

Processing and marketing goat products

Introduction

Any improvements made in the productivity of goats should be exploited as fully as possible. Once a surplus to the family's requirements has been produced, attention should be paid to the handling, processing, and marketing of goats and goat products. Goats can produce a huge range of products which, if processed at home, or by a group of farmers or pastoralists, can increase the owner's income. Products include:

- milk and milk derivatives
- meat and carcass products
- butter
- cheese
- skins
- fibre
- manure

Improving the processing of these products can increase the value of the product; balance out seasonal fluctuations in supply through processing and storage; improve human health; and increase the income earned by farmers from their goats. Farmers should carefully consider the costs of any processing equipment, the extra labour required, and the costs of marketing the product, and match these to the higher price of the product sold. In most cases, if there is the possibility of processing products at home, it is worthwhile to do so.

Processing milk and meat is one way to make use of surplus production. Perhaps in the wet season there is plenty of milk and milk products, while in the dry season there is a scarcity, and the price rises. Farmers have a choice of either trying to produce them during the dry season, which may be very difficult, or of processing the surplus for storage and later consumption or sale.

There are diseases which can be transmitted from goats to humans through milk and meat. Farmers must always be

encouraged to improve the way they handle products, to reduce the risk of disease to their own families and to other consumers of their products.

10.1 Milk

Table 10.1
Goat-milk composition

Goat type	Fat (%)	Crude protein (%)
Tropical	3-6	3-5
Temperate	2-4	3-4

Milk is a valuable source of protein (including essential amino acids), fat, calcium, iron, phosphorus, and vitamins (including the important Vitamin A). With proper milking and handling practices, milk can be a highly nutritious food. It is especially valuable for growing children. The small size of the fat globules in goat's milk makes it easier to digest than cow's milk. Some children who are unable to digest cow's milk can happily drink goat's milk. Milk composition varies with breed, nutrition, stage of lactation, and age of the goat. Table 10.1 indicates the composition of goat's milk.

Unfortunately, milk is an ideal medium for the growth of bacteria. This means that great care must be taken at all stages, from goat to mouth, to avoid contamination of the milk with dirt that contains micro-organisms, and to reduce the growth of the bacteria that naturally occur in milk.

The wide range of vegetation consumed by goats can sometimes lead to milk tainted with a particular smell and flavour. Temperate breeds may emit a smell from musk glands in the head of sexually active males, so the odour is normally limited to the breeding season. Most tropical breeds are sexually active all the year round, but most are virtually scentless. If they release a smell at all, it is not as potent as in temperate breeds. The tainting of milk is almost entirely caused by the presence of a buck close to the place of milking. If temperate breeds are being used, tainting can be reduced by milking away from bucks and covering the milk container immediately after milking. Musk glands are also present in females and some emit a mild smell, but this is unusual.

10.1.1 Milking practice

The release of milk by a goat is an involuntary reflex in response to a set of external stimuli. These stimuli include the presence of the kid and the action of suckling by the kid. This reflex, to 'let down' milk, can be conditioned to occur under a set of particular circumstances. This is why a settled routine will help the goat to let down her milk under the artificial conditions of milking. If goats are to be milked, they should be milked regularly, once or twice a day. Irregular milking can lead to low yields and a much greater chance of mastitis developing (see 6.4.9). Ideally the same person should milk the goat, at the same time and in the same place every day. The establishment of a quiet, settled routine will

help the goat to be relaxed and let down her milk. Changes to the routine will unsettle the goat, reducing milk yield.

If only a few goats are milked, it is best to give them a little food during milking, to settle them. The kid(s) should be present at milking, to encourage the doe to let down her milk. Farmers must decide how much milk there is in the udder, how much of it should be milked, and how much can be drunk by the kid. Some farmers may decide to let the kid suckle one teat, while milking the other at the same time. In order to reduce mastitis, the kid should be allowed to suck the milked teat after milking; this ensures that the teat canal is properly emptied, reducing the risk of later infection. Goats that are only suckled by kids and never milked have a very low incidence of mastitis. It is good to alternate the teats used for suckling and for milking.

It is vital that any milk for human consumption is as clean and uncontaminated as possible. The milker must observe the following precautions.

- Wash his or her hands.
- Clean the teats with warm soap and water, but only if clean water is available.
- Check the milk for mastitis, looking for any clots or blood. If mastitis infection is being treated with antibiotics, the milk must not be consumed by humans during the day of treatment and for seven days afterwards.
- Milk into a clean container, ideally a clean metal container.
- Milk away from the presence of a buck.
- Avoid any contamination from faeces, urine, or feed.
- After milking, cover the container and remove the milk from the vicinity of the goat as soon as possible.

The ideal milking technique would closely mimic the natural sucking of a kid. The base of the teat should be gripped between thumb and forefinger, the remaining fingers creating a ripple of gentle pressure down the teat, pushing the milk down the teat canal and expelling the milk in regular, even squirts. The teats should not be pulled, as this can damage the teat canal and invites infection. When milking very small teats of first-time kidders, pulling the teat may be necessary, but should be done gently.

10.1.2 Milk handling

All milk for human consumption must be pasteurised. Milk can transmit the following health problems to people: brucellosis, tuberculosis, and diarrhoea and abdominal pains.

Milk can be pasteurised by heating it to boiling point and keeping it there for one minute. Pasteurisation will not only make the milk safe to drink: it will also lengthen the time for which it can be stored. Pasteurised milk can be stored for two–three days in a

cool place (less than 10°C). The warmer the storage temperature, the shorter the storage life.

In some cultures, milk containers, often made from gourds, are smoked and then burnt wood, notably the African olive (*Olea africana*), is rubbed inside them. This preparation is believed to reduce contamination and gives the milk a characteristic smoky taste. This treatment will not reduce the bacterial content of the milk, but the strong taste produced will make the fresh milk more acceptable to drink for a longer period.

Many cultures in Africa and India allow the milk to sour naturally, and may either consume it as sour milk, or use the sour milk as the starting material to make butter, ghee, or cheese.

10.1.3 Milk collection, processing, and marketing

In areas where there is a tradition of milk production, there are also likely to be traditional systems of trading surplus milk with neighbours, or in rural or urban markets. Milking is normally the responsibility of the women of the household, and it has often been found that they have traditional systems of cooperation with neighbours to market milk in more distant and lucrative markets. These systems should be investigated before any intervention to improve milk marketing is suggested.

In countries with a national system of cow's-milk collection, such as Kenya, it might be possible to market goat's milk through the existing system. The Kenya Cooperative Creameries, for example, will mix goat's milk with cow's milk, to a maximum of 5 per cent of the total.

In situations where there is no traditional system, or only limited markets, a system of milk collection and marketing might be organised as part of a project intervention. Milk could be collected fresh and pasteurised in a central plant, or further processed into more valuable products such as butter, cheese, or yoghurt. The scale on which the collection and processing and marketing take place will depend on several factors:

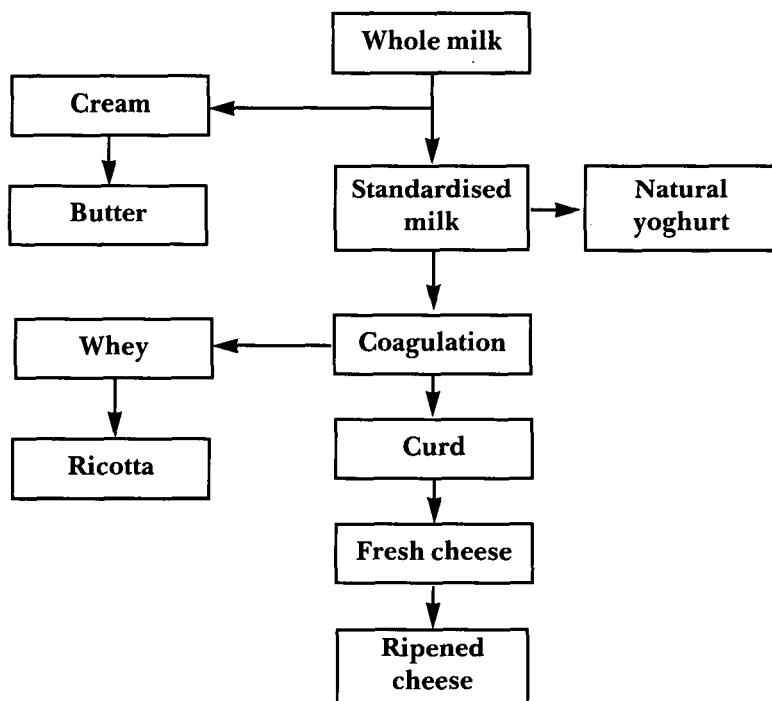
- the supply of milk, including seasonal fluctuations in supply;
- the market demand for goat's milk and milk products;
- transportation available for both collection and marketing;
- potential profitability of collection, processing, and marketing;
- the technical capability of those involved.

The functions of marketing organisations are discussed in 10.6.

10.1.4 Milk products

Figure 10.1 outlines how milk can be broken down into its components and converted into different products. Only the main products relevant to goats are described.

Figure 10.1 The conversion of milk into its products



Condensed milk

Making condensed, sweetened milk is one simple method of storing fresh milk for future use. The principle is to reduce the moisture content of the milk by 20–30 per cent and then add sugar until the milk reaches a thick consistency. A large saucepan of milk should be brought to the boil and then simmered for one hour, until moisture has been boiled off. Sugar should be added at the rate of about one third of the volume of the milk. The sweetened condensed milk can then be stored in a sealed container, such as a clean tin with a lid. Condensed milk can be stored in this way for 6–8 months. It can then be used in tea or coffee, or in other cooking.

Yoghurt

Yoghurt is made when milk is soured by certain selected bacteria, and not by other bacteria. Raw milk should be heated nearly to boiling point for three minutes. It should be cooled to about 45°C, when a small quantity of a starter, such as previously made yoghurt, is stirred into the milk. The milk should then be left, undisturbed, to sour at a temperature between 30°C and 45°C. Yoghurt incubated at 40°C–45°C takes 3–6 hours to set; at 30°C–40°C it takes 15–24 hours. The temperature will determine

the time it takes for the bacteria to grow and pleasantly sour the milk. The correct temperature will feel warm to touch, neither too hot nor too tepid.

Butter

Butter is a very valuable commodity in many societies; it may be used in cooking, for human beautification, and in some societies as a medicine. Converting milk to butter is an important method of adding value to milk and increasing the income earned from goats. Most societies which make butter have their own traditional methods of doing so. These methods are often very labour-intensive and inefficient; usually they require women to spend hours in churning milk, to recover a small amount of butter. Goat's milk, from tropical breeds, has a high fat content, making it very suitable for butter-making. Many societies add goat's milk to cow's milk to increase the fat content of the milk and increase the butter yield. In order to produce one kilo of butter, 25 litres of milk must be churned. There is seldom enough goat's milk from one farm alone to consider making butter from it

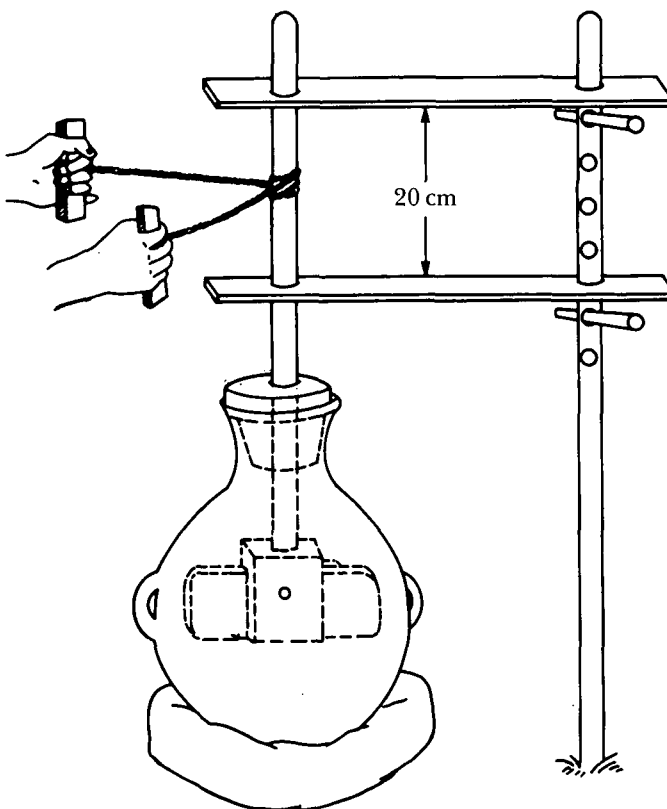


Figure 10.2 ILRI butter churner

exclusively. A group of goat farmers might consider getting together and contributing milk to a butter-making enterprise.

Butter can be made from whole fresh milk, cream, or sour whole milk. The milk or cream is agitated, often in a large earthenware pot, until butter grains form. The pot is then rotated slowly, until the grains join together into one lump, sloshing about in the buttermilk. The lumps of butter are then picked out and kneaded together in cold water. Salt may be added to help to preserve it. Some societies flavour the butter with herbs or spices, which helps to increase its storage life. Others further process the butter into ghee, or clarified butter, which is simply butter that has been heated to reduce the moisture content. Butter should be stored in a sealed container at a cool temperature. The buttermilk, left over after butter-making, can be used to make cottage cheese.

Traditional methods of butter-making can be improved through the construction of a simple paddle churner, or the purchase of a specially constructed butter churner. Specialised equipment can be purchased, perhaps on credit, by a group of farmers who contribute their milk. Improved equipment will reduce the time spent churning, relieving women of a burden, and increase the yield of butter obtained from milk.

Cheese

Hundreds of types of cheese are made around the world. Northern and southern European countries have developed many types of goat's milk cheese, and the recipes for some have spread outside Europe. Few countries in the tropics traditionally make cheese, and even fewer make cheese from goat's milk. This reflects local traditions and the small quantities of milk produced by most goats in the tropics, rather than any lack of potential. India and Central and South America are the main areas in which goat's cheeses are produced. The high fat-content of goat's milk makes it very suitable for cheese-making, and some delicious cheeses can be made.

In the countries where cheese is traditionally made from cow's milk, it is worth encouraging farmers to try making their traditional cheeses from goat's milk, when they have produced sufficient milk to do so. Where goat's milk cheeses are made, the process can often be refined to improve the quality of the product. There may also be potential to organise larger-scale cheese-making and improve packaging and marketing.

In situations where cheese has never been made and is not traditionally consumed, there must be very good reasons for introducing the practice. These may include the following factors:

- lack of access to a market for fresh goat's milk;
- surplus milk production;
- some farmers motivated to learn cheese-making;

Processing and marketing goat products

- the existence of an accessible market for cheese, or a potential market which can be developed.

Most traditional cheeses are soft cheeses of some sort. Greater skills, more equipment, and a greater volume of milk are needed to make hard cheese. About 7.5 litres of milk are needed to produce one kilo of fresh cheese, but over 10 litres are needed to make a kilo of hard cheese. The harder cheeses often become popular with urban residents as they become richer and are able to afford them. It is good for poorer farmers to take advantage of the increase in wealth of urban dwellers and sell them valuable products, provided that the farmers get a fair price for their products.

A goat-cheese factory in Burundi

As part of a dairy-goat project funded by the German government in Ngozi district of Burundi, a milk-collection system was set up to provide a guaranteed market to producers and supply goat's milk to a small cheese factory. The factory made soft and hard cheese. A small cheese shop was opened in the town and a few cheeses sold to middle-class residents. More cheeses were transported to Bujumbura city, where they were sold to wealthy Burundians and expatriates. A few cheeses were exported to Germany as a novelty product.

It is beyond the scope of this book to describe the procedures for making the different types of cheese. Special equipment is needed and skills must be acquired before cheese-making is begun on a large scale. Help must be obtained from experts in the field. A few of the simplest recipes are given below for people to try making cheese for the first time. Have a go and see if you like the results!

Soft or cottage cheese

Heat two litres of milk (fresh or sour) in a saucepan and bring it to the boil, stirring all the time. Remove it from the heat and, while stirring, add eight teaspoons of lemon or lime juice, or vinegar, drop by drop. Curds will form. Strain the curds through a clean cotton cloth with a fine mesh, until all the moisture (whey) has dripped through and the curds remain. The curds can be flavoured with salt, spices, or herbs and put into a small pot. Two litres of milk will make about 250 g of fresh cheese. This sort of cheese should be consumed within one–two days.

Ricotta

The whey from the making of soft cheese can be made into ricotta cheese. Heat two litres of whey until a cream-like substance rises to the surface. Add three cups of milk and heat it until very hot.

Then stir in 3.5 teaspoons of vinegar or lemon juice. Keeping the mixture hot, stir it quickly until the curd rises to the surface. Remove the curd and drain it through a cloth for a few hours. Ricotta can be salted and stored for a few days.

10.2 Meat and carcass products

Most goats in the tropics are either killed at home for use by the owner's family, friends, and relatives, or sold alive at a livestock market for subsequent slaughter. Few goats are slaughtered in recognised slaughterhouses, so their contribution to most nations' meat supply is usually grossly underestimated. Being small in size, goats are easy to slaughter for home use, or conveniently slaughtered by a butcher for sale in his shop during the day.

In most developing countries, virtually every part of the carcass is consumed or used in some way. For this reason, the Western concept of dressing percentage — a measure to describe the proportion of the carcass that is edible — is irrelevant. Very often the highest prices per unit of weight are paid for the portions that are, perhaps, less appealing to Western palates. In parts of Africa, raw blood is highly prized, and the goat's head may be valued to make a medicinal soup, common in East Africa.

In most countries, goats are valued for the medicinal properties thought to be possessed by different parts of the carcass. The basis of this belief is the goat's consumption of a wide variety of plant species in its preferred diet. There has been virtually no scientific research to establish the validity of these widely held beliefs.

10.2.1 How to kill a goat

Every culture has its own method of killing goats. Methods vary according to the state of consciousness of the animal at death and how it is bled. Methods of slaughter may broadly be divided into three kinds.

- **Ritualistic or religious slaughter:** this requires the goat to be conscious at the time it is bled. Muslim (Halal), Jewish (Kosher), and Sikh (Jhatka) methods are basically similar in practice, but each has its own ceremonial procedures.
- **Traditional slaughter:** there are many traditional methods of slaughter which have no religious connotations. For example, the Maasai pastoralists of East Africa value fresh blood and will suffocate the goat by placing a hand over the mouth and nostrils, while an assistant holds it down. This is a very slow death. After death the jugular vein is slit open lengthways and a flap of skin pulled out to catch the blood, from where it is drunk.

- **Humane slaughter** means that the goat is unconscious at the time of bleeding. Unconsciousness is induced by mechanical or electrical means. The goat's death is painless.

Each culture has a different attitude towards the animals it keeps. Many people in Western countries are concerned that the animals they consume are treated kindly during production and killed in a humane manner. Other countries may value their animals equally or even more, but do not ascribe feelings to them in the same way that Western societies do. Cultural considerations aside, farmers must be aware that the welfare of the livestock they keep affects the animals' health and productivity, and that a quick painless death is an appropriate end to an animal that has served its owner well. However, we must be realistic: unless there is legislation to confine the slaughter of goats to recognised slaughterhouses, using humane methods of slaughter, it is very difficult to make any changes to the method by which goats are killed.

If a gun is not available, the following method of killing a goat is humane and efficient.

- Hold the goat securely. Stun it by a sharp blow to the centre of the forehead. Use a small heavy instrument, such as a hammer.
- While the goat is still stunned, use a sharp knife to cut its throat from ear to ear, making sure that the windpipe and blood vessels are severed.
- Allow the body to bleed. Although the goat is dead, nervous reflexes will cause its body to jerk for a few minutes after death.
- When the body is quiet, it can be hung up by its hind legs and skinned, and the carcass cut in the local manner.

10.2.2 Preservation of meat

Most goats slaughtered in the tropics are consumed almost immediately. Their small size makes them ideal to slaughter for a family and a few friends, at a time of family celebration or a religious holiday. However, there may be occasions when the carcass of a goat is too much to consume in one–two days and it would be helpful to store meat in some way. In the absence of refrigeration, there are two main methods of preserving meat:

- **Air drying:** strips of lean meat are cut and hung in the open air until thoroughly dried. The resulting dried meat, sometimes known as 'biltong' or 'pemmican', can be kept for several months in this way.
- **Deep frying:** several pastoral groups in Africa deep-fry meat until it is dry and crisp. Stored in a sealed container, goat's meat preserved in this way has been reported to last for several years.

10.3 Skins

For many countries in the tropics, the sale of semi-processed hides and skins forms a valuable, sometimes major, source of foreign exchange. Several countries produce goat skins and products of great value, such as Moroccan kid leather, quality leather from Red Sokoto goats in northern Nigeria, and 'Bati' quality leather from Ethiopia. Most tanning is still carried out by the country which imports the skin. European leatherware manufacturers prize high-quality goat skin for the manufacture of gloves, shoes, and other products. The main types of leather made from goats' skins are Glacé, or glazed, kid leather, Semi-chrome leather, Patent leather, Full-chrome suede garment, Full-chrome goat Nappa, and Chamois leather. Tanning skins and manufacturing leather products from them can increase the value of the skins by four or five times. As a result, several developing countries now ban the export of semi-processed skins, insisting that they are processed in-country. It is obviously more profitable if these products can be made in the country of origin, but the quality of products must be high to compete in the world market. There are many countries in the tropics which are developing their own leather industries, notably India, Pakistan, Bangladesh, Nigeria, and Ethiopia.

For the individual owner, the skins of goats slaughtered at home can be used in countless ways for making clothes, bags, beds, thongs, and various containers. It is often too useful at home to be sold. If skins are sold, they are more valuable if they have been preserved in some way, to prevent deterioration.

10.3.1 Preservation of skins

Skins naturally contain bacteria which, on the death of the goat, will multiply, putrefying the skin. In hot humid conditions, this process of rotting will quickly spoil the skin. The first stage in the preservation of fresh skins is known as *curing*. There are two simple methods of curing.

- **Air-drying:** The wet skin can either be pegged out on the ground or tied to a frame and dried upright. It is important to avoid any damage to the skin and to try not to spoil the edges through clumsy pegging or tying. In climates that are not too humid, skins can be cured in one–two days.
- **Salt curing:** The fresh skin is cleaned of any blood or dirt, and washed with clean water. It should be laid out with the inside facing upwards. About 40 per cent of its weight in salt is then sprinkled on to it, until it is covered in an even layer. The salt will serve both to reduce its moisture content and to prevent

bacterial development. The skin can be folded with the salted side inside and kept in this way for long periods before tanning.

Factors affecting skin quality

There are many diseases of goats that will damage the skin and affect its quality and price. They include goat pox, streptothricosis, ticks, mange, ringworm, and warts.

10.4 Mohair and cashmere

Goats produce several types of hair fibre, depending on their breed and to some extent on their environment. There are three main types.

- **Mohair** is the hair of the Angora goat. The Angora produces fair-coloured long hair in either waves or ringlets, 12–18 cm long. Mohair is used to make fine cloth, carpets, and other products. Mohair production is now a specialist activity and has developed into a sophisticated industry. The International Mohair Association sets international standards, grading mohair fleeces according to fineness. In some countries, the fleece can be shorn twice a year. Shearing must take place in a clean environment, so that the mohair is not contaminated with other fibres. Any contamination will immediately downgrade the whole fleece, or — even worse — the whole bale in which it is packed.

A few countries in the tropics, including India, Lesotho, and Madagascar, have begun upgrading local goats for mohair production through cross-breeding with Angora bucks.

- **Cashmere (Pashmina):** many breeds of goat produce the very fine soft cashmere undercoat that is so highly valued internationally. There are no specific cashmere goat breeds, but many breeds in the colder regions of China, Mongolia, Tibet, and Northern India are considered cashmere types. These goats may yield 200–300 g of high-quality cashmere fibre per year. The cashmere fibre is grown by the goat for insulation, so when temperatures rise, they are naturally shed. In most countries the fibre is carefully combed out by hand, but other, labour-saving methods of harvesting are being investigated.
- **Common goat hair:** many breeds of goat are naturally hairy, with long coarse hair, which can be clipped and used. For example, Tauran goat keepers in northern Iran clip their goats and use the hair to weave coarse cloth for making tents. Skins of goats with long hair are often used to make warm clothes.

10.5 Manure

Goat manure is a valuable product and in some areas, such as Java, may be traded and given a cash value. The quantity and quality of manure depends on the quantity and quality of the diet consumed. As a rough guide, a goat is likely to produce 1–2 per cent of its weight as dry matter (DM) of manure per day. Therefore a 30 kg goat might produce 300–600 g DM manure per day, depending on the feed intake and digestibility of the diet. Table 10.2 indicates the typical composition of goat manure.

Table 10.2 Composition of goat manure

Moisture (%)	Nitrogen (%)	Phosphorus (%)	Potassium (%)
40-60	1.0-3.0	0.2-0.8	0.4-0.8

The quantity and quality of manure that can actually be collected and used will vary according to the system in which goats are kept. In housed systems, it may be possible to collect urine in addition to the solid waste, enriching the value of the combined waste material. Urine is particularly rich in nitrogen and potassium. In raised goat houses, urine can be caught underneath the house, soaking into waste feed and bedding, and combined with manure to make a rich fertiliser. Wet goat wastes are approximately 66 per cent solid waste and 33 per cent urine. In systems where goats are grazed, only the dry manure can be swept up and collected from areas where goats are penned at night, limiting the amount of waste collected and its quality.

There are two main uses for goat manure and urine: soil fertiliser and fish-pond fertiliser.

10.5.1 Soil fertiliser

Manure used to fertilise crops may be applied to the soil fresh; or mixed with waste feed and bedding; or stored with, or without, additional organic material. The breaking down of organic material through the action of bacteria is known as *composting*. The addition of manure to organic matter such as waste feed, fruit skins, and crop wastes can considerably improve the fertilising quality of the compost. The soil will benefit from the release of nutrients, and the build-up of organic matter will improve the structure of the soil. However, the storage of manure can lead to considerable losses of nitrogen, and exposure of manure to air leads to the volatisation of ammonia. These losses are greater at higher temperatures, under windy conditions, and the larger the surface area exposed. The bacteria that break down the organic material also require nitrogen

for their growth, which results in further losses. In addition, nitrogen can be leached out of manure by rain. If manure can be composted under conditions that reduce these losses, such as in a covered pit, then it is probably worth composting manure. Otherwise it is probably best to use the manure fresh.

There are also many pastoral systems in West Africa, and northern Pakistan and India, where goat flocks may seasonally graze crop-stubble, indirectly returning valuable nutrients to the soil.

10.5.2 Fish-pond fertiliser

There are many different systems of fish production into which livestock may be integrated. Common systems in South-East Asia include the housing of chickens, ducks, and pigs directly over, or next to, ponds containing a polyculture (mixture) of fish. The manure, urine, and high-quality waste feed fertilise the pond to supply nutrients for a rich phytoplankton, or algal, growth, which is consumed directly by fish such as tilapia (*Oreochromus niloticus*) and carp, such as Silver carp (*Hypophthalmichthys molitrix*). In addition, the phytoplankton feed zooplankton, which are consumed by other fish species, such as the Bighead carp (*Aristichthys nobilis*).

There are few traditional systems of fish production that integrate ruminants; but, with the increasing intensification of ruminant livestock production, particularly for dairying, new systems could develop. The traditional housed goat and sheep systems of Indonesia, Malaysia, and Philippines could immediately be integrated with fish culture, requiring little change in the management of either system. Conversely, fish farmers might consider starting goat farming as an additional source of cash income for their families. Some experiments indicate that the total income from a pond can be more than doubled by the addition of goats.

Goat manure should not be considered a high-quality pond input. Fertilising the pond with goat manure alone will not produce high yields of fish. However, it can serve as a basal fertiliser, supplemented with a higher-quality source of nutrients such as purchased chemical fertilisers, or with manure from intensively fed chickens. Or the farmer may decide that the low yields obtained from the pond are worthwhile.

Total fish yield depends on many factors, among them the stocking rate and the general water quality, including phytoplankton growth and the amount of dissolved oxygen in the water. The faster that phytoplankton multiply, the more oxygen they need for their growth; this reduces the oxygen available for fish. In extreme cases, fish can die through over-manuring of ponds. A balance has to be found between manure loading and

Recommendations for a goat/fish farm

As a rough guide, recommendations for a small enclosed pond of 200 m² are as follows.

- Fish stocking rate is 200–400/pond
- Goat manure loading rate is 1–2 kg DM/day, which can be obtained from 4–8 goats.

It is recommended that fresh manure is used.

The ratio of dry matter to fish weight gain is about 5:1.

the oxygen demands of the fish. The ratios of organic matter, nitrogen, phosphorus, and potassium also affect the growth of phytoplankton, and thus zooplankton, and water quality. Water quality can be assessed by observing the pond early in the morning. A well-fertilised pond should be a rich green colour. A rough guide is to immerse an arm in the pond up to the elbow: if the hand can be seen, there are not enough algae in the pond and more inputs should be added; however, if fish are gasping at the surface of the pond, there are low levels of dissolved oxygen in the pond, and manure should not be added.

A goat farmer with both crops and a fish pond must decide which will receive manure from the goats. There are a number of questions to consider.

- Is there enough waste to make a significant contribution to the pond?
- Can other fertilisers be purchased for the pond or field?
- What are the relative costs and returns from fertilising the field crops, compared with fertilising the fish pond?

The farmer may have to compromise and perhaps use the liquid waste and some solids for the pond, and the remaining solid manure for the crops.

A farmer has a fish pond of 200 m², stocked with 200 tilapia fingerlings. There is a goat house over the pond, receiving manure and urine from goats which are fed a high-quality diet of leucaena and sweet-potato tops, supplemented with rice bran.

If there are six adult goats weighing 30 kg each, the total DM production per day is 2.7 kg DM.

This will produce about 0.5 kg fish per day.

Example of a goat/fish enterprise

10.6 Marketing goats and goat products

It is obviously important that any goat or goat product for sale, whether it is milk, skins, or live animals, should earn the farmer a good price. Goat products which have been produced traditionally will have a 'traditional', informal market. There are few State-run or private marketing organisations for goat products in the tropics. This is because most goat products are either consumed at home or are traded in villages, or perhaps in district centres.

Careful consideration must be given before any interventions are made to improve the marketing of goat products. Local marketing systems are constantly evolving in response to changing circumstances, and they usually function best when not interfered with. From the goat-keeper's point of view, marketing is only partly for the sale of the goat or product. It also serves a social function: people meet not only to buy and sell but also to eat, drink, and chat together. If owners are selling directly to consumers, the balance between supply and demand will normally create a fair price. If the owner is selling to a trader, provided there are many traders, operating independently, and vendors have access to reliable information about prices, there is no reason to suppose that the owner is offered anything but a reasonable price. Farmers and pastoralists are in a weak position when, due to circumstances beyond their control, such as a drought, they are forced to sell their goats and have to take whatever price is offered.

Interventions in markets should not be considered except in the following circumstances.

- There is a very significant increase in production and the market cannot absorb it, which causes the price to fall.
- A new product is being introduced and there is no existing market.
- There is an advantage to individual goat-producers if they cooperate and market a larger volume of products together.

It must be decided whether the intervention will be for a short or long time period. Interventions might be designed to overcome a short-term marketing problem, allowing the normal market to adapt to the problem. Setting up a longer-term, even permanent marketing organisation might, in some circumstances, be desirable.

Marketing interventions might take one or more of the following forms.

- **Collection of goats or goat products:** collection may be from the farm itself or from some central collection point, to which farmers bring their products.

- **Processing products:** processing might include pasteurising milk, making cheese, making butter, slaughtering goats, and sorting fibres.
- **Grading products:** grading may be important in fibre production, or for the sale of live goats, particularly for export.
- **Packing products:** packing may be for easier transportation, for example baling mohair fleeces, or for the final consumer, such as packing cheese or butter for retail sale.
- **Promotion of new products:** if a new product has been made, for example goat's milk yoghurt, it may need to be advertised and promoted in some way. This does not mean billboard advertisements! It might take the form of inviting neighbours round to a house of a woman who is making cheese or yoghurt for the first time, for a free tasting.
- **Transporting goats or products:** transporting goats or goat products can be costly. It helps if owners get together to rent or buy a bicycle, scooter, van or truck; if goats or products are collected together and transported to a more distant market where prices are higher; and if they are sold on a contract to a slaughterhouse or butcher's shop, or other retail outlet.
- **Selling goats or products:** producers who group together in some way will have more bargaining power with buyers than if they negotiate separately. If they can offer a reasonable price and a regular supply, they can probably negotiate a good contract with the buyer.

Organisations that might serve some or all of these functions are listed below.

- **Producers' groups, associations, and cooperatives:** groups of farmers might get together and form an informal (or more formal) group, in order to improve the marketing of their goats and/or products.
- **Private companies** may make a contract with producers to buy a product at an agreed price, quality, and frequency. This arrangement can be beneficial to both parties.
- **Government organisations:** an existing government marketing organisation, such as one dealing in milk, might agree to help with the marketing of goats' milk. Alternatively a government might decide that goats are important enough to need their own marketing organisation.
- **Non-governmental organisations** might help to set up a producers' marketing organisation.

Further reading

- O'Conner, C.** (1993) *Traditional Cheesemaking Manual*, Addis Ababa: International Livestock Research Institute (ILRI)
- Dubach, J.** (1989) *Traditional Cheesemaking*, London: Intermediate Technology Publications
- Ebing, P and K. Rutgers** (1991) *The Preparation of Dairy Products*, 2nd revised edition, Agrodok 36, Wageningen: AGROMISA
- Little, D. and J. Muir** (1987) *A Guide to Integrated Warm Water Aquaculture*, Sterling: Institute of Aquaculture, University of Sterling
- O'Mahony, F.** (1988) *Rural Dairy Technology*, ILCA Manual No. 4, Addis Ababa: ILRI
- Sinn, R.** (1985) *Raising Goats for Milk and Meat*, Arkansas: Heifer Project International

Goat-improvement programmes

11.1 Introduction

So far, this book has described both the common problems of goat production in various systems and the methods that can be used to identify the specific problems in particular systems. The technical aspects of improved goat production have been described in some detail. It is now time to consider how to put these technical improvements into a plan of action in the field.

11.2 Goat-improvement strategies

Goats have many different functions in the rural economy. Developing and extending their use can benefit many social groups. There are two main approaches to the use of goats in development.

- **The improvement of existing systems of goat production:** improving some existing system of goat production is, of course, the most common approach. Chapters 2 and 3 showed the importance of identifying the system concerned and investigating the specific problems of keeping goats in that system, before improvements are attempted.
- **Stocking/restocking people who do not own goats:** extending the ownership of goats to people who do not own them may have a major impact on the lives of families and can be used to help some of the poorest to take a step out of poverty.

11.2.1 Improvement of existing systems

The approach to improving existing systems of goat production should be one of stepwise progress, in keeping with the owner's objectives. After identifying the owner's reasons for keeping goats and defining with the owner what would be an improvement, technical or economic improvements can be designed.

In donor-funded projects, a 'package' of improvements is often promoted, the argument being that the individual technical

innovations proposed are linked to other innovations and will not perform properly unless they are adopted by producers simultaneously. An example of such a linkage might be the promotion of supplementary feeding, combined with an anthelmintic drenching regime. The supplementary feeds will not be used efficiently by the goat, if it is supporting a heavy load of internal parasites. Technically a 'package' approach makes sense. However, in reality owners seldom adopt new technology in strict accordance with the recommendations given by scientists and extension staff. They tend to pick up new technology in a piecemeal way, adopting and adapting it as they are able and as it suits them. It may be that, in the example above, the owner can see and appreciate clear improvements resulting from drenching, but not from the use of the supplementary feed. He or she may become interested in supplementary feeding at some later date.

*Dairy goat project:
Ethiopia*

In order to improve local goat production in the highlands of Ethiopia sufficiently to introduce a cross-bred milking goat, a stepwise approach to improvement was taken by the FARM-Africa Dairy Goat Project. Small farms in the highlands suffer from a chronic shortage of animal feed. The Dairy Goat Project started by introducing the growing of forage crops in strategies which did not take any land away from food-crop production. The project then trained women to be paravets and improve the health of local goats through the use of anthelmintics, vaccination, and tick control. The women soon showed varying levels of management skills and varying levels of adoption and adaptation of the technology being promoted. Once the level of local goat management by some of the women was good enough, cross-bred goats were introduced, two–three years after the start of the project, and performed very well. Some women, however, were learning the value of drenching their goats, while others were still struggling to establish some forage successfully.

There is no shortage of technical options for goat improvement to be incorporated into an extension programme. It is often said that little is known about goats and that more research needs to be done. Although it is true that less is known about goats than about other domestic livestock, many technical improvements can be made with the knowledge currently available to us. What is often lacking is not the technology but the means of appropriately introducing it, and sustaining it, within any community. Technology should not be divorced from the method of organising it: the two are intimately linked.

Technical options

Options for improving the feeding of goats

Use existing feeds more efficiently:

careful selection

appropriate treatment: wilting, chopping

correct presentation: rack/net/tied bundle; mixture; frequency; cleanliness

frequent/continuous access to water

supplementation with energy/protein/minerals

scarce feeds targeted to the most needy goats.

Improve the quantity and quality of feeds through the year:

conservation and storage

forage-crop growing.

Options for improving the health of goats

Improve nutrition Close supervision of kids

Improve housing Foot care

Vaccination Identify and treat diseases

Control parasites Drug shops

Primary health care through use of paravets

Options for improving the reproduction of goats

Improve nutrition

Improve oestrus detection

Improve access to males

Options for improving the genetic potential of goats

Selection of the best males and best females

Buck exchange/rotation to avoid in-breeding

Selection programmes on stations

Up-grading through cross-breeding (on-station F₁ production, buck stations, artificial insemination)

Options for improving goat-product processing and use

Group milk collection, processing, and marketing

Improved butter churner

Condensed milk

Simple cheesemaking

Meat preservation: air dry/deep fry

Skin preservation: dry/salt

The technology options available have been described in detail in the relevant chapters and are summarised in the box on the previous page. It is important to be aware of the need for fine-tuning the techniques, so that they work properly in particular districts, villages, and farms. Most of this fine-tuning will be done by the producers themselves, who will pick up and adapt technology to suit their own particular circumstances. This is a continuous process, as circumstances (weather, prices, owners' objectives, family sizes) are constantly changing. Producers may need some help with some of the adaptation. For example, if drenching of goats is carried out for the first time, monitoring the faecal egg count for a one-year period will help to show how effective the drenching regime is, and whether it should be adapted in any way.

The methods of organising the introduction and support of technology in any community are listed in the box on this page, and are discussed in 11.4.

Organisational options

Use existing organisations or establish new goat group to
supervise credit repayments and reallocation of credit
manage a drug supply
supervise paravets
supervise buck stations and 'rotation' of bucks
assist in recording/monitoring performance
organise an accompanying savings association
assist in group collection and processing, e.g. butter or cheese
assist in group marketing
manage a communal grazing resource
Basic training course
Specialised training courses

11.2.2 Stocking/restocking people with goats

Supplying goats to people who do not currently own them is a very attractive way for a donor-assisted project to make an immediate and significant impact. There are two main approaches here. First, extending goat ownership within a community, often to the poorest members, by providing finance, normally in the form of credit for the purchase of goats, either local or improved. Second, restocking pastoralists or farmers who have lost their goats, and thus their livelihood, during a drought, disease epidemic, or warfare.

The role and management of credit for goat-keepers, together with guidelines on restocking pastoralists, are discussed in 11.6.

11.3 Participatory planning

11.3.1 Introduction

Chapter 3 described the methods that might be used to identify the specific problems of goat production in an area, in order to design a programme of action to improve production. The process of identifying improvements, considering how they might be implemented, consulting all individuals and organisations who would have to be involved, negotiating the allocation of responsibilities, obtaining the finance (if required), and phasing the activities are the elements of planning.

Who should be involved in planning? It seems obvious that all those who would be involved in the eventual programme of action should be involved in its planning. However, in reality, this rarely occurs. Far too many development plans are made by outsiders who live at a physical and cultural distance from the situation to be improved. This seems absurd, because there is a much greater chance of developing an effective improvement programme if all those to be involved participate, right from the start, in all stages of the planning process. Participation is the basis for success.

It is important to understand that planning is a continuous process. The traditional distinctions made between planning, implementation, and evaluation are artificial separations of what is, in reality, one on-going activity. At some stage a plan has to be made, normally to secure funding, but this plan should be constantly reviewed and revised in the light of experience.

11.3.2 The planning process: alternatives analysis and participation analysis

Planning starts when initial contact is made between one or several communities and a governmental or non-governmental agency. There must be an initial period of listening to, and learning from, the community, during which rapid methods of assessment are used to make a preliminary analysis of the situation. This period of assessment should not be too long: farmers or pastoralists expect to see some action. Experience has shown that, after an introductory period, an initial period of joint action, often called a *pilot phase*, deepens the relationship between producers and extension staff. This will build up trust between all the parties involved, and will inevitably bring new information to light; the result will be better plans. Learning by doing is an important component of the planning process.

The course of action to improve goat production evolves through discussion and constant consultation among all those to be involved. Section 3.2.13 described how a group could use the tools called problem analysis and objectives analysis to think about

the problems of goat production in their area. These tools will normally reveal several, often interlinked, problems which can be solved through several alternative courses of action. There comes a point when the group must decide which of the alternative courses of action they are going to follow; this is known as *alternatives analysis*. There are usually many factors which affect the final choice, including:

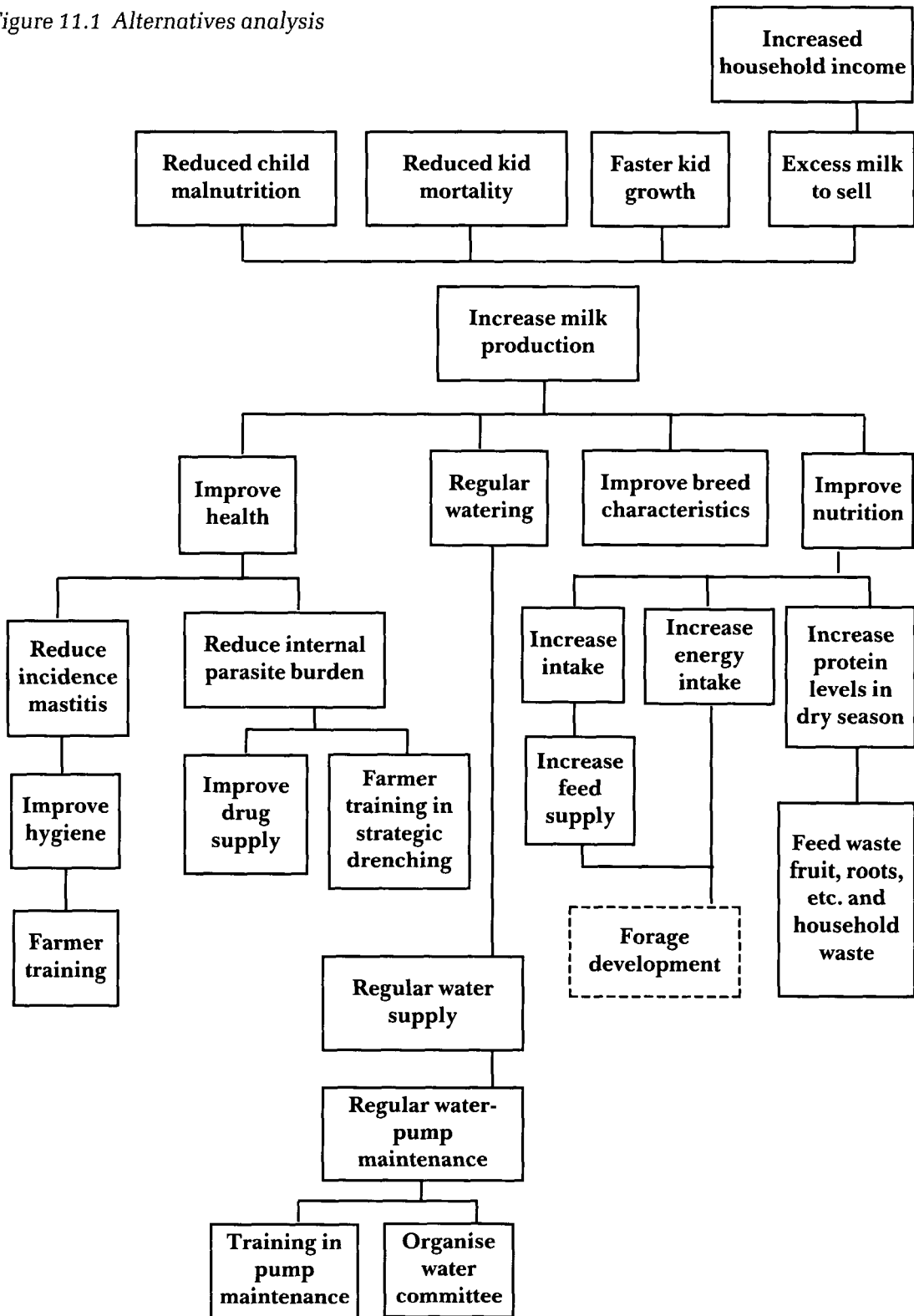
- the interest of the community
- the capability and resources of the donor/implementing agency
- the policy of the government
- the costs and likely benefits.

Using the example of low milk production employed in the problem and objectives analysis, it is clear that there are several alternative ways of achieving the main objective of increased milk production. One, or more, of the four means of increasing milk production could be tackled. For example, the health of goats could be improved, through reducing the parasite burden by improving the supply of anthelmintics, and training owners in their economic use. Alternatively, the feeding of goats could be improved by developing high-quality forage crops to be fed as a protein supplement. If the resources are available, both health and nutrition could be tackled. If the agency involved is concerned only with animal husbandry, it might be difficult for it to become involved in improving the water supply; but it might encourage an appropriate agency to tackle this problem. Some NGOs have the capacity, themselves, to improve water supply. Improving the breed characteristics might be too difficult for a small agency to consider, but a large government programme, or a well-funded NGO, might consider breed improvement.

During the planning process, it is also important to gauge the strengths and weaknesses of the individuals and organisations concerned; this is sometimes known as *participation analysis*. Make a list of all organisations, individuals, and interest groups who are, or might become, involved in the proposed action. Next, consider what each party's interests are, and what their fears are. Assess the strengths and weaknesses of each group and the possible implications of the chosen course of action. Consider how to make best use of participants' strengths and interests, how to allay their fears, and either avoid their weaknesses or strengthen their capabilities.

It is important to identify what each party is capable of doing and what they could do with better resources. Then enter a process of negotiation to allocate specific responsibilities to them. Consider what is expected from the community itself. What will be the contribution of local people? What do they expect in return? What is the role of community leaders? What is the

Figure 11.1 Alternatives analysis



Goat-improvement programmes

Planning a goat project in Kenya

The Ministry of Agriculture, Livestock Development and Marketing (MALDM) invited an NGO to start a goat project in a densely populated, marginal farming area of Kenya. After a short reconnaissance visit by a small team representing the government and the NGO, a Rapid Rural Appraisal was made over a period of six weeks by a livestock specialist and a socio-economist. Extensive discussions were held with farmers, individually and in groups, to identify the problems they experienced in keeping goats and their interest in overcoming these problems. By the end of the RRA, a report was written and a good picture emerged of the problems of goat production, and the areas and people who would benefit most from project interventions. A project proposal was written and external funds sought, in order for the NGO to implement the project jointly with the MALDM.

extension service expected to provide? What resources would help them to do this better? What service will the local farmers' organisation, such as a co-operative, supply?

Once responsibilities for different aspects of the project have been assigned, consider whether a legally binding agreement is required, or whether an informal agreement is adequate. What will happen if one party is unable to fulfil its obligations? Will this have a major or minor effect on the outcome?

Developing a government goat-improvement plan: Sikkim, India

The Food and Agriculture Organisation (FAO) of the United Nations received a request from the Department of Animal Husbandry and Veterinary Services of the government of Sikkim for assistance to develop goat production in the state. Sikkim is a small mountainous state in the north-east of India. It has received very little outside assistance for the development of its agriculture. It was decided that there was very little information available on goat production in Sikkim, beyond the understanding that goats were tended by women, and that it would be an opportunity to assist women with their chickens as well. A small team of consultants ran a training course on RRA methods for department staff and carried out a RRA exercise with them, to start to identify goat-production problems. This was used as a starting point for a longer, monitoring study, designed to yield sufficient information to write a long-term plan for the development of the goat and chicken resources of the state.

11.4 Writing a plan

At some stage, a plan will have to be written down for others to read and assess. If external funding is being sought, it will have to be written in the form of a project proposal. Donors often have a standard format for the proposal, which must be followed scrupulously, before they will consider funding any project. Even if external funds are not required, it is still important to write down the proposed plan of action, to show to all those who will be involved. This will form the basis for any agreement, possibly a legal agreement, under which the project operates within the community. A project proposal should have the elements described below.

11.4.1 Objectives

The objectives for undertaking the proposed activities must be clearly stated, because it is against these that the project will ultimately be evaluated. The objectives might be revised later, but they will be the guiding force behind the start of the project.

It is sometimes helpful to state objectives at two levels. General, or wider, objectives might be statements such as: 'to improve the welfare of goat farmers in X District by increasing the incomes they receive from their goats'; or 'to increase the stability and sustainability of family incomes through improving goat production'.

More specific objectives should then be stated, such as 'to increase the milk production of goats owned by 1,000 farmers through improved management and breeding'; or 'the development of cut-and-carry feeding of goats in X District through the establishment of forage strips and back-yard pasture'; or 'to reduce the pre-weaning mortality rate of kids through improved health care by paravets'; or 'the breeding of 200 cross-bred goats per year for distribution to farmers in X District'. A project will probably have several specific objectives which it is trying to achieve simultaneously.

11.4.2 Physical context

There should be a description of the climate (rainfall, temperature, humidity, frost incidence), topography, soils, vegetation, land use (agriculture, communal grazing areas, forests), and infrastructure (water points, roads, markets, slaughterhouses, etc.).

11.4.3 Socio-economic context and the target population

The current economic activities of the people of the area should be described (agriculture, trading, manufacturing, employment opportunities), together with some assessment of current annual incomes, size and distribution of land-holdings, land-tenure arrangements, and access to communal resources (grazing, water, forests).

Current community organisations, producers' organisations, and co-operatives should be mentioned and their functions described. Existing extension services, other development agencies (government and NGO), and their programmes and their potential involvement in the proposed programme should be described.

The current sources of agricultural inputs — seed, drugs, fertilisers, credit, breeding stock, etc. — should be described. The marketing system for livestock and livestock products, and current prices, must also be described.

11.4.4 Statement of current situation and problems

There should be a clear statement of the current methods of keeping goats in the target area. The problems associated with goat-keeping must be described, together with a description of how these problems were identified. A report from a Rapid Rural Appraisal might be attached to the proposal as an annex.

A description of the sorts of farmer, or pastoralist, who are likely to benefit from the proposals should also be made. Are you trying to help the poorest families, or will the slightly richer families be more likely to adopt the proposals? Define the target group for whom the proposals are made.

11.4.5 Project activities and organisation

The plan must clearly state exactly what will be done, and by whom. The allocation of responsibilities between all those involved must be clear, to avoid misunderstandings. What is expected from men and women farmers or pastoralists, from extension staff, from community leaders and community organisations, credit banks, the project agency, commercial companies, and producers' groups must be negotiated and must be clear to all concerned. Project proposals often form the basis for a legal agreement between agencies and government organisations, so the expectations and responsibilities of all parties involved must be clearly stated.

It should be the aim of any development agency to achieve sustainable improvements in goat production, which must mean

that either existing rural institutions take up new responsibilities as part of the project, or that new institutions are created, which become responsible for activities started under the project. Either way, responsibilities will inevitably shift as the project develops; but their initial allocation should be clear.

The project proposal must clearly describe the activities that will be carried out, under headings such as the following.

- **Extension programme:** the activities carried out with farmers and pastoralists must be described. Will producers be visited individually, or will they form producers' groups? How often are extension staff expected to visit individuals/groups/villages? What will they do during their visits?
- **Training:** what training is required by different individuals and organisations involved in the programme? What sort of training is needed by farmers and families, and by extension staff? Is specialist training needed by veterinarians, credit-fund managers, breeding specialists, or forage specialists? Who will do the training? Where will the training take place? How often and for how long? How many people will be trained?
- **Infrastructure development:** what infrastructure needs to be built? Who will build it: the community or the government or the development agency? How will it be funded: jointly with the community, or wholly by a donor agency? What materials will be used? What are the costs and availability?
- **Research:** is any research needed to assist the implementation of the project? Who is able to do this research: can project staff, or should specialists be brought in? What equipment will be needed? Is it available, or will it have to be purchased?
- **Public awareness/education:** is there a need to run a special public-awareness campaign? How will it be organised? Through schools, community meetings, churches, mosques, women's groups?
- **Monitoring:** what information needs to be collected to assess the performance of the project? Who will collect it? How often? Who will analyse it? How often will it be reviewed? Monitoring is discussed further in 11.7.
- **Reporting:** regular reports should be written, to record the progress of the project. Donors have their own reporting requirements, which must be strictly followed. However, even if an external donor is not involved, reports should be written to review performance and record events before they are forgotten. Reports are the history of the project and are a valuable resource. They should not be written too often, or they become a burden: monthly is too often; but they should be

written regularly enough to keep people up-to-date with events: every six months is reasonable. The project proposal must state how often reports will be written. Reports should be written honestly. When writing reports for donors, there is a temptation to over-emphasise achievements and play down problems that have caused delays. Be careful! Later on, if the project is reviewed by the donor, the reports will form the basis for charting the project's progress. If real problems have not been reported, it is hard to cite them later as a reason for not meeting a target objective.

11.4.6 Project period, phasing of activities, and targets

The period covered by the project proposal will vary according to the purpose for which it is written. Normally the period would fall in the range of 1–10 years and would most likely last for 3–5 years. It must be remembered that improvements in livestock production will take time to achieve. Although it is perhaps quicker to make improvements in goat production than, say, in cattle production, some improvements — particularly in breeding — will take a long time.

There should be a calendar indicating the proposed timing of activities. It is inevitable that the timing of activities will be described in detail for the first year and in less detail with each succeeding year. Activity calendars should be reviewed every year and modified in the light of current circumstances.

Output targets to be achieved each year should be set at a realistic rate, considering the resources likely to be available, to encourage achievement, rather than to create a burden to discourage project staff and participants. Targets often become a burden if staff believe that they must be met at any cost. Donors will naturally want to know the number of people they will be assisting through the project and the likely scale of benefit received by each person involved. Set reasonable, achievable targets that do not become a burden to staff.

11.4.7 Inputs required

The calendar of activities, together with targets, will indicate the type, timing, and quantities of inputs needed for the project to function. The organisation responsible for obtaining these inputs must plan carefully, to ensure that they are available on time. Delayed procurement is often the cause of delays in implementing the whole project. This is particularly true if items have to be imported into the country — which can be a slow and costly process. A few useful addresses of (mainly UK-based) companies which supply livestock inputs are given in the Appendix.

Inputs required might include the following.

- **Staff:** if staff have to be recruited, it is important that suitable staff are in place at the start of the project. The process of staff recruitment can take a very long time, and can considerably delay the important early stages of a project.
- **Forage seed:** forage seed can often be obtained through local agricultural offices, or in small quantities from research stations, universities, and colleges. There are several international organisations that will supply very small quantities of seed for small trial plots; their addresses are given in the Appendix. Larger quantities for an extension programme may have to be procured from a reputable seed company. There are several good seed companies in Australia which sell tropical forage species.
- **Drugs:** drugs can often be obtained locally, but the quality of locally manufactured drugs must be checked, where possible. There have been reports of ineffective drugs reaching the market in tropical countries. Drugs procured from an internationally reputable company should be effective. If drugs are imported, allow plenty of time for delivery, and make sure that the company specifies the exact drug, its method of presentation (liquid, powder, or bolus), its container size, and its date of expiry.
- **Goats:** the purchase of good-quality goats from local markets can take time (see 11.6.7). The procedures for the importation of goats have already been described in 8.4.2. Make sure that time is allowed in the plan to purchase goats if they are needed in the project.
- **Vehicles and spare parts:** if staff need vehicles, make sure they are appropriate to the terrain, the likely distances to be covered, and the abilities of the user, and that they can be easily maintained and repaired locally.
- **Equipment:** what equipment will be needed? Can it all be purchased locally, or will some of it have to be procured from overseas? Do you know a supplier? Is there a locally available alternative to the overseas product?
- **Training:** can all necessary training be carried out by project staff and collaborators, or will an outside expert be needed? Do you know of such an expert? If a more formal training course is envisaged, is the course 'in country' or overseas?
- **Extension materials:** consider the training materials that will be needed. What sort are appropriate to use: pamphlets, flip-charts, slides, film strips, videos, etc.? Will they have to be specially developed; if so, by whom? Where will they be produced? Can it be done locally? What languages will be used?

- **Finance:** money will be needed for infrastructural developments and any operating costs. Will cash be needed to establish a credit fund, or purchase stock from contract farmers? Consider the source of finance and how it will be managed.

11.4.8 Making predictions about the future

It is important both for those preparing a goat-improvement plan and for the potential funders to think through the likely consequences of the proposed improvements. This should be done for the individual farmer or pastoralist, and might also be carried out at a broader level, for example for a village flock.

Start by considering the biological effects of the improvements on the flock, and then consider what this means in terms of increased products, and ultimately money and security.

Table 11.1 Projected flock structure (before project)

Age/sex categories	Year 1	Year 2	Year 3	Year 4	Year 5
Flock structure					
Adult females	10	11	13	15	18
Adult males	1	1	1	1	1
Weaner females	3	4	5	6	7
Weaner males	3	4	4	5	6
Kids females	4	5	6	7	8
Kids males	4	4	5	6	7
Total	25	29	34	40	47
No. dead					
Kids	4	4	5	5	7
Weaners	2	2	3	3	4
Adults	2	2	3	3	6
Total	8	8	11	11	17
No. sold					
Adults	1	1	1	1	1
Weaners	2	3	3	4	5
Total	3	4	4	5	6

Parameters:

Age at first kidding = 18 months

Kidding interval = 365 days

Number of kids per kidding = 1.2

Pre-weaning mortality rate = 30%

Post-weaning mortality = 20%

All females retained in flock

One buck retained for breeding per year, previous buck culled

11.4.9 Flock projections

Let us consider the effect of health and management improvements reducing pre-weaning mortality from 30 per cent per year to 15 per cent per year, and post-weaning mortality from 20 per cent per year to 10 per cent per year. What is the effect on the flock? Tables 11.1 and 11.2 present the development of a flock of 10 breeding females over a five-year period. The first table reflects the current performance of the flock with high mortality rates. The second table shows the dramatic improvement in flock development if mortality rates are reduced by half. The number of weaners available for sale is roughly double, and the flock size has dramatically increased in number, and thus in value. The parameters used must always be shown, together with the management strategy assumed. When

Table 11.2 Projected flock structure (after project)

Age/sex categories	Year 1	Year 2	Year 3	Year 4	Year 5
Flock structure					
Adult females	10	12	16	20	25
Adult males	1	1	1	1	1
Weaner females	5	5	6	8	10
Weaner males	4	5	6	8	10
Kids females	5	6	8	10	13
Kids males	5	6	8	10	12
Total	30	35	45	57	71
No. dead					
Kids	2	2	3	4	5
Weaners	1	1	1	2	2
Adults	1	1	2	2	3
Total	4	4	6	8	10
No. sold					
Adults	1	1	1	1	1
Weaners	2	4	5	7	9
Total	3	5	6	8	10

Parameters:

Age at first kidding = 18 months

Kidding interval = 365 days

Number of kids per kidding = 1.2

Pre-weaning mortality rate = 15%

Post-weaning mortality = 10%

All females retained in the flock

One buck retained for breeding per year, previous buck culled

calculating flock structures for small flocks, round up, or down, to the nearest whole number.

11.4.10 Partial budgets

Once the likely biological improvement in production from an intervention has been calculated, the costs of achieving this improvement should be estimated. First consider the owner's objectives and whether the benefits gained meet these objectives. Then consider the cash costs and benefits. A simple calculation of the net benefit, in terms of cash income, of the current and future goat enterprise will indicate whether the benefits of improving production are likely to outweigh the cash costs. A simple table, like Table 11.3, will reveal the cash benefits of the proposed health and management interventions.

The interventions proposed do more than increase cash income through supplying more young males for sale. Reducing mortality rates has dramatically increased the number of goats owned, increasing the flock size from 30 to 71 in five years. This is an improvement of 136 per cent over what would have been the final flock size without the intervention. This expansion of the flock has increased the security of the family, giving them more goats to sell in times of trouble; it has increased the future earning power of the flock; and it will provide many future benefits to the family. Finally, within most societies, the increase in flock size will have increased the esteem with which the family is held within the community.

Table 11.3 Goat-enterprise budget for 10-doe flock

Before project		After project	
Item	\$	Item	\$
Variable costs		Variable costs	
Vaccination	10	Vaccination	10
		Veterinary drugs	50
		Mineral lick	5
Total	10	Total	65
Income		Income	
Sale of weaners	250	Sale of weaners	450
Sale of adult culls	75	Sale of adult culls	75
Total	325	Total	525
Net benefit	315	Net benefit	460
(Total income less variable costs)		(46%)	

The increase in flock size and income will, of course, have been achieved not only through simple cash expenditure on drugs and minerals, but will have required increased labour and skills, greater supervision, perhaps the construction of a larger house using local materials and family labour, as well as other, less quantifiable, costs. In addition, we should consider the effects of any changes in input or output prices on the overall profitability of the new system. Will the interventions increase the risk faced by the owner? Is this acceptable, or is it putting the owner in jeopardy? These matters must all be considered and discussed with producers, when considering any intervention and making a plan.

11.4.11 Expected benefits and number of beneficiaries

A plan for external funding must explicitly state the number of families which will benefit from the proposed interventions and try to quantify the benefits they will receive. The flock projections, estimates of increased productivity (milk production, etc.), and partial budgets for different situations will help to establish the expected increases in meat, milk, and cash. These can then be combined with an estimate of the number of families which can reasonably be expected to participate in the project.

In addition to the quantified benefits, there should be a statement of some of the unquantifiable benefits derived from the project. These might be increased knowledge about goats through the monitoring or research components; improved awareness of goats among policy makers, school children, and others; improved public health through better hygiene in milk handling; and improved status for women in the community through their involvement in a goat programme.

11.4.12 Environmental impact

It is important to be aware of the effects of people and their way of life on the environment. Donor agencies are increasingly concerned that their projects should not have any detrimental effects on the environment, and, wherever possible, should have a beneficial impact. Furthermore, the widely held misconceptions about goats and their supposedly negative effect on the environment mean that it is essential to have an explicit statement concerning the environmental impact of any proposed goat project.

The sorts of environmental concern that should be addressed are whether the project will increase the numbers of goats, and thus increase the pressure on the available grazing resources. How will the goats be managed? Is it possible to encourage forage

development (beneficial to the environment) and the cut-and-carry feeding of goats? Is there any chance of widespread agreement among producers to exercise control of livestock using communal grazing areas?

11.4.13 Other side-effects of proposals

It is good to state what other likely side-effects the project might have. Many of these side-effects cannot be predicted and will come to light only after the project has been operating for some time. However, it is important for those who will implement a project to think about both the good, as well as potentially bad, side-effects of the actions they are planning. In particular, the following questions should be considered.

- **Labour requirements:** does the proposed intervention involve more work? If so, by whom? Will they have time to carry out their existing tasks as well as the new jobs?
- **Gender:** will the intervention change any of the current roles and status of men and women? Will it improve the quality of life for men, women, and children? If one member of the family benefits from the project, will the benefits be shared among the family or retained by the individual for personal use?
- **Culture:** does the intervention expect any change in the culture of those involved? For example, in some societies people are not used to drinking goats' milk. Will it be accepted?

11.4.14 Budget

It is important to prepare a clear and realistic budget, whether external funding is required or not. Consider whether all the resources are available or not in order to carry out the programme of work successfully. It is distressing for all concerned if work is started and cannot be completed because of lack of resources.

External donors normally require a budget to be prepared in a particular format. A simple example is given in Table 11.4. Costs are separated into funds spent on capital items such as vehicles, farm development, and the purchase of bulky items such as large equipment and goats. Costs that recur every year, such as staff salaries, vehicle running costs, and purchase of drugs and stationery, should be presented separately.

It is usually helpful if capital and recurrent costs can be presented separately for each activity of the proposal. If this is done, donors can immediately see how their funds are going to be spent and, if desired, shift more resources to a preferred activity from another, less preferred one.

Table 11.4 Sample budget format for project proposal

Item	Year 1	Year 2	Year 3	Total
Capital				
Extension				
Goat purchase				
Vehicle purchase				
Training				
Audio-visual equipment				
Breeding				
Farm development				
Equipment				
Total capital costs				
Recurrent				
Extension				
Staff				
Vehicle operating costs				
Drugs				
Forage seed				
Equipment				
Stationery				
Breeding				
Staff				
Drugs				
Equipment				
Training				
Staff				
Extension materials				
Monitoring				
Staff				
Stationery				
Administration				
Staff				
Stationery				
Total recurrent costs				
Total budget required				

11.5 Methods of implementation

11.5.1 Introduction

At the start of the implementation of any development initiative, it is important to develop points of contact and channels of communication with the local community and with those directly involved in the programme. It is assumed that the communities with whom the project was designed are aware of their role and the benefits they are likely to receive during the course of the project. However, it is very hard to provide enough extension staff to work closely with individual families. Contact with individuals is very important, but it is unrealistic to base an extension programme on one-to-one contact.

For effective implementation, there must be:

- a channel to supply and manage inputs;
- a forum for the exchange of ideas;
- a training forum.

It is most likely that some sort of organisation of farmers or pastoralists, formal or informal, will be used as the main point of contact. It is much more efficient, and appropriate, for producers to learn from each other, and it is a more efficient use of the time of extension staff if they can train groups, rather than individuals. The appropriateness of any technology that requires regular, lengthy contact between an extension agent and an individual owner has to be questioned.

There is often debate about the need for, and role of, contact farmers. The well-known training and visit (T and V) system of agricultural extension relies heavily on extension staff working exclusively with contact farmers, who pass on agricultural messages to their 'follower' farmers. This is a very formalised extension system, which allows little scope for feedback and for extension staff and farmers to diverge from the official programme. In reality, extension staff will always get to know a few of the more enthusiastic farmers or pastoralists, upon whom they will increasingly rely as their main contacts with the local community. These enthusiastic men or women will be the ones who quickly take up new ideas, who regularly attend meetings, and want to attend training courses. Their motives are, naturally, mixed between seeking advantage for themselves and their family and wanting to help their less able neighbours. Some development agencies formalise this relationship and employ these leaders as community workers, who earn a small salary, and in turn visit their neighbours on behalf of the project and, perhaps, help to organise meetings. This can be an extremely cost-effective method of maintaining contact with the community. However, over-stretched extension staff may quickly

find that their only contact with the community is through these leader farmers, who may not represent the views of the whole community and may tend to monopolise the staff and resources of the project for themselves.

11.5.2 Farmer/pastoralist organisations

Farmer, or pastoralist, organisations can take many forms, from informal neighbourhood groups to legally recognised co-operatives. These organisations can serve one or more of the following functions:

- as a channel for inputs, including credit;
- for processing products;
- for marketing products;
- as savings associations;
- as forums for discussion;
- as forums for training;
- as welfare organisations;
- as lobbying groups.

Each country has its own legislation governing the status of producers' groups, or associations, and the necessity for legal recognition, registration with authorities, reporting, accounting, etc. In some countries, producers' organisations are used more for political purposes than genuinely to assist their members; they may even be used as a channel for the collection of taxes.

A project first has to decide whether, in order to achieve its purposes, it is able to work through existing organisations, or whether it is necessary to start a new one. Existing groups are seldom orientated towards goats and goat development. But it is preferable in most cases to try to work through, and adapt, existing structures wherever possible. This will improve the chances of the long-term sustainability of the intervention. However, if there are no appropriate organisations with which to work, new ones might have to be established.

A 'goat group' might be set up to serve one or more of the following functions:

- to supervise credit repayments and reallocation of credit;
- to manage a drug supply;
- to supervise paravets;
- to supervise buck stations and 'rotation' of bucks;
- to assist in performance recording/monitoring;
- to organise an accompanying savings association;
- to assist in product collection and processing, e.g. butter or cheese making;
- to assist in group marketing;
- to manage a communal grazing resource.

The status of the group might start by being quite informal; but, as production increases, the group could develop into a more formal organisation, serving the functions of a co-operative for goat producers. All groups, of whatever status, should be democratic and accountable bodies. If groups start accepting credit on behalf of their members, more formal arrangements may have to be initiated. Each country will have its own legislation regulating these informal groups and they must, of course, always function within the law.

11.5.3 Training

One of the main purposes of a producers' organisation is to become a forum for the frank exchange of ideas and information, among producers and between the community and the agency assisting them. These organisations can provide the structure through which training takes place.

The effective training of farmers and pastoralists is likely to be critical to the success of the goat-improvement programme. Training may take several forms:

- a basic farmer-training course in improved goat-management;
- specialised training in a new skill, such as cheesemaking;
- training of selected individuals in specialist skills, such as paravet techniques.

Designing appropriate training programmes for producers requires a careful assessment of their existing knowledge, and consideration of how to help them to acquire the new knowledge they need.

Methods

Many different methods have been used to train farmers and pastoralists, from a residential training course away from home to an informal demonstration within the community. Training sessions might take place at the regular meeting of a group, or during a specially organised training course. Training can be in small neighbourhood groups, or larger village groups. As a general rule, training should be informal, practical, and brief; it should take place in a familiar setting; and it should be fun.

Farmers are unlikely to be comfortable or to learn well when confined in a formal classroom. Make the training friendly and informal. Participants could bring some food and drink to share.

Learning by doing is always better than just listening and learning. Whenever possible, use real objects: real goats, actual equipment. Encourage people to handle them and to practise the new skill for themselves.

Farmers and pastoralists are busy people who have no leisure to attend long courses or long training sessions. Like most people,

they will quickly become bored in a long session, unless the subject matter is particularly interesting. Keep the sessions brief.

It is very hard for farmers and pastoralists, especially women, to leave their homes to attend a residential course. A shady spot under a tree is usually a suitable place to learn, or in the home.

Make the training as interesting and enjoyable as possible; there is much more chance that the lessons will be learned and remembered. Acting short sketches has been used with great success.

11.5.4 Extension materials and other forms of communication

The choice of extension materials depends on whether you are trying to transmit a training message to a target group, or simply to gain publicity for a new project or programme. In the latter case, the best way to convey simple messages to large numbers of people is through posters and the organs of the mass media: radio, television, and newspapers.

There can be no doubt that the best materials to support training are real goats, equipment, forage plots, etc., which can be seen, touched, and examined. However, it is not always possible to arrange this, and visual aids may have to be used instead. There are many different visual aids available, and they vary in cost and effectiveness. It is important to consider the sort of message you want to communicate, the target audience, and the cost; not least you should consider how to make the materials appropriate to the local culture. Here is a summary of the advantages and disadvantages of various kinds of visual aid.

Posters

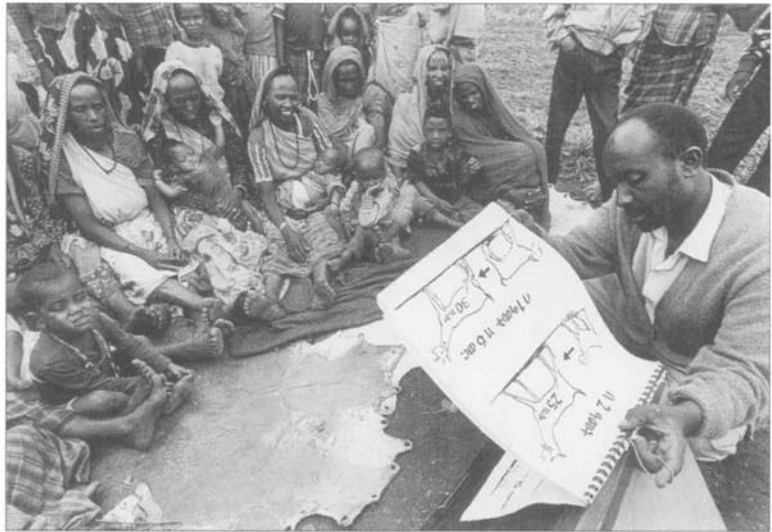
A well-designed, attractive poster can effectively present a simple message. However, many posters designed to convey an extension message are dull, complicated, and poorly drawn and designed. Most of them try to say too much. Keep posters simple and eye-catching, and use them only to convey one simple message. Try to print them on good-quality paper, or they will soon deteriorate, especially out of doors.

Pamphlets

Small pamphlets with a simple text and drawings can be a helpful method of distributing information fairly cheaply. Obviously, producers must be literate in order to benefit from any text. Pamphlets are a useful method of providing the sort of information that needs to be kept for future reference. They can take the form of photocopied and stapled sheets, or be professionally printed and bound.

Figure 11.2
A flip-chart in use

JENNY MATTHEWS/OXFAM



Flip-charts

An experienced extension agent, with an extrovert personality and basic presentation skills, should be able to present fairly complicated information in a manner that is attractive and memorable. However, not all extension staff have the necessary skills and confidence. Less experienced staff will run more effective, interactive meetings with the aid of pre-prepared flip-chart presentations, written up on A3-sized paper (or even bigger), supported by clear, detailed accompanying notes.

More sophisticated equipment

Overhead transparencies, film strips, and video films can present information in an extremely attractive and memorable way. Unfortunately, of course, they require electricity. If mains electricity is not available, you might be able to use a small, portable generator, or large batteries charged by solar power.

An overhead projector can be a useful visual aid in training, provided that the transparencies are prepared in a clear, simple manner. In a darkened room, the image can be projected on to a screen or white bed-sheet.

A limited number of film strips about goats are available. Or you could make your own: it is quite simple to put together a series of slide transparencies, photographed in the project area, to present a message. This can be especially powerful if the slides feature people in the audience! There are projectors that can run off solar power and are small and light enough for extension staff to carry around (see the Appendix).

Video films may be purchased commercially (though there are very few concerning goats), or they can be specially made, by

professionals or amateurs. Such a production can be very time-consuming and expensive, but video films are the most powerful of all types of medium for communicating a message.

Mass media

Mass media such as radio, TV, or newspapers offer a very useful method of presenting a simple message to a large number of people. Mass media channels might be used during a disease epidemic, such as an outbreak of CCPP: radio transmissions might be used to encourage farmers to vaccinate their goats.

Visits

It is often useful to arrange for a small group of selected producers to make a visit outside their home area in order to see something new for themselves. They might visit a large goat farm to see new breeds or new techniques, or visit other producers who are having some success with a new technology. 'Seeing is believing', and visits can have a profound effect on people's thinking.

Goat shows

A gathering where owners exhibit their goats in public can generate a great deal of interest and provide valuable publicity. Invite senior professional extension staff, or research staff, or respected local producers to act as the judges; involve local leaders, perhaps religious leaders if appropriate, in presenting the prizes. Classes might include best milking doe, best buck, best castrate, best forage, etc. Think of classes appropriate for the conditions. Give small prizes to as many people as possible. Prizes might include milk cans, hoof-trimmers, or other agricultural tools.

11.6 The role and management of credit

11.6.1 Why do producers need credit?

Credit is normally given to help people start a new enterprise or expand an existing enterprise. Receiving goats on credit may be the only way that some farmers or pastoralists will be able to start keeping goats. If families do not have enough savings, or if they generate little income from which savings can be made, or possess few capital items to sell, credit in some form remains the only way they can start to own goats. In addition, goat producers who want to up-grade their stock may require credit for the purchase of an improved buck or doe. Credit can be a valuable way (indeed, for some, the only way) to gain access to new technology.

When the case for giving credit is being considered, it is important, at the outset, to decide whether the new goat enterprise is likely to be viable and productive and whether the borrower is able to repay the loan without getting into long-term

debt. You should also be sure that the area is suitable for goat production and that the goat enterprise does not place too large a burden on the family receiving it. For new goat-keepers, credit is not enough. Some form of training and extension will be necessary at the start to ensure the proper care of the goat. If someone wants credit for improved stock, then he or she is likely to know about goat-keeping but may not be aware of the special management requirements of the improved animal; in this case too, extension will be required.

11.6.2 Likely sources of credit for goat purchase

There may be a government institution such as an agricultural credit bank which provides credit for livestock; or a commercial bank might agree to lend money for goat purchases. However, the work involved in administering a loan for the relatively small purchase price of one or two goats may make these institutions reluctant to lend for goat credit. In order to borrow money from such formal institutions, some form of collateral security is required: proof of ownership of land or capital items equivalent to the value of the loan requested. The collateral is pledged to the lender, as a guarantee for the loan. It can be difficult for poor people, particularly women, to provide collateral.

Ethiopia: women in Laftu try to get goat credit

The Ministry of Agriculture started a women's goat group in Laftu, Eastern Hararge, and registered over 50 names of the poorest women in the village who wanted to receive two local goats each. In order for the application to be considered by the local branch of the Agricultural and Industrial Development Bank (AIDBANK), the local extension staff had to prepare a 20-page technical proposal to AIDBANK, to enable them to consider its feasibility. This proposal had to be supported by letters from the district and regional Ministry of Agriculture offices. A visit was made to the group by a loan officer to discuss the proposal with the women and extension staff. It was found that the husbands of several of the women had outstanding debts with the bank; until these were repaid, their wives could not receive credit. Although it was pointed out that, at the time of their husbands' taking the loan, women were not legally able to receive credit, the AIDBANK insisted that the wives were equally liable for the outstanding debt and so were not able to take a new loan for themselves. Finally, once the terms of the loan were set at 12 per cent interest + insurance, the women decided against taking the loan, because it seemed too expensive.

*The Grameen Bank in
Bangladesh*

The Grameen Bank of Bangladesh was established to give credit to the landless, or those with very small farms. A small loan is given to a group of five for any productive enterprise. To start with, only two members of the group receive a loan. The other members of the group act as guarantors of the loan. No further credit is given to other members of the group until the first two recipients have made successful repayments for at least two months. After successful repayment by the first two recipients, two more members of the group receive their loan, and the same procedure is followed to allow the final group member to receive credit. In this situation, collateral was impossible to offer; instead, the pressure which members of the group exerted on each other ensured that repayments were made. The bank's repayment rates of 98 per cent are very high, demonstrating the success of using group liability in place of a guarantee. The Grameen Bank has been used as a model for other countries.

Borrowing by individuals from a formal lending agency may also be difficult for illiterate people, who may be expected to fill in forms and produce letters of support from people in their community. Often there are simply too many hurdles to overcome for the sorts of people who may benefit. The requirement for collateral is hard for marginal producers, tenant farmers, landless labourers, and urban residents to comply with. This is the reason why local-level organisations, such as co-operatives or farmers' associations, are set up to help their members obtain credit from larger lending institutions.

Producers' organisations take many different forms, ranging in size from large farmers' co-operatives down to groups of 4–5 farmers who may run their own group guarantee scheme. The co-operative or farmers' association acts as an intermediary and guarantor for the loan, borrowing from a bank at the official rate of interest and lending to its members at a few per cent more, in order to cover their costs. However, it can be difficult for the very poorest to participate even in this set-up. Special arrangements may have to be made by projects and programmes established to reach the poorest.

11.6.3 Terms and conditions

In situations where a development agency is setting up its own credit programme, careful consideration should be given to the conditions under which loans will be given. The terms should be discussed with the community and agreed by them. If credit terms

are too difficult, producers will not accept them or, if they do, may not be able to meet the repayment schedule and may become indebted. If the terms are too easy, people will be discouraged from taking the responsibility of the loan seriously. Borrowers who do default should be penalised, to discourage irresponsibility and the development of a culture of non-repayment.

A community committee should be established to select suitable recipients. Repayment schedules should be discussed with the borrower in detail, and a grace period and repayment rates agreed. It should be clear under what circumstances (drought or disease, for instance) repayments may be delayed and for what periods. In the case of very poor borrowers, flexibility and kindness should be exercised if the family encounter a problem outside their control. Penalties and procedures in the case of default must be discussed and agreed.

The terms agreed should be written in a contract, for future reference. The contract should be signed and witnessed. If the borrower is illiterate, the contract should be carefully read out and a mark made to indicate agreement. The borrower should be given a copy.

Repayment of a loan to purchase a goat can be made in two ways:

- repayment in cash, either in small regular instalments, or in a lump sum on the sale of a goat, or at crop-harvest time;
- repayment 'in kind': repaying a weaned kid to the lender for sale, or repaying a weaned kid (female) to another family.

11.6.4 Repayment in cash

Repayment of a loan in cash is the method of repayment accepted by banks and other formal lending institutions. The loan is received in cash and repaid in cash, normally with some interest. If the interest rate is less than the rate of inflation in goat prices, then repayment in cash is preferable, for the farmer or pastoralist, to repayment in kind. Repayments may be requested annually or may be allowed in small regular instalments. Some farmers may find it easier to repay a larger lump sum after the annual harvest, for example. Others find it easier to repay in small amounts, perhaps with money obtained from some petty trading activities. Repayments made from benefits derived directly from the goat may take some time to materialise. If the goat is female, she will have to be mated and give birth and the offspring will have to be sold before any income is received which can be used to repay the original loan — unless some milk can be sold. This may take at least one year, and probably more. If the loan is short-term credit for fattening male goats, repayment is relatively straightforward and can be made at the end of the

fattening period, when the fattened goat is sold. Producers need to think carefully about where they are going to get the cash to repay a cash loan, and must be realistic about when they can repay it.

Repayment in cash is often relatively difficult for communities to manage themselves. It is essential that accurate records are kept; this requires standards of literacy and book-keeping which may not exist within the community. It is normally essential that a bank account is opened — a difficult procedure in some countries. Handling relatively large sums of cash also requires honesty if the scheme is to succeed. The possibility of corruption exists and may be very tempting. When community-managed credit schemes are set up, they are usually designed to establish some sort of revolving fund. A lump sum is obtained by a co-operative or farmers' association, which is on-lent to individuals. Once individuals have repaid their loan, the money can be used again and lent to new individuals. In theory the money can revolve forever. In practice, unless the funds are very well managed, they tend to revolve away and disappear! People default or delay repayment, some funds are stolen, and the original fund gradually shrinks.

11.6.5 Repayment in kind

For families where cash is very scarce, repayment in kind, returning a kid, is a very attractive option. Repayment in kind is also much easier for the community to manage themselves, because it is not essential for the fund's managers to be literate, and there is very little chance of corruption. There are often traditional practices for giving or lending livestock which can be used as a basis for credit programmes.

If the current interest rate is greater than the current rate of inflation in goat prices, then repayment in kind is attractive for farmers. Schemes involving repayment in kind are ideal ways for NGOs to reach and help the poorest. They are perhaps harder for government extension systems to promote and manage. There are many different methods of organising repayment in kind. The principle is simply that, for any goat received, a goat should be returned.

Repayment in kind should be started on a relatively small scale, involving no more than 10–30 members per group initially. Because of the nature of the repayment method, the original number of members will quickly double and then quadruple, and so on. This, of course, is a very attractive feature for donors, because the injection of a small amount of money into a community can have a widespread impact. Through people helping each other, close ties can be formed within the community, which can be of lasting benefit. However, there comes a point when everyone in a community who wants one has received a goat, or the scheme becomes so big that it is

*Repayment in kind:
some examples*

1 A doe is received by a member of a group and the first kid kept by the owner. The second kid is returned. If it is a female, it is passed on to another member of the group. If it is male, it is sold and the money either used to buy a female goat or used by the group for another purpose, such as topping up the group's savings, or to buy veterinary drugs.

2 A doe is received and the first female kid is returned and on-lent to a new member of the group. If the doe does not produce any female offspring in the first two years, a male kid is taken and sold. The money is used for the group, as above.

3 A pure exotic doe is lent to an individual who has access to an exotic buck. The borrower keeps the pure-bred kid and passes on the doe to another member of the group.

unmanageable. At some point the on-lending of goats must end. If it is a small group activity, the group should decide when to stop repayment in kind. Perhaps the group is developing some other activity and could use funds generated from the sale of the last round of repayment goats for some other group activity. Perhaps the members need the money to buy veterinary drugs or an improved buck.

11.6.6 Insurance

It is always best to insure a loan when possible, to ensure that the borrower is not thrown into debt if the goat dies or is stolen, and so is unable to repay the loan. The insurance premium should be calculated according to the probability of the goat's dying or otherwise being lost to the owner. Ideally some cost of administering the insurance should also be included in the premium calculation, but it may not be. There are two ways of insuring goats: via a commercial or government insurance company, or through a self-insurance scheme.

Commercial or government insurance companies may not have any experience of insuring goats; they may need to be persuaded to do so and may need help to obtain information on mortality rates, in order to calculate a premium. The goat should be insured for the whole period of the loan. Normally insurance companies, like lenders, will insist that the goat is permanently identified in some way. The identification will then need to be produced at the time of making any claim for the death of the goat. Insurance companies vary in their claims procedures. Some may require a death certificate signed by a local government

veterinarian, certifying that the goat died of natural causes and not through neglect. This may not be easy to obtain if the farmer lives far from a vet.

If a farmers' co-operative or association is administering the loan, it might be simplest if they run their own insurance scheme. An annual cash premium is paid to the association, which accumulates the funds for purchasing replacements for any goats which die. Realistic premiums should be calculated, so that the fund is not exhausted. It should be made clear that, if there is an outbreak of an epidemic disease which causes abnormally high mortality rates, the association or co-operative cannot be liable in this case.

11.6.7 Purchasing goats

Most organisations which lend funds for the purchase and insurance of goats will require them to be purchased under some sort of supervision by a responsible authority, such as the extension staff of the local Ministry of Agriculture. Goats will normally have their health checked before they can be insured. Certain guidelines should be followed, to ensure a fair and proper purchasing procedure.

Normally there is little choice but to purchase from local markets. There are advantages in this: the borrower will participate in selecting the goat; the goat will not have any problems in adapting to its new home environment and is unlikely to introduce any new diseases. The purchasing group would consist of the borrower, a representative of the lending organisation (bank, co-operative, association, NGO), and a local veterinarian.

If there is not a convenient market, or if local market prices are particularly high, purchasing from a more distant market may have to be considered. It may be difficult to transport several borrowers to the market, in which case a representative of the borrowers should be elected and should purchase on their behalf. Arrangements will then have to be made to transport the goats back from the market. If goats are bought in this way, it is fair to allocate them by drawing lots.

The sort of goat to buy depends on the purpose of taking the loan. If it is to establish a small breeding flock, young healthy females should be bought. A buck should be bought only if sufficient breeding males are not available near the borrower's home. If the loan is for fattening, immature males should be bought.

A female with one pair of permanent incisors (15–18 months), or a female with milk teeth which has been weaned for some time (12–15 months), would be ideal foundation breeding females. Older females are usually sold for a reason, frequently infertility or poor mothering ability; be careful not to buy an older female with a poorly developed udder: this is a bad sign.

Figure 11.3 A doe with a good wedge shape and a well-hung udder

JENNY MATTHEWS/OXFAM



A good doe should have a 'wedge' shape when viewed from the side, having as much depth as possible in front of the hind legs, giving her a triangular look: deep in the hindquarters, narrowing towards the front. Check the teeth, not just for age, but also for wear and any irregularities. Make sure there are no obvious problems with the udder, such as supernumerary teats (small teats attached to the side of the main teat) or any sign of mastitis, if she has kidded.

The vet should make a physical inspection to check for obvious diseases or wounds: the eyes (for infections), nose (discharge), feet (foot rot), swelling under the jaw (internal parasites), skin (mange mites or ticks), coats (is it dull or shiny and healthy?), and general appearance (dull/listless or full of energy?).

Often prices fluctuate with seasons or cultural holidays. Try not to buy just before a major holiday, when prices are high. The arrival of a group of buyers, including, perhaps, a government official, may make traders in the market raise their prices artificially high, thinking they are selling to the government.

After purchase, the following procedure should be observed.

- The goat should be identified with an ear-tag or other means of identification. (At this point, it is useful to write a physical description of the goat, so there is no doubt about its status if the tag is lost in the future.)
- The animal is drenched for internal parasites, and vaccinated against major diseases (this may be a condition for insurance).
- Ideally a blood sample should be taken and the goat, if it is to be used for breeding, checked for brucellosis. This may be difficult to arrange.
- The borrower should pay the insurance premium at this point, before receiving the goat.

Buying a goat from a market is always risky. After purchase, the goat may show signs of disease or some sort of incapacity. In females it may be found that they regularly abort and that is, perhaps, the reason why they were sold in the first place. As a rule, if a goat aborts twice, it should be sold for slaughter and replaced.

11.6.8 Group development and training for credit management

It is clear that the proper management of funds is of fundamental importance to the success of any credit programme. The mismanagement of credit funds, repayments, and insurance is the most common reason for the failure of credit programmes and a consequent loss of confidence in them by producers, extension staff, and donors. It is therefore of great importance that effective systems of management are in place from the start; that producers and fund managers are properly trained in the skills necessary to manage the credit properly; and that a relevant organisation regularly supervises and monitors the scheme.

Training of goat-keepers and/or extension staff for effective credit management might range from basic literacy/numeracy skills to computer training, depending on their initial levels of skill. At the most basic level, a small-scale credit programme for a small group of farmers can prompt them to recognise the need to learn to read and write. Many NGOs have set up functional literacy programmes in order to train group leaders in literacy, so that they can keep simple records, write letters, operate a bank account, and write simple reports to their donors. It is important that the capacity of the group is developed to make use of organisations outside their community, better manage their own affairs, and directly improve their livelihood through the use of the credit received.

Think carefully about the training needs of those involved in a credit programme. If you control funds, allocate a proportion of credit funds for training, as a routine procedure. In this way the funds will be better used and mismanagement reduced.

11.6.9 Gifts of goats

Is it ever right to give goats away to farmers or pastoralists? Under what conditions might this be considered? The advantage of giving away goats is that gifts are much simpler to organise than loans, which require constant follow-up to ensure that they are repaid and reallocated correctly to new families. For destitute families, in desperate conditions, the gift of some goats might make the difference between life and death. However, it must be clear that they are able to look after them properly and are not going to sell them immediately for cash to buy food. If they do this,

it would have been much simpler to give them cash or food in the first place.

The main reason not to give goats is that, if they are widely and regularly given, it can create a culture of dependency within the recipient community. This is not a good basis for the solid, sustainable economic development for which we strive.

11.6.10 Restocking pastoralists

The restocking of pastoralists with goats after a disaster, natural or otherwise, has been a particularly important role for goats in recent years. It is a specialised form of goat credit, or gift, and so is described separately here.

Experiences of restocking in Africa over the last 10–15 years have been reviewed by Oxby (1994). She has set out clear guidelines on restocking, which are summarised below.

Restocking is an appropriate strategy during the early stage of recovery after a disaster. After a drought, epidemic, or war, pastoralists will typically congregate around a settlement such as a feeding camp, irrigation scheme, or food-for-work scheme. The land around the settlement will quickly become over-grazed by their remaining stock. Restocking should be considered only for pastoralists who are willing and able to return to the pastoral way of life, away from the settlement centres where they have sought assistance. Goats are a suitable species for pastoralists familiar with them, because they are relatively cheap and reproduce quickly, so they can soon be 'traded-up' in exchange for larger cattle or camels.

Restocking should be achieved through the purchase of goats from richer pastoralists for redistribution to poorer families; in this way the total stocking rate of the whole area is not disrupted. Normally it is not possible to restock a family with enough livestock to meet all their food needs, so restocking must be viewed as a supplement to what is already owned; it would, ideally, be sufficient to tip the balance, and return the family to a nomadic way of life. For this reason it has been found that destitute families, with no livestock of their own, cannot benefit from restocking programmes which are unable to provide them with enough livestock to return them to full self-sufficiency. For this reason, the key to a successful restocking programme is the selection of families who are in a position to benefit from the restocking package on offer, and time and resources must be devoted to the selection of suitable families.

How many goats to give? Inevitably there will be limited financial resources and/or a limited number of goats available to be purchased. Therefore it will not be possible to provide a complete recovery package to all who may need it. It is for this reason that restocking should be viewed as supplementing

existing livestock with enough animals for families to leave the settlement and return to the nomadic way of life. It must be appreciated that pastoralists have traditional ways of assisting their needy relatives. Livestock are often loaned to families in need, and so restocking families should be viewed as a supplement to these traditional welfare systems, and to any alternative sources of income. The total combination of different sources of livelihood must be viable, not just the restocking package itself. Most restocking packages range from 25 to 70 goats per family. Packages are provided per family, not per head, as it is time-consuming for agency staff to try to find out how many people are genuinely dependent in a family.

Target groups who might be specially selected to benefit from restocking might include food-for-work recipients and women-headed households, especially after war, if they have sufficient labour. Restocking young widows may make them more eligible for remarriage, opening up another route to return to the pastoral life. Allocating goats to women is often appropriate anyway, because they traditionally look after goats and are responsible for feeding children with their milk. In addition, women are often less likely to receive traditional livestock loans from relatives.

Families may be selected, and goats purchased, by a committee representing the beneficiaries, local leaders, and the agency financing the purchase. Selecting near-viable households may prove to be such a sensitive issue that it is sensible to have a wide spectrum of opinion, and then to cross-check the choices made by the committee. Mature female goats should be given together with adequate bucks, which may take time to buy. This delay can mean that partially restocked flocks are forced to remain near the settlement, which is not desirable. It is best if a family can be completely restocked in one allocation, so that they can move away from the settlement immediately.

The conditions under which the livestock are received must be clear right from the start. These must be discussed with all concerned. Are they a gift or a loan? If they are a loan, what are the repayment terms and conditions? Some restocking programmes give a loan in cash for pastoralists to buy their own stock, and repayment in cash is expected. Others give the loan in kind and expect the repayment in kind. Harsh repayment conditions will undermine the recovery of the family, while gifts can lead to the development of an irresponsible attitude. Some past projects have based the restocking conditions on the terms enforced in traditional livestock loans.

The sale or slaughter of any livestock received is usually prohibited until loan conditions have been fulfilled. This is hard to enforce if the family is not viable and has to sell stock in order to stay alive. This emphasises the need for careful selection. If goats will immediately be sold to buy grain, it is probably simpler to give

grain in the first place. Some restocking programmes do supply grain for a limited period and may even supply a pack animal, such as a donkey, to carry the grain away from the settlement centre. Grain distributions should not be too frequent, or families will not be able to move very far from the settlement, thus defeating the purpose of the restocking programme. Ideally they would be decentralised as much as possible.

Regular health-care is often a condition of receiving livestock. Frequently herders are trained as paravets, and vaccination may be offered through the programme.

To evaluate the effects of the restocking programme, flocks should be monitored every 6–12 months. At this time repayments can be made to agency staff, who are in a position to evaluate the effect of repayment on the family's viability. Some flexibility may be needed, to give families every chance to make a full recovery to the pastoral life, which is the purpose of restocking.

11.7 Evaluation of goat-improvement programmes

11.7.1 Introduction

Although this book is called *Improving Goat Production*, its concern is to improve goat production in order to improve human welfare. We should never forget the importance of defining, and continually redefining, what constitutes an improvement in any situation, and trying to measure whether this improvement has in fact been achieved. If it is not being achieved, and human welfare is not improved, then either modifications must be made to our actions, or we should cease them altogether.

There is a tendency for the job of monitoring project progress and evaluating project achievements to be done by outsiders, usually representatives of the donor. Their evaluation is often seen as investigative and threatening, leaving project staff and their collaborating farmers feeling defensive about their efforts. This is very unfortunate. While donors obviously need to check that their money is being spent as it was supposed to be, and there has been no dishonesty, it is project staff and beneficiaries who have the greatest interest in checking that their joint efforts are not wasted. Monitoring and evaluation should therefore be seen as an integral, and continuous, part of project life, involving producers, extension staff, development agencies, and donors on equal terms. An atmosphere must be created whereby all concerned feel able to make a frank evaluation of their efforts, achievements, and failures. We often learn more from failure than from success. Systems must be in place for this to happen.

Monitoring, therefore, has two main functions: to improve project implementation, and to provide the background information for effective evaluation.

All goat programmes will have both quantifiable and unquantifiable outputs, and both must be monitored in order for them to be evaluated. It is important that those collecting data have a real interest in, and need for, the information that comes from the data. This will ensure that the data are regularly and accurately collected. There is a tendency to collect too much data, which then become a burden for the collectors; too much information is difficult to analyse and so cannot be used to improve implementation.

11.7.2 Quantifiable information

Table 11.5 lists the basic minimum information that should be collected on outputs that can be quantified. This information might be recorded by the farmers or pastoralists themselves, or by extension staff. Ideally it would be recorded before any project interventions have been made, in order to describe the situation at the start of the project. Any changes in these parameters can be recorded over the life of the project.

Monitoring records must be simple and easy to maintain. They should be regularly analysed; the results should be presented to the community and discussed by them at regular reviews. This will

Table 11.5 Basic monitoring information required for quantifiable outputs

Topic	Minimum monitoring information
Credit	Rate of credit disbursement Credit repayment rates
Productivity	Births, deaths Milk production (daily yield, lactation length)
Health	Deaths (cause if possible) Sickness (cause if possible) Paravet treatment book
Nutrition	Growth rates, milk production
Forage	Number of seedlings distributed and surviving
Marketing	Number and price of goats sold Amount and price of milk sold

allow quick reactions to changing circumstances and should feed back into the implementation process, helping staff and beneficiaries to improve their operations.

Quantitative records will form the basis by which any donor will also assess the overall costs and benefits of a project, and they should assist in the design of more efficient projects.

11.7.3 Qualitative information

Besides the hard data collected on the performance of goats, it is important to make a more qualitative assessment of interventions. Farmers may have improved their goats' performance, but has it had a detrimental effect on some other part of their lives? For example, cut-and-carry feeding may have improved the diet of the goat, and its productivity, but the extra labour needed is being taken away from another activity. What do farmers — men, women, and children — think about this? Planting forage on every square metre of land available may have improved feed supply, but has it reduced the family's recreation area? Does the meat from a cross-bred goat taste the same as that from local goats? Is it better or worse?

In addition to these qualitative side-effects of improved production, we should remember that the participation of the family in the project will affect their lives in other ways. Many projects place a strong emphasis on social development, rather than exclusively on economic development. Social development projects are often concerned with empowering farmers, increasing self-reliance, and increasing their involvement in the development process. For example, goat projects are often used as a way of channelling assistance to the poorest in a community. It is hoped that the beneficiaries will, for instance, increase their incomes, or milk supply — but in addition that their status in society will be improved. Perhaps they have been elected to a village committee, or have been able to make a contribution to a community project, which they would have been unable to make before. Likewise, goat projects are often focused on women, because they are usually responsible for looking after goats. Project interventions may encourage women to take up new roles in their society. For example, in some societies it might be unusual for women to attend meetings, manage credit funds, speak in public, or take products directly to market. An increase in self-esteem and personal confidence is not something that can be easily measured and evaluated, and yet it is of inestimable worth to the individual. In order to try to evaluate these aspects of development, in the context of the local culture, we must listen to all concerned and give people the opportunity to express themselves.

Further reading

- ALIN** (1993) *Restocking in Kenya*, Dakar, Senegal: Arid Lands Information Network (ALIN)
- Cammack, J.** (1992) *Basic Accounting for Small Groups*, Oxford: Oxfam (UK and Ireland)
- Elliott, N.** (1996) *Basic Accounting for Credit and Savings Schemes*, Oxford: Oxfam (UK and Ireland)
- Feuerstein, M.** (1992) *Partners in Evaluation*, London: Macmillan
- MacDonald, I. and D. Hearle** (1984) *Communication Skills for Rural Development*, London: Evans
- Marsden, D. and P. Oakley** (eds) (1990) *Evaluating Social Development Projects*, Oxford: Oxfam (UK and Ireland)
- Oxby, C.** (1994) *Restocking: A Guide*, Edinburgh: VETAID
- Werner, D. and B. Bower** (1991) *Helping Health Workers Learn*, Palo Alto: Hesperian Foundation