Income from milk sales Income from selling males Income from breeding stock sales Improved soil fertility and stability from manure and fodder crops Skills & status Support from group Improved social network	Leadership skills Access to buck services Access to veterinary advice and treatment Access to veterinary drugs Buck keeper Income from service fees Manure Soil fertility Social standing Breeding Unit Manager Income from breeding stock sales Milk for home use and sale Manure Social standing CAHW Income from treatment fees Status in community Animal Health Assistants Employment and income from selling drugs, treating cases, AI services	Improved disease surveillance New products: Milk & milk products Meat Goat shows Empowered district staff Access to veterinary advice and services including AI services Purchase of veterinary drugs Breed Association Improved district leadership and co-ordination Contribution to district development Links to national networks Veterinarian Employment and income from selling drugs, treating cases, AI services

Table 10. Some indicative unit costs of inputs and a minimum size of implementation unit.

Activity	Indicative unit cost (US\$)	Minimum unit
Goat Credit	50 each	5 groups of 25 members = 250 goats Total US\$12,500
Training (farmers, buck keepers, CAHWs etc)		Total US\$2,000
Animal Health Component CAHW	300/kit	5 CAHWs Total: US\$1,500
AHAs Vets		
Breed Improvement Purchase of Toggenburg Males Females	300 300	1 breeding unit 5 bucks =10 goats Total: US\$3,000
Total cost		US\$20,000

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Please note that some of the references are incomplete (working version | June 2007)

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FARM-Africa support to adopters

Resources available to support adoption

Materials

- The Goat Model Training Package
- Goat Story Video (2002) — www.farmafrica.org.uk/documents/74.WMV
- Farmers' Dairy Goat Production Handbook (2003) – FARM-Africa — www.farmafrica.org.uk/documents/31.PDF
- Delivering Affordable and Quality Animal Health Care to Kenya's Rural Poor — FARM-Africa (2002) — www.farmafrica.org.uk/documents/24.PDF
- Goats: Unlocking their potential for Africa's farmers (2005) — FARM-Africa — www.farmafrica.org.uk/documents/123.PDF
- Manual: Peacock, C. (1996) Improving Goat Production in the Tropics. A manual for development workers. Oxfam/FARM-Africa, Oxford.

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