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Centre for Agricultural Strategy



Farm Animal Care Trust

Sustainable livestock farming into the 21st century

Edited by B J Marshall

STP
SF61
.S77x
1992

CAS Paper 25

February 1992

5 Options for poor livestock farmers in low income countries

P M Mulvany

INTRODUCTION

'The future . . . is largely predictable, if we have a solid and extensive knowledge of the past. Largely, but by no means wholly; for into the making of the future there enters that mysterious and irrepressible factor called human freedom.'

Small is Beautiful
Fritz Schumacher (1973)

Tomorrow's experienced livestock farmer is already herding or looking after goats, cattle, poultry and other animals – next century's 45 year old is 15 today and is already apprenticed on the range or farm. Our concern is thus not for some theoretical scenario peopled by farmers of the future, but for people who are already raising livestock and who wish to continue to do so, providing food for themselves, their families, a surplus for the market, the protection of grazing ranges and animal power and fertility for the farm. In turn, is it not expected that their children will continue to work with animals; for if not who will?

In thirty years' time it is probable that more domestic livestock will be raised, and that even more producers will be caring for them than at present. Most of the producers will be poorer than the people consuming the majority of the livestock products, a disparity which may be even greater than it is at present. This paper examines some of the options the producers may have and considers the constraints in the context of a fast changing and greedy world, where short-term gain has higher status than careful husbandry. What options exist for these livestock farmers on whom all of us, especially those who can create an effective demand for the livestock products, depend? What is going to enable him or her to continue producing livestock, not only sufficient for home consumption but a surplus for the growing urban

population of the next millennium? The views expressed here are based in part on the work done by my colleagues at Intermediate Technology, in part on the thoughts and work of others recorded in books and papers, and in part on private speculation. I hope that the origin of each idea will be clear but I remain responsible for the text and any errors of fact or interpretation are mine alone.

Table 1
Various FAO global livestock statistics

Ref	Data for 2 years	1979	1989	% Change
A	Total livestock excl poultry (million head)			
	World	3809	4106	+ 7.80
	Developing Countries	2490	2747	+ 10.32
	% in Dev Countries	65%	67%	
B	Buffaloes (million head)			
	World	124	140	+ 12.90
	Developing Countries	123	139	+ 13.01
	% in Dev Countries	99%	99%	
C	Goats and Sheep (million head)			
	World	1561	1702	+ 9.03
	Developing Countries	1023	1112	+ 8.70
	% in Dev Countries	66%	65%	
D	Cattle (million head)			
	World	1218	1281	+ 5.17
	Developing Countries	792	878	+ 10.86
	% in Dev Countries	65%	69%	
E	Annual Milk Yield per cow (litres)			
	Developed Countries	3102	3605	+ 16.22
	Developing Countries	679	807	+ 18.85
	Ratio as %	22%	22%	
F	Cattle Carcase Weight (kg per animal)			
	Developed Countries	219	242	+ 10.50
	Developing Countries	158	161	+ 1.90
	Ratio as %	72%	67%	
G	Population (billions) ¹			
	World	4.45	5.21	+ 17.00
	Developing Countries	3.28	3.96	+ 20.73
	% in Dev Countries	74%	76%	
H	% Economically active in agriculture ¹			
	World	22%	21%	- 4.55
	Developing Countries	28%	26%	- 7.14
	% in Dev Countries	93%	95%	

Table 1 (continued)
Various FAO global livestock statistics

Ref	Data for 2 years	1979	1989	% Change
I	Daily calorie consumption per head ²			
	Developed Countries	3333	3398	+ 1.95
	Developing Countries	2319	2434	+ 4.95
	Ratio as %	70%	72%	
J	Daily Calories from animal products ²			
	Developed Countries	991	1028	+ 3.73
	Developing Countries	188	230	+ 17.00
	Ratio as %	19%	21%	
K	Numbers of livestock per head of population economically active in agriculture			
	World	3.83	3.76	- 1.82
	Developing Countries	2.69	2.64	- 1.85

¹ Data from 1980 and 1989

² Data from 1979 and 1988

Source: FAO (1990) FAO Production Yearbook 1989 Vol 43

A picture of the present situation brings into sharp focus the importance of livestock. Table 1 provides data which show that the numbers of livestock kept (Refs A, B, C, D) are decreasing relative to the numbers of people economically active in agriculture (Ref K). (These data are taken from the FAO yearbook and uses its definitions of 'Developed Countries', 'Developing Countries', Economically Active in Agriculture etc.) The numbers of people economically active in agriculture are a reducing proportion of the population as a whole (Ref H), who need to produce food for themselves and an increased non-farm and urban population (Ref G). This increase outstrips the increase in population of livestock. It also shows the disparity in consumption of calories from animal products between richer and poorer countries (Ref J) which indicates that increased purchasing power is translated into the consumption of more animal products, even though it is at a lower level, in the Developing Countries. The average carcass weights (Ref F) and the average milk yield (Ref E) of cattle are also presented to give a further idea of the disparities between richer and poorer countries in terms of resources available for their animals. In sub-Saharan Africa alone 10% of the population depend primarily on livestock and about 58% in varying degrees depend on the 'productivity of animals' (de Haan *et al*, 1985).

What these data cannot show is the disparity within countries, which, in many cases, is likely to be as marked as that between countries. Bearing in

mind that livestock care is usually the task of lower classes in society (often of women within those classes), most livestock farmers will be very poor. It is in these people who can least afford to change, for lack of resources and political power, that we are placing responsibility for increasing livestock production, livestock's contribution to crop farming through the provision of manure, and the protection of the ranges on which grazing animals depend. Is it not incumbent on us then, to assist where possible, with ideas and resources which will facilitate appropriate choices for livestock production by poorer producers? Should we not also try to minimise those obstacles, over which we have control, to production by these farmers?

OPTIONS FOR POOR LIVESTOCK FARMERS

The options theoretically available would be considerable, if there were fairer global resource allocation and a greater degree of selflessness between people of different classes. Livestock production embraces such a wealth of technology and many technological developments are being tried out on farms across the world. Some are developed, tested and implemented by the farmers themselves, others are initiated by outsiders but end up being modified on the farm or on the range to suit the circumstances of a particular production system. Much of the work of the producers themselves is not recorded – most of the 'project' work of agencies is. Thus many references in this account focus on 'project' interventions or the producers' own experiences recorded by agencies during the execution of a 'project'. To give a flavour of the options available to poor producers, the following brief review provides some, by no means exhaustive, information, and a selective guide to further information.

Value of livestock to farmers

Livestock have important cultural and religious significance. They form the centre of many rituals and fertility rites practices by farmers across the world. They may be a family's most significant capital asset and source of food and income (Burne *et al*, 1986). Ruminants and scavenging monogastric animals and poultry process forage and waste crop materials and collect widely scattered feed, which is unavailable to or inedible by humans, into nutritionally desirable products (Payne, 1981). They can utilise land not available for other agricultural activities, produce essential manure and provide power for farming, post-harvest processing and transport. Ruminants are the main source of livelihood for pastoralists and many settled farmers, and although cattle are much prized for their capital value and their power as oxen, in many poorer societies – in western Sudan in the wake of famine for example – there has been a move to smaller ruminants, particularly goats (de Waal, 1989). These are often looked after by women who may have special rights over their own animals (Watson, 1991). In much of Asia small ruminants are equally important but are secondary components in mixed farming systems and may be overlooked (Devendra, 1987).

Fodder provision for ruminants is critical for poorer farmers (Kategile & Jackson, 1984) and ways must be found of increasing or legalising access to grazing land as well as improving its carrying capacity, using more legumes and preserving fodder from one season to the next. Fodder conservation has had limited success and the use of silage conservation techniques has generally not benefitted poorer farmers (Bunch, 1982). Livestock are criticised for causing deforestation, often wrongly. In India, for example, it was found that native trees and good quality grazing grasses grew well without protection in areas grazed by animals; in areas not grazed, the tree seedlings were swamped by coarse unpalatable grasses (Pereira *et al*, 1990). Agro-silvo-pastoral systems are common practice to many poorer farmers and could be further supported.

Water provision is essential for grazing animals and work on maintaining supplies is very time consuming. Renovating remote wells can prove a sustainable way of providing water and, for example in eastern Sudan, it not only provided much needed water but it proved an essential component in the organisation of pastoralists (Tilley & McEwan, 1991).

In much of Asia, despite many years of subsidised cross-breeding programmes to 'upgrade' cattle with European cattle genes (Odedra & Hadrill, 1987) poorer producers are still more interested in the production of local dual purpose breeds for farm power, manure (fertilizer and fuel) and milk production, with increasing emphasis on the high fat content milk produced by buffaloes (Mishra & Sharma, 1990 and Hadrill, 1986). Buffaloes are also useful providers of power and beef, although beef production has lower priority in some states (Jarvis, 1982 & Sampath, 1982). Elsewhere similar experiences are recorded, for example in Guyana there was a reluctance of smallholders to change to exotic breeds preferring the Creole cattle adapted to local conditions (Deep, Food & Muñoz, 1990).

There is still potential for more milk production on the range, on smallholdings and by poor landless producers who zero graze their stock (Chamberlain, 1989). This could benefit the nutrition of poorer households so long as the sale of milk products to urban consumers is not excessive, as critics of India's Operation Flood programme have pointed out in the past (Rasmusson, 1987). Much of the milk is traditionally processed on the farm, usually by women, and forms an essential part of the diet. For example in Mongolia there are four different processes using colostrum, warmed milk, fermented milk and curdled milk (Swift, 1991). These practices need protecting in order to maintain nutritional levels.

The power provided by animals throughout the world (60% cattle, 15% buffaloes, 10% donkeys) is of critical importance on smallholdings. This can be enhanced by the provision of the right equipment and harnesses (Inns, 1985). Questions about the morality of 'enslaving' animals in this way are still raised and efforts must continue to be made to promote good husbandry and care of draught animals (Löwe, 1986). In the Andes of Peru the re-establishment of camelids, alpacas and llamas, in the production system of

X poor farmers, in place of imported sheep, is being encouraged (Minka, 1982). The significance of poultry in the economy of very poor people has been noted in Kenya, for example. In a survey of households in Meru District it was found that the poorest households (often female headed), in the lowest potential areas relied on a few chickens (Young, 1987). Beekeeping is also an important activity of poorer people across the world (Crane, 1985). It can be especially significant to poorer women. An experience in Mexico recorded by Norman Long underscores this. The project was formally initiated in 1984 with a loan of about \$1500 to purchase 50 beehives and basic beekeeping equipment and developed into a successful enterprise. Although there was some formal training at the outset and on-going advice, the project succeeded from the women's point of view when they owned not just the project but also the ideas that created it – when they were able 'internalise' the advice given (Long & Villarreal, 1989).

'BEYOND THE PROJECT'

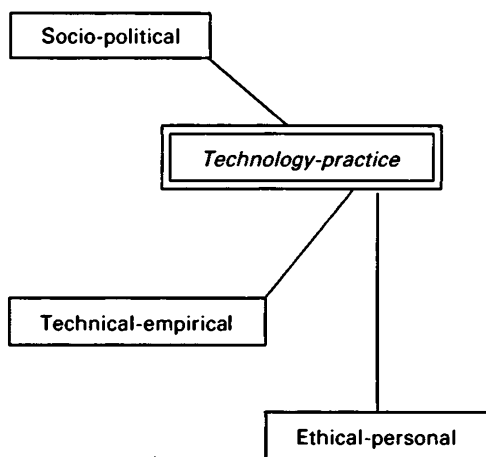
X The approach in Mexico is but one of many examples of interventions that have been adopted by the producers who have then extended the knowledge and skills beyond the confines of a 'project'. Life, especially for poor people, does not neatly compartmentalise into 'projects' – survival from one meal to the next is often the overwhelming concern. 'Projects' are the creation of outside agents who come in to influence the lives of the producers. 'Project' workers usually intend to help and often achieve notable increases in production but the measure of success is if the ideas introduced become 'owned' by the producers and form part of their normal production practices. Although in the next section there will be a focus on projects, both good and bad, the underlying message is that these should simply be vehicles to expand appropriate choice for poor producers, enabling them to decide what they should incorporate into their production practices. Willoughby in his careful critique of the Appropriate Technology movement (Willoughby, 1990) makes the case that the successful choice of a technology appropriate to the needs of specific producers depends on all three dimensions of what he calls *technology-practice* being simultaneously satisfied, the technical-empirical (the right techniques), the socio-political (the right social and political environment, including fair terms of trade) and the ethical-personal (the right lifestyle preferences and patterns). This section of the paper examines inappropriate and appropriate choices in terms of Willoughby's model as a way for helping understanding about how options for poor livestock farmers can be increased.

INAPPROPRIATE CHOICES

Poor livestock farmers face the many problems of livestock production with the peculiar disadvantages of poverty, that is the inability to mitigate the

effects of problems such as unpredictable weather and lack of rainfall; shortage of sufficient fodder, grazing land and water; breed selection; lack of access to services; and the effects of conflict. The following examples are of inappropriate choices. They are set in the context of the above constraints and they are placed under the headings of the three dimensions of Willoughby's *technology-practice*—Technical, Socio-political and Lifestyle/cultural. They provide examples of interventions, however well meaning, in which at least one of the dimensions was not satisfied.

Figure 1
The three dimensions of technology choice



Source: Willoughby (1990)

Technical

Inappropriate breed

Although the development of disease-free, higher yielding pigs might seem an attractive proposition for farmers, indigenous breeds are now recognised by the scientific establishment as valid for sustainable production. For example native 'Creole' pigs in Haiti have been bred over centuries to fit the integrated production requirements of poor farmers; they are ideally suited to the climatic and fodder regime available to peasant farmers in the island; furthermore the pigs have become significant in the religion of the farmers.

Yet, there are many pressures to force poor farmers to make choices inappropriate to their farming system. For example when in 1983, some of these native 'Creole' pigs were found to be carriers of African Swine Fever this was perceived as a threat to the pig production industry in continental USA. The request by the USA for a cordon sanitaire, backed by about \$US14M USDA and \$US16M USAID grants, was translated into a mandatory slaughter policy of every native pig, including a remote island breeding colony certified as clear of the disease. The only replacement stock permitted were sophisticated US breeds which cannot survive as scavengers in the integrated peasant farming system (Robinson, 1989). This loss of a genetically diverse breed which was technically an ideal match to the environment and the production system, is a bitter blow to the Haitian farmer. The replacement stock is technically unsuited to the conditions and is thus not an appropriate choice even if it were financially affordable and could fit with the religious requirements of the farmers.

A similar neglect of appropriate breed was made in an artificial insemination programme to raise milk yields in India. This was in a project in Bangalore by the Intensive Cattle Development Project (studied by the Institute for Development Research) and although it was offered free to the cattle of all farmers it was found to benefit richer farmers who could afford the extra feed needed by the cross-bred cattle. The poorer farmers did not take up the scheme, partly because of cost but also because the strength of the male offspring as bullocks was considered inferior to local breeds. The requirement for bullocks was not given priority by the planners of the AI project (Biggs & Alsop, 1984).

Inappropriate water pumping system

More water for stock in arid grazing ranges could be considered beneficial. However, the introduction of borehole water pumps for providing water to livestock in such remote areas has had limited success. Even if it were possible to manage the new water supply in a way that fits with the pastoral lifestyle and the grazing patterns of the stock, and even if the infrastructure were affordable, the knowledge, skills and equipment needed to maintain the pumps are usually not available – technically, the pumps are often not an appropriate choice (Wiggins, 1991).

Socio-political

Bureaucratic interference

It needs to be recognised that the adoption or non-adoption of a technology is a political choice and those with political power may try to make the choices for others poorer and less powerful (Redclift, 1984). This can be seen in livestock work by the many obstacles placed in the way of poor farmers when they wish to adopt some new technology which may well be technically and culturally appropriate. A simple example, typical of many schemes for the subsidised purchase of livestock, or their purchase through credit, illustrates

this. It is told by Joe Madiath (1989) the Director of an Indian NGO working with tribal people in Orissa state, India, about Siro Mallik a poor farmer who wanted to borrow money to buy bullocks and a cart. A combination of corruption, red tape and official indolence cost this farmer 4 months delay, 1134 rupees to secure a loan of 1200 rupees for a pair of unsuitable oxen when, with 700 rupees the farmer could have bought a good pair of his own choice, if he had been allowed to do so. The loan scheme for oxen may have been valid in concept but it did not fit the local political reality and this made it an inappropriate choice.

Privatisation of commons

In pastoral societies, flexible access to grazing ranges is part of the response to irregular and increasingly scarce (Rasmusson, 1987) rainfall. The sustainability of the pastoral lifestyle lies in pastoralists' ability to 'follow the rains', moving their herds to areas of good grazing. Demarcation or privatisation of grazing ranges threatens this since it pre-empts the spatial flexibility upon which the entire agro-pastoral system ultimately depends. As Zeremariam Fre says in the article by Martin Wallis on pastoralism and drought management in Chad, 'All we need to do is to introduce a *supportive* structure to enhance traditional systems. This way we can make pastoralism a viable way of economic survival' (Wallis, 1991).

Monopoly control of choice by professionals

Veterinarians often profess a monopoly over knowledge about animal disease and are sometimes surprised at the validity of indigenous diagnosis, cures and prevention. This is referred to by Constance McCorkle in her paper on the health of small ruminants in indigenous communities in the Peruvian Andes (McCorkle, 1988). She notes that the knowledge of the peasant farmer often rivals that of the professional veterinarian. In such circumstances, the veterinarians control the Veterinary Code and most of the state's resources put into animal healthcare placing conditions on technology choice, and may make it inappropriate to poor farmers.

Lifestyle/cultural

Even when an innovation may be technically feasible and encouraged politically and economically it may still not fit the cultural dimension of *technology-practice*. Some anecdotal evidence underscores this, including aspects of some of the examples quoted above, especially the eradication of the Haitian Creole pig.

Helping animals more than humans

In the northern coastal plain of Peru a scheme to introduce Andean guinea pigs to settlements of labourers who also came from the mountains was technically well researched and was officially encouraged. It would have seemed to have been culturally acceptable, the guinea pig being an essential

part of the household diet in Andean Communities. However the constraints on growth and reproduction of the guinea pigs in the hot tropical climate forced the project to provide proper, thermally insulated housing and concentrate feed for the animals. This resulted in the animals being better housed and fed than the labourers who were meant to benefit from their production and this was resented (Mulvany, 1982).

Sedentarisation of pastoralists against their will

Many pastoral communities which have been destocked through pandemic animal disease or drought, have been encouraged to adopt non-pastoral livelihoods and settle on irrigation schemes. Impoverished herders move to these schemes, often with the hope of returning to pastoralism, but low returns from these schemes in which they have little interest, result in a more permanent form of pauperization (Harowitz & Little, 1987). The herders have little chance to rebuild their herds and, as Richard Hogg says, are 'increasingly vulnerable to drought' (Hogg, 1984). The choices imposed on the destocked pastoralists have not fitted with the chosen lifestyle of the pastoralists and have resulted in failure.

Neglecting the importance of raiding and conflict

Part of the culture of pastoralism is the way in which stock are redistributed through raiding or rustling (Fernandez & Gutierrez, 1991). This is an essential part of traditional production systems, but nowadays it is often enforced brutally, using automatic weapons, in serious conflicts sometimes inspired by border disputes. Failure to recognise this reality may lead to an unexpected lack of interest in a particular intervention. The threat of raiding can also affect choices for settled farmers. In western Sudan, for example, camels are technically ideal for traction but their attractiveness to neighbouring pastoral tribes, as raiding targets, makes them less desirable to farmers. Other stock, especially donkeys, become a more appropriate choice (Croxtton, 1990).

APPROPRIATE CHOICES

The above examples provide some evidence that appropriate technology choices cannot be made if one or more of the dimensions of Willoughby's *technology-practice* model are not satisfied. There is a requirement for the integration of approach for the making of appropriate choices, whether these are made by outside agents such as advisers, policy makers, government etc, or if they are made by the producers themselves. Our experience shows that the latter usually make better choices, when given the chance. As can be seen above, outsiders too often miss out vital elements, deliberately or unintentionally, and make choices that reduce rather than expand options for the producers.

Decentralised animal healthcare

Intermediate Technology has been working on improving the knowledge and skills of local farmers for providing more accessible basic animal health services. This experience gives some pointers to the way in which appropriate choices, which favour poorer producers, can be made. This work was initially carried out in India (Hadrill, 1989) and later in Kenya (Grandin, Thampy & Young, 1991). Often, external analysis would suggest that access to land, fodder and water, improvements in breeding programmes to increase output and improved livestock quality through better culling, should have precedence. The reasons for focusing on animal health is that the poor livestock farmers with whom we work have consistently identified this as the priority area of need. The rationale for this cannot be denied – to a particular poor producer owning a few animals, the loss of a single animal can be a catastrophic economic event, even if such losses represent a very small percentage in Government statistics. Preventing such losses is highly desired by the individual farmer or herder. Furthermore it can be addressed collectively by the community itself, which can organise to run its own village animal health scheme, given appropriate training, a reliable medicine supply and a favourable policy environment. The policy environment not only needs to address ethical questions about drug use but also to consider the relationship, in terms of the provision of training and referral services and medicine supply, between government services, the private sector, non-governmental organisations, community organisations and the livestock farmers and herders (Mulvany & Hadrill, 1984, and Herredero, 1983).

Decentralised animal healthcare in pastoral areas – the case of Samburu, Kenya

In terms of Willoughby's *technology-practice* model, a village (or otherwise decentralised) animal health scheme would need to satisfy all three dimensions in order to be an appropriate choice. Looking at this in the context of a pastoral production system the successful adoption of the animal health programme would simultaneously need to be *technically* sound (ie provide remedies for common diseases using treatments and medicines which must be available at an affordable price); would need to have *socio-political* acceptability (ie that the policy environment, the Veterinary Code, permits the use of the medicines on the range by unqualified practitioners and herders, and that the manner of operating the service is acceptable); and the service needs to be viable within the *culture* of pastoralist society (ie that the control of the medicine and the preventative husbandry practices, and the knowledge and skills to use them, fit with existing pastoral lifestyles).

The following example is taken from the work of my colleagues, Karen Iles, John Young and others, who have been working on decentralised animal health schemes in Kenya for several years. In particular it refers to a scheme

in Samburu which was written up in the recent *Appropriate Technology Journal* issue on Pastoralism (Iles & Young, 1991). I am grateful to them for allowing me to use this material.

In the pastoral areas of Kenya where more than half the country's 11 million cattle, 14 million sheep and goats and all of the half million camels live, livestock keeping is the main economic activity. Pastoralists spend much of their time and effort keeping their stock healthy with little support from State services, which in these areas are very limited because of their remoteness and political insignificance. For example in Turkana and Marsabit Districts, each trained Ministry of Livestock Development staff member has six times as many tropical livestock units (TLU) to care for than colleagues in the intensive cattle keeping highlands, for example Kiambu District (13 000 TLU compared with 2000 TLU). The services that do exist in pastoral areas are mainly to control major epizootic diseases such as rinderpest, foot and mouth, and contagious pleuropneumonia of both cattle and goats. There are reasons of National Interest for these choices, to provide a cordon sanitaire to protect the national herd and the export market. In this context, the pastoralists' demand for better animal health services is understandable.

For pastoralists in Samburu, whose traditional disease control methods are becoming less effective due to changes in disease patterns caused by a reduction in grazing areas and the impact of ill-conceived disease control programmes, there is a clearly articulated need for curative services using a blend of modern medicines and traditional practices. The Samburu perceive the problem as the lack of drugs, in most areas of the District, and insufficient knowledge about the effective use of modern drugs whose use is legally controlled. In this area, the technology needs to be effective to deal, at least, with ticks, fleas, worms and diarrhoea (some of the commonest 'diseases' identified by the pastoralists) and to cure some of the major diseases in order to satisfy the *technology* dimension of the *technology-practice* model.

Based on acceptable Samburu methods of information sharing and with the support of local government, training in the preparation and use of simple medicines for individual pastoralists selected by their 'community', is carried out. These medicines are available for purchase in a shop in Baragoi at affordable prices. It is intended that the range of conditions and diseases for which training is carried out will be increased and discussions are underway with local government staff, to consider the legal use of scheduled veterinary medicines by the pastoralists to control serious diseases. If this can be achieved the scheme will then satisfy the *socio-political* dimension of the *technology-practice* model – the scheme will fit with the desired local social and economic conditions and the local policy environment.

The scheme also tries to fit as closely as possible the cultural and environmental requirements of the pastoralists and their livestock production

system. It respects the wisdom and status of the elders. The training builds on the pastoralists' existing knowledge and their perceptions of disease. It encourages the use of traditional treatments of disease. The training is set in the context of the pastoralists' lifestyle and trainees are selected through local organisations. Due to cultural preferences, training for elders, young men and women, should be carried out in separate sessions according to their needs, and the scheme intends to do this. It is intended that supplies of medicines, in mobile stores run by the pastoralists, can follow the herds to the dry season grazing grounds. When all these aspects of the scheme are in place the *cultural/lifestyle* dimension of the *technology-practice* model will be satisfied.

So far, 200 people, mainly elders, from 9 communities have been trained in the treatment of seven simple conditions including worms, skin and foot problems, and ticks. In the period May to November 1990 the trainees purchased more than Ksh 87 000 worth of medicines (mainly antihelminthics (66%) and acaricides (33%)) to treat an estimated 45 000 animals (90.2% goats and sheep) for ticks (35%), fleas (15%), worms (38%) and diarrhoea (12%). The pastoralists feel positive about this scheme. Demand for further training is strong and will increase if the use of scheduled medicines is permitted. The knowledge and skills are percolating into the community in a way which is consistent with existing production and organisational systems. There is thus every possibility that this scheme, satisfying all three dimensions of the *technology-practice* model, will offer appropriate choices to the pastoralists and will increase their production options for livestock keeping.

OVERCOMING OBSTACLES TO MAKING APPROPRIATE CHOICES

Although most of this paper has dwelt on technical options, the main obstacles to the adoption of appropriate technologies are not technical. As Willoughby (1990) points out:-

'The serious obstacles to Appropriate Technology . . . are primarily social and political in nature. While these are certainly very widespread, our analysis has revealed that there is no reason to assume that such social and political factors are immutable or absolute.'

One way of achieving this is to ensure that technical options are available and proven, in order to influence not only the producers but also the policy makers who frame the environment in which production can take place.

It is the author's conclusion that only by working *with* the poor producers, to *their agenda*, can an environment be created where these options are available, for incorporation by the producers into their normal daily practice. Of the many ways in which such an environment can be created it is worth emphasising two - the value of participative workshops for exchanging information and for training, and the value of exchange visits where livestock keepers visit other communities or farms to learn about different practices. As Suchint Simaraks (1991) summarises about his work with smallholder dairy farmers in three villages in northeast Thailand:-

'Farmers often develop different solutions to similar problems. When given the opportunity to visit each other's farms and discuss their different techniques, they can learn about other options which might improve their own farm systems. The researchers who facilitate and record these exchanges learn about the farmers' needs and interests and can plan their supportive activities accordingly.'

This information can be passed on to policy planners who, if they chose or are forced to listen, can incorporate the new ideas. It is the most effective way of conveying information, being based on actual experience rather than the polemics of optimistic or pessimistic zealots. These new ideas developed by the creative 'irrepressible human freedom' of poor producers, are what Schumacher referred to in the quote at the beginning of this document. They provide the unexpected developments that allow progress, or the mitigation of disaster, to occur. Appropriate Technology has a future in expanding choice for livestock production as much as for any other technology. As Schumacher (1974) said:-

'What we need are what I call optimistic pessimists who can see clearly that we can't continue as before, but who have enough vigour and joyfulness to say all right, so we change course. I know it can be done and it will be done if people are not paralysed by either the optimists or the pessimists.'

In this spirit we should look in hope to a future which need not be simply an extension of past experience, but one which develops in new and unpredictable directions - in which poor livestock farmers can make appropriate choices, exercising options which enable them to survive, producing livestock for themselves and also livestock products for sale, products that we consume. But we should not be complacent about the many problems that beset the poor majority of livestock producers and should strive to influence policy makers to reduce these to a minimum. Tomorrow's experienced livestock farmer, today's apprentice, will set this new agenda, if given the chance.

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