CHAPTER 7

IMPROVEMENT OF AGRO-PASTORALISM THROUGH CAPACITY BUILDING

INTRODUCTION

The role of capacity building of community groups or individuals must be recognised if greater rural development is to be achieved. Community groups are particularly important as the effects of their training are expected to be multiplied many times over through the members of the groups; as the groups’ resources would be pooled together and the concept of local level initiative (LLI) would be easily applied. LLI involves individuals or groups who identify their local problems and opportunities and, by interacting with development agents, suggest solutions and implement them. This is particularly important so as to avoid "free-donor-money syndrome" or handouts from outside.

Some of the reasons given by the people as to the need for capacity building within the local community included the following:

- Community resource persons (CRPs) trained by local NGOs (e.g. AAK) to assist farmers in soil conservation have left for urban areas to look for jobs. It was recommended that the CRPs who were selected for training should be stable and ready to assist the community. Women were more preferred since they were more available.

- It was noted that the community members had not addressed the issue of natural resource management effectively as evidenced by overgrazed/denuded areas and continued felling of trees for charcoal burning. According to them, this situation was due to lack of basic services at the village level coupled with weak community participation in natural resource management.

- Community groups should be sensitised towards empowering them to effectively manage their natural resources in collaboration with relevant organisations through activities such as rehabilitation, agro-forestry and water harvesting.

In realisation of the need for community-own resource persons, the Project embarked on capacity building aimed at improving the technical capacity of the stakeholders in the Project area in livestock production and other activities. The training was through onsite seminars, workshops, meetings and exposure tours. The purpose was to empower the agro-pastoralists, thus enhancing faster technology adoption and economic
development. Capacity building worked out very well at community level as it compensated for major capital investments.

From capacity building training, it was confirmed that improving the educational status of the agro-pastoralists is of great importance. It provides the foundation for the acceptance of innovations and easy adoption of appropriate techniques aimed at improving agro-pastoral production. Generally, the local communities in the drylands have had little or no formal education at all. Even those who have gone to school have received very limited exposure. This therefore had important implications for effective agricultural extension and approaches to research in the Project area.

DHP-Kenya trained two cadres of community resource persons, namely Paravets or Community Animal Healthcare Workers (CAHWs) and the Agro-Pastoral Development Agents (APDAs) or Pastoral Development Agents (PDAs). These were expected to act as catalysts in development at the grassroots. They would in effect be providing a form of extension services at the community level.

**CAPACITY BUILDING AS A MEANS OF IMPROVING LIVESTOCK PRODUCTION**

The problem of herd productivity is deep-seated in the Greater Kibwezi region. The abiotic environment and biotic components constantly stress animals. The Project’s intervention in handling the abiotic environment, i.e., hot and cool weather, night temperatures and exposure during the rains, was through shelter, mainly targeting small ruminants and young or newly born ones. Shelter or prevention of exposure is important. DHP-Kenya influenced better animal health and production through routine training of the community-own persons, such as CAHWs and PDAs. The Project oversaw the construction of a number of goat sheds and calf pens alongside other animal husbandry initiatives. Notably, such shelters also served as night security for susceptible small ruminants and young stock.

It is recognised that the biotic (living) environment has the most significant impact on animal health and performance. The Project made an impact on this aspect through disease control and superior nutrition and breeding. Through a herd-health programme of the Faculty of Veterinary Medicine of the University of Nairobi, students were supported to handle and practise drenching, vaccination, injection of drugs, and blood and other sample collection exercises in the field. Accompanied by their lecturers and the locally trained CAHWs, such field days turned into a triple-win whereby the local herd owners benefited from better herd health, veterinary students practised and paravets learnt how to do things better. In each annual event, the herd health targeted over 800 head of cattle, sheep and goats. Other aspects, along the same axis, were disease control such as
rabies in dogs and a myriad of poultry diseases such as new castle disease (NCD).

With the assistance of the PDAs, the Project introduced improved feeding through better pastures, feed conservation, high protein supplements of molasses, and urea mix. Of note was the PDAs’ initiative where a locally formulated and constituted mineral supplement was introduced to the Project area. Most of the minerals available to livestock are through saltlick sites. When cattle, sheep and goats lack salt and other minerals in their diet their health can suffer. They will eat anything—soil, rags and rubber—in search of these nutrients.

To make saltlick, bones, salt and clay are needed. The following are the steps involved:

- Burn the bones until they become white, crush them in a mortar and sift the powder obtained
- Take some pieces of a termite mound, put them in the mortar and pound them into a dry clay powder, and sift
- Use two parts rock salt, mixed with four parts bone powder and one part clay from a termite mound
- Mix the ingredients carefully then add enough water to create a well mixed paste
- Put the paste in a calabash with drainage holes and allow it to dry for several days until it becomes hard
- Put the saltlick where animals have access to it upon their return from the fields

For the first time, animals should be allowed to taste the saltlick; and during the rainy season the saltlick should not be exposed, as the rain will destroy it. With the saltlick the animals will always have salt and minerals readily available. They will grow better and produce more milk.

To determine the nutrient content of the locally formulated mineral saltlick, an analysis was undertaken in a reputable animal science laboratory at the University of Nairobi to establish the key elements. The results indicated the following levels: Calcium, 16.7%; Phosphorus, 11.0%; Sodium, 10.5%; and Magnesium, 0.9%. From these results, it can be concluded that the saltlick has sufficient calcium and phosphorus content to meet animal requirements. There is need, however, to carry out further analyses to establish other essential elements in the saltlick.

Animal breeding initiatives saw the introduction of the Galla goat breeding bucks to a number of SHGs for the production of a robust meat goat which would also produce increased milk output. The Togenburg dairy goat was also introduced. The PDAs were lead persons in this initiative.
What was envisaged was a small household dairy project through these measures. Otherwise there was a noticeable impact on livestock production as indicated by better animals, more productive stock, which has improved the farmers' incomes.

In the recent past, there has also been increasing interest in semi-intensive improved dairy goat systems among our stakeholders in the Project area. The following trends and implications were identified:

- Land fragmentation, which implies that land is getting smaller as it is divided for each new generation inheriting land
- Retrenchment of government staff, which means that government services are being reduced including the supply of inputs such as veterinary services
- Privatisation, which leads to private services being developed in high potential areas only
- Marginalisation, where cultivation of marginal land is increasing and communal grazing areas are being lost
- Impoverishment, where there is an increase in absolute and relative poverty leading to increased food insecurity

This therefore means that goat improvement programmes offer a special opportunity to assist the agro-pastoralists because:

- Goats are cheap to buy
- Few facilities are required to keep goats
- Goats reproduce quickly, offering early returns on investments
- Keeping a small number of goats is less risky than keeping a single valuable cow
- Goats offer the potential for more regular cash income
- Goats are suitable for emergency sales
- Goats offer the potential for intensive milk production for home consumption and sale
- Goats are suitable for women and children to herd, and they offer an opportunity for women to benefit from an economic activity returning substantial financial benefits

Goat SHGs were encouraged, which accrued the following benefits:

- Mutual support, which can be important for vulnerable families
- Access to small scale credit
TRAINING OF COMMUNITY ANIMAL HEALTHCARE WORKERS (PARAVETS)

Animal healthcare delivery at the community level is a subject that has recently created a lot of interest among stakeholders in the livestock industry. DHP-Kenya presents some experiences gained through the involvement of livestock owners, trained community based animal health workers, veterinary students and veterinarians in the delivery of animal healthcare services in the Project area. The interactions, antagonisms, complementary or synergism between current and conventional practices, including ethnoveterinary practices are outlined in this section.

The current socio-economic and political trends in Kenya have brought about a sudden decline in the delivery of animal healthcare services at the community level. Whereas in the past government used to be solely responsible for control of animal diseases including treatment of sick animals, vaccination programmes and control of insect pests and disease vectors, the situation today has changed. Inevitable budget cuts on civil service functions have reduced not only the number of available government supported veterinarians, but also the logistical backup such as transportation and supply of drugs. It has become increasingly clear that such services are not sustainable unless backed by concurrent returns through taxation or otherwise. Since it is not possible to increase taxes indefinitely to cover public services, a number of conventional services such as veterinary care have been on the decline.

Background to the Paravet Training

The main participants in the delivery of animal health and disease control services in the Project area include Veterinary Officers and Animal Health assistants from the Ministry of Agriculture and Livestock Development; graduates from veterinary institutions; CAHWs and individual farmers.

Although indigenous cattle and local sheep and goat breeds that are resistant and/or tolerant to a number of host diseases are kept, several diseases are important in the region. They include trypanosomosis, tick borne diseases such as anaplasmosis and babesiosis, neonatal pneumonia/diarrhoeas, malnutrition, and helminthosis. Other important diseases are contagious caprine pleuro-pneumonia (CCPP), contagious bovine pleuro-pneumonia (CBPP), foot and mouth disease, rinderpest and new castle disease.
Disease control strategies and programmes include vaccinations against rinderpest, CBPP, CCPP, new castle disease and trypanosomosis; provision of extension services; regulation of stock movement (quarantines); and tick control through dipping.

The main constraints to animal health and disease control in the Project area include lack of enough qualified staff with a wide scope of training in animal diseases, and failure of vaccination campaigns. In addition, lack of adequate extension services, high cost of drugs such as acaricides, lack of suitable animal shelter, and inadequate water availability due to frequent drought.

The training of paravets, in particular CAHWs, was carried out within Greater Kibwezi Division, the Project area. Greater Kibwezi was chosen as a case of the vast dryland areas of Kenya. DHP-Kenya, carried out the CAHWs training under the broad mandate of the Institute for Dryland Research, Development and Utilisation (IDRDU), situated in Kibwezi. One veterinary officer (VO) and a handful of animal health assistants (AHAs) currently cover Kibwezi. It is due to the realisation that the area was inadequately served by the central government veterinary services that the need for alternative service providers was recognised. Thus, the paravet training was initiated. A number of other factors for this were considered. Chief among these were:

- Remoteness of the area
- Privatisation of veterinary services—limiting services as vets are unwilling to work in remote areas
- Structural adjustment programmes—personnel have been withdrawn leaving farmers with no options; and the government handing over certain services to farmers, e.g. tick control and artificial insemination
- Nomads in the neighbourhood districts, especially Kajiado, where livestock-keepers travel away from service centres in search of pasture and water
- Insecurity
- Poverty where professional charges are not affordable or the value of the animal is not worth the investment
- Giving the livestock keeper greater control of their animal resources

The Concept of Community Animal Healthcare

In order to ensure the decline of essential services does not lead to the destruction of the livestock sector, other approaches have been under exploration to enhance the delivery of the same services. It is on the basis of
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The Concept of Community Animal Healthcare

In order to ensure the decline of essential services does not lead to the destruction of the livestock sector, other approaches have been under exploration to enhance the delivery of the same services. It is on the basis of
this that donor agencies, NGOs and community-based organisations (CBOs) have been trying to locally institutionalise community animal healthcare services. The so-called decentralised animal health (DAH) by donor agencies is a system to build animal health services at the community level. In this way, locally trained and available community-based animal healthcare workers (CAHWs) undertake the role of service providers at the community level. They do not only provide some limited veterinary services but also carry out necessary animal husbandry extension services as may be required. The supply of animal health products as an essential factor in the success of the DAH involves very high costs in the process.

The objective of training CAHWs was to enable them to appreciate the importance of CAH and to encourage them to volunteer and provide the service to the community after the course. Thus, the main purpose of training CAHWs was to provide them with basic skills of identifying diseases so that they are available to give first aid to the animals and to coordinate between farmers and the veterinary department and veterinarians. A training syllabus was therefore prepared in conjunction with the local veterinary officers in Makueni and Kajiado Districts.

What is CAH? Community-based animal healthcare:

- Originated from lessons and experiences learnt from Nepal
- In Kenya started in Kamujene in Meru
- Started due to inaccessibility to vet services as a result of poor infrastructure, lack of vet services, poverty and remoteness
- Has importance in bringing vet services closer to the people and in making vet services more affordable
- Makes farmers more responsible for their own livestock for sustainability
- Lessens the burden on the vet staff.

The principle of community-based animal healthcare is based on the following:

- People already know a lot about animal healthcare (AHC) and ethno-veterinary knowledge (EVK). They have lived with their livestock for centuries and have vast experience with the health of their livestock
- Existing service systems—the government and traditional healers—are aware of AHC and EVK
• Livestock keepers only need guidance and not basic training in AHC

• DHP-Kenya together with stakeholders only worked to increase their know-how by building on existing knowledge so that people can treat common simple diseases on their own. Some of the diseases and cases that paravets are trained to handle are helminthosis (worms), tick control, foot rot, wounds, hygienic milking, ear and eye infections, diarrhoea in calves and poultry, and hoof trimming

Paravets are trained to acquire knowledge on notifiable diseases. They are trained to report the occurrence of these to the veterinary department for appropriate action to be taken. To make the system sustainable, a system of drug supply must be established which the trained people can easily have access. There must also be a follow-up mechanism. Part one poisons are used but paravets have to be trained to the absolute satisfaction of the veterinary officer that is training and supervising.

The Role of DHP-Kenya in Decentralised Animal Healthcare

DHP-Kenya joined the community animal healthcare activities in collaboration with the local actors. The Project worked within the semi-liberalised veterinary service programme of the government where the legal recognition of paravets is being reviewed for implementation. DHP-Kenya used its professional experts in collaboration with the Ministry of Agriculture to institute a DAH programme within the Project area.

The Project trained a total of 22 CAHWs. These local people are based at community level with village and community attachment. Their work is to treat simple cases and report major ones to the private or local government veterinarians who take the lead in disease control. This undertaking is useful by way of information gathering and action in case of disease outbreaks as the local veterinarian may not be able to undertake routine scouting due to logistical problems.

A new approach to enhance on-the-job training of the CAHWs was adopted, involving a training programme at the University of Nairobi for Veterinary Medicine students. As part of their field exercises, the university students routinely visited the Project area to learn about local diseases. The CAHWs who used the opportunity to learn from the professional veterinarians and the students some of the 'rules of the game' joined them which would be otherwise difficult to learn on their own or within the short period of training. The opportunity also accorded the students first-hand experience to handle and treat sick cases. It further exposed the students to aspects of livestock management, social service, conservation, and biodiversity in the ASALs. Through this programme, the major diseases in
the Project area and its environs, which include worms and blood parasites (trypanosomosis), were identified. In the exercise, vaccinations against rabies in dogs, NCD in chicken and CBPP in ruminants, were carried out. The CAHWs are now able to carry out a field day of herd health in their community with minimal supervision by a veterinarian. This is a significant step towards full-fledged DAH in the Project area.

**Constraints to the Introduction of Community Animal Healthcare (CAH)**

A number of constraints were experienced and need highlighting. One of the major ones was the lack of recognition of the CAHWs by local community. This was a problem initially but was overcome later. Confidence building had to be instituted, and this went a long way to support the community service.

The initial training was not considered sufficient. However, with routine practice, refresher courses, on-the-job interaction, and supervision by the local veterinarians would elevate the level of competence. It is hoped that these activities will be sustained to instil confidence in the CAHWs. In handling animal healthcare matters to this level, the CAHWs will be fully accepted by community members. The recommendation is that government should take the role of facilitator in this undertaking. Since the DAH is geared to getting quality services closer to the people, there is need for a legal framework to enable the CAHWs to do their work.

The donor community, NGOs and private supporters should come forward and support the CAHWs. Reference is made to the need for capital to meet the procurement of animal health products. The local CAHWs in the Project area have formed the “Kikumbulyu ANICARE,” a self-help group that wishes to put up a local facility for the supply of animal health products, through donor assistance. Such a facility will bring essential drugs and other inputs closer to livestock owners and the local practitioners.

**Training Manual for Community Animal Healthcare Workers**

Seven main steps are taken in training paravets. These are:

- Baseline study on existing knowledge and systems in animal health
- Selection of trainees
- Training
- Drug supply
- Follow-up support and referral systems
- Monitoring and evaluation
- Results
The development of a CAHWs’ training manual involves two main things—what the CAHWs must know and the role of CAHWs.

Disease and animal health problems may differ from area to area but the basic role of a CAHW is the same. Thus, a manual is a guide, which helps the trainer to do effective training by:

- Organising the training so as to achieve the training aim or objective
- Helping the trainer to pass across to the trainee the training content (in terms of quality and quantity)
- Breaking the training session into a logical sequence to limit repetition and or confusion. A logical sequence will help the trainer to develop the trainee into learning a skill
- Helping the trainer to assess the progress of the trainee in acquiring a new skill
- Helping the trainer to collect and assemble training tools/materials prior to the training

Thus, any trainer can use a manual to achieve the objective of the training. To achieve their role, CAHWs need to know the following:

- Diagnosis and treatment
- Symptoms of health/sickness (physiology)
- Differential diagnosis (symptoms) of various common diseases and conditions
- Use of various diagnostic tools, such as a thermometer (as in Fig. 7.1)
- Sampling
- Drugs and vet application dosage and administration
- Follow-up and advice or precaution—drug safety, drug types, presentation, trade names, expiry, residues, disposal, storage and transport

Fig. 7.1 Paravet Trainees Taking Rectal Temperature Using a Thermometer
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Fig. 7.1 Paravet Trainees Taking Rectal Temperature Using a Thermometer
CAHWs must also understand proper management practices. These include castration, tick control, hoof trimming, control of parasites, nutrition, recording and basic business skills, bookkeeping, charges, reports to the veterinary department, restraint, disease control, and vaccination. Other management practices are regarding noticeable disease/zoonoses, community tsetse fly control, training others on CAH work, awareness creation and mobilisation. In addition, communication skills/approaches (passing correct messages to farmers), and understanding the roles of CAHWs to the community, the role of the community to CAHWs’ services and the concept of CAH.

Methodology

The training methodology had six main components:

- Brainstorming to explore trainees’ knowledge on CAH
- Explaining what CAH is about
- Mini-lecture on the origin and its development including some lessons learnt
- Group discussions on its importance and its application in their situation
- The importance of CAH and how it can be applied in specific situations
- Giving examples of areas where the system has succeeded or failed and the reasons
- Questions and answers from participants to trainers and vice versa

The main questions to be discussed in plenary group discussions are:

- Who are the key stakeholders in CAH?
- What are the roles of stakeholders?
- What is the linkage between the different stakeholders?

Training materials used include flip charts, felt pens, and masking tape. Trainees are asked to make a list of animal diseases and other problems in their areas. The diseases and problems are ranked using certain criteria, e.g. the most commonly found in bovine, sheep, goats, poultry and donkeys. Local names are also used if available. Special areas with respect to incidence of certain diseases, such as ECF and acute trypanosomosis, are identified.
The Future of Community Animal Healthcare

The local community, farmers and livestock keepers have been encouraged to use the services of the CAHWs so as to promote them. Local CBOs such as women groups are beginning to keep animals since services are getting closer to them. It is envisaged that the full-fledged DAH will go a long way to enhancing livestock production and the well being of the people. Since the CAHWs are able to interact with the immediate family members and others in the community, they are useful in disseminating new knowledge. Proper utilisation of this programme will provide an opportunity for the government and other stakeholders to improve the livestock industry. In this way, the government can achieve its goals of improving the living standards and reducing poverty among the people, and in turn the people will contribute to the improvement of the national economy through improved livestock health, productivity and utilisation.

PROSPECTS AND UTILISATION OF ETHNOVETERINARY MEDICINE IN CAH

There is a renewed interest in the usage of medicinal plants worldwide and especially so in developing countries. The reason for this interest, especially in developing countries, is due to scarce resources to access modern treatment, increasing incidences of drug resistance, environmental pollution and unreliable manufacturers who produce drugs with little or no efficacy. There is availability of traditional knowledge on the use of herbal treatment, especially the use of medicinal plants mainly in rural areas. The medicinal plants are accessible to herbalists and farmers. However, there is a need to validate their use in order to establish general reliability, safety, efficacy, cost-effectiveness, and practicability of treatment and to empower the local community using these plants (McCorkle et al., 1996).

The Project area is endowed with a number of medicinal plants. There is, however, little documentation on these plants and their use. There is also lack of quantitative data on the efficacy, toxicity, and dosage rates, among others. Documentation and validation of indigenous knowledge on the use of these plants are therefore needed.

Ethnobotanical Survey

A survey was conducted in the Project area using a questionnaire (Gakuya, 1996) adapted from Farah (1991). The questions tried to identify the various uses of the plant and the parts used, methods of extraction, dosage rates, species of animal they are used for, and frequency of use. The questionnaire also tried to identify the toxicity, storage methods, expiry date after extraction and practical experience on their use. Four renowned herbalists and one community-based animal health attendant were involved in this
survey. After identifying each plant, the leaves were collected and pressed for botanical identification after which photographs of the plant were taken.

In this survey, 51 plants were identified as having medicinal value and were being used for human and animal treatment. Of these plants, two were identified as potent anthelmintics and further studies were recommended on them. These plants were *Albizia anthelmintica* Brogn and *Maerua edulis* (Gilg) De Wolf. Table 7.1 shows the control of helminthosis, a zoonotic disease, while Tables 7.2 and 7.3 show the treatment of common livestock and human diseases using plants in the Project area, respectively.

**Table 7.1 Control of Helminthoses in Humans and Livestock Using Plants in the Project Area**

<table>
<thead>
<tr>
<th>Plant species</th>
<th>Family</th>
<th>Life form category</th>
<th>Kikamba name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Albizia anthelmintica</em>, Brogn</td>
<td>Mimosaceae</td>
<td>Tree</td>
<td>Kyoa, Mwoa</td>
<td>Dewormer</td>
</tr>
<tr>
<td><em>Acacia brevispica</em>, Harms.</td>
<td>Mimosaceae</td>
<td>&quot;</td>
<td>Mukuswi, Kinatha</td>
<td>Intestinal worms</td>
</tr>
<tr>
<td><em>Maerua edulis</em> De Wolf</td>
<td>Capparidaceae</td>
<td>Shrub</td>
<td>Mutaa</td>
<td>Anthelmintic</td>
</tr>
<tr>
<td><em>Ocimum basilicum</em>, L.</td>
<td>Labiatae</td>
<td>Herb</td>
<td></td>
<td>Stomach and intestinal worms</td>
</tr>
<tr>
<td><em>Ralanites aegyptiaca</em>, L.</td>
<td>Balanitaceae</td>
<td>Tree</td>
<td>Mulului</td>
<td>Anthelmintic, purgative</td>
</tr>
</tbody>
</table>

**Table 7.2 Treatment of Common Livestock Diseases Using Plants in the Project Area**

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<tbody>
<tr>
<td><em>Grewia villosa</em>, Willd.</td>
<td>Tiliaceae</td>
<td>&quot;</td>
<td>Muvu</td>
<td>Foot and mouth, retained after birth</td>
</tr>
<tr>
<td><em>Pappia capensis</em>, Spreng.</td>
<td>Sapindaceae</td>
<td>Tree</td>
<td>Muva</td>
<td>Indigestion in goats</td>
</tr>
<tr>
<td><em>Cicurus rotundifolia</em>, Forsk</td>
<td>Vitaceae</td>
<td>Shrub</td>
<td>Itulu</td>
<td>Foot and mouth, poultice, purgative, diarrhoea</td>
</tr>
<tr>
<td><em>Barleria acanthoides</em> Vahl.</td>
<td>Acanthaceae</td>
<td>Herb</td>
<td>Thangila</td>
<td>Medicine for goats</td>
</tr>
<tr>
<td><em>Lepidigathis scariosa</em>, Nees</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Justice striata</em>, Ki</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Maerua crassifolia</em>, Forsk</td>
<td>Capparidaceae</td>
<td>&quot;</td>
<td>Kinatho</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Anthericum subpetiolatum</em> Bak.</td>
<td>Liliaceae</td>
<td>Herb</td>
<td></td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Loranthes rufescens</em>, DC</td>
<td>Loranthaceae</td>
<td>Herb</td>
<td>Kyeva</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Dioscorea schimperiane</em>, Kunth</td>
<td>Dioscoreaceae</td>
<td>&quot;</td>
<td>&quot;</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Lannea alata</em>, Engl.</td>
<td>Anacardiaceae</td>
<td>Shrub</td>
<td>Kitungu</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Aracia nilotica</em> L.</td>
<td>Mimosaceae</td>
<td>Tree</td>
<td>Kiseinei</td>
<td>Abortion and orf</td>
</tr>
<tr>
<td><em>Duosperma kilimandscherica</em> L.</td>
<td>Acanthaceae</td>
<td>Shrub</td>
<td>Ithande</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td><em>Commiphora schimperi</em>, Berg.</td>
<td>Burseraceae</td>
<td>Tree</td>
<td>Lulu, yeulu</td>
<td>and medicinal</td>
</tr>
<tr>
<td><em>Ochna inermis</em>, Forsk</td>
<td>Ochnaceae</td>
<td>Shrub</td>
<td>Mutandi</td>
<td>Calving problems in cattle</td>
</tr>
</tbody>
</table>
Table 7.3. Treatment of Common Humans Diseases Using Plants in the Project Area

<table>
<thead>
<tr>
<th>Plant species</th>
<th>Family</th>
<th>Life form category</th>
<th>Kikamba name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boscia coriacea Pax.</td>
<td>Capparidaceae</td>
<td>Herb</td>
<td>Kitandamboo</td>
<td>Stomach-ache and gonorrhoea</td>
</tr>
<tr>
<td>Capparis tomentosa, Lam.</td>
<td>Capparidaceae</td>
<td>Tree</td>
<td>Mukaaka</td>
<td>Eye problems and diarrhoea</td>
</tr>
<tr>
<td>Grewia bicolor, Juss</td>
<td>Tiliaceae</td>
<td>””</td>
<td>Ilawa</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td>Grewia villosa, Wild</td>
<td>Tiliaceae</td>
<td>””</td>
<td>Mulawa/Kivu</td>
<td>Lumpy skin disease, Salmonellosis</td>
</tr>
<tr>
<td>Maerua kirkii Oliv.</td>
<td>Capparidaceae</td>
<td>Shrub</td>
<td>Ivovotwe</td>
<td>Browse for livestock</td>
</tr>
<tr>
<td>Grewia a similes, K. selium</td>
<td>Tiliaceae</td>
<td>Shrub</td>
<td>Mutua</td>
<td>and general medicinal</td>
</tr>
<tr>
<td>Cassia kasneri, Bak. F.</td>
<td>Caesalpinaceae</td>
<td>””</td>
<td>Mwela ndathe</td>
<td></td>
</tr>
<tr>
<td>Entada abyssinica, Steud.</td>
<td>Mimosaceae</td>
<td>Shrub</td>
<td>Mwaitha</td>
<td></td>
</tr>
<tr>
<td>Lannea stulhumanii, Engl.</td>
<td>Anacardiaceae</td>
<td>Tree</td>
<td>Mwethi</td>
<td></td>
</tr>
<tr>
<td>Hoslundia opposita, Vahl.</td>
<td>Labiatae</td>
<td>Shrub</td>
<td>Musovi</td>
<td></td>
</tr>
<tr>
<td>Ormocarpum Kirkii, S. Moore</td>
<td>Papilionaceae</td>
<td>Shrub</td>
<td>Muema nzou</td>
<td></td>
</tr>
<tr>
<td>Occhua inermis, Forsk</td>
<td>Ochnaceae</td>
<td>Shrub</td>
<td>Mutandi</td>
<td></td>
</tr>
<tr>
<td>Acacia nilotica L.</td>
<td>Mimosaceae</td>
<td>Tree</td>
<td>Kisemey</td>
<td></td>
</tr>
<tr>
<td>Plectranthus barbatus, Andr.</td>
<td>Labiatae</td>
<td>Shrub</td>
<td>Mwoya</td>
<td></td>
</tr>
<tr>
<td>Acacia mellifera, Vahl.</td>
<td>Mimosaceae</td>
<td>Tree</td>
<td>Muthia</td>
<td></td>
</tr>
<tr>
<td>Dichrostachyus cinerea, L.</td>
<td>Mimosaceae</td>
<td>Shrub</td>
<td>Mundua</td>
<td></td>
</tr>
<tr>
<td>Tephrosia villosa, L.</td>
<td>Papilionaceae</td>
<td>Herb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Commelina africana L.** Commelinaceae  " Kikowe  Fever, relieve eye irritant latex drops, ear-ache

**Combretum exalatum, Engl.** Combretaceae  Shrub  Mukokola  Rheumatism

**Boszia angustifolia a. Rich.**  Capparidaceae  Shrub  Isivu  Malaria treatment

**Boszia corticea Pax.**  "  Herb  Kisivu  Stomach-ache and gonorrhoea

**Achyranthes aspera, L.** Amaranthaceae  Herb  Uthekeethe  Headache, stop bleeding, constipation

**Psychotria febrifuga, Engl.** Combretaceae  Shrub  Mukokola  Malaria treatment

**Bacopa lateriflora, Jacq.** Capparidaceae  "  Herb  Uthekeethe  Stomach-ache and gonorrhoea

**Justicia flava, Vahl.** Acanthaceae  Herb  Mutaa  Asthma, chest pains, cough and abdominal pains

**Capparis tomentosa, Lam.** Capparidaceae  Tree  Ktandamboo  Treatment of abscess and boils

**Cyphostema orondo, Desc.** Vitaceae  Herb  Kyungu  Lack of appetite, anti-emetic, malaria headache

**Aloe secundiflora, Engl.** Liliaceae  Herb  Kiluma  Cystitis and gonorrhoea

**Aspilia mosaambicensis, Oliv.** Compositae  "  Multi  Lice infestation and fish poison

**Adenium obesum, Forsk** Apocynaceae  Shrub  Mwatha  Emetic and chest troubles

**Sonchus schwenfurthii, Oliv.** Compositae  Herb  Uthunga  Malaria and stomach-ache

**Tridax procumbens, L.** Compositae  "  Mumela  Indigestion, abdominal pains during menstruation

**Rhoicissus tridentate, Lif.** Vitaceae  Herb  Muvelengwa

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**Experimental Work on A. anthelmintica and M. edulis**

The efficacy of crude extracts of *A. anthelmintica* and *M. edulis* (the latter shown in Fig. 7.2), prepared as per the herbalists’ instructions, against gastrointestinal nematodes of sheep was evaluated (Gakuya, 2000). The extracts had a percentage faecal egg count reduction of 55%, 49%, 16% and 14% for powdered *A. anthelmintica* and *M. edulis*, and fresh *M. edulis* and *A. anthelmintica* respectively. The extracts were further tested for their biological activity using the brine shrimp lethality test. Water, methanol and chloroform freeze-dried extracts of both plants were used to evaluate their biological activity. All the extracts of *A. anthelmintica* were active at LC$_{50}$ < 1000 µg/ml while it was only the chloroform extract of *M. edulis* that was active at LC$_{50}$ < 1000 µg/ml.
The efficacy of the freeze-dried aqueous extracts of *A. anthelmintica* and *M. edulis* was evaluated using the nematode *Heligmosomoides polygyrus* infections in mice (Gakuya, 2002). There was a percentage faecal egg count reduction of 72%, 69%, 50% and 42% for water extracts of *A. anthelmintica* at 10gm/kg, *M. edulis* at 20gm/kg, *A. anthelmintica* at 20gm/kg and *A. anthelmintica* at 5gm/kg bodyweights respectively. Using the worm counts reduction after treatment, there was an efficacy of 68%, 36%, 20%, 19%, 16% and 14% for water extracts of *A. anthelmintica* at 5gm/kg bodyweight, *M. edulis* at 10gm/kg bodyweight, *A. anthelmintica* at 10gm/kg bodyweight, *A. anthelmintica* at 20gm/kg bodyweight, *M. edulis* at 20gm/kg bodyweight and *M. edulis* at 5gm/kg bodyweight respectively.

From this study, it can be concluded that there is a wide knowledge on the use of medicinal plants among farmers and herbalists in the Project area, but more studies in this field are necessary. The crude and refined aqueous extracts of *A. anthelmintica* are more potent in the control of gastrointestinal nematodes than *M. edulis*. There is a need to carry out more
studies on *A. anthelmintica* to get a purer product that can be packaged or mixed with feed for the animals. It is also important to separate the active compound in *A. anthelmintica*.

**TRAINING OF AGRO-PASTORAL DEVELOPMENT AGENTS**

**Course Objective and Outline**

As already noted, APDAs are community-based workers in natural resource management and dryland agriculture, who work as an additional arm of extension services to complement the Ministry of Agriculture or Livestock Development. The emphasis of the training was sustainable development, addressing natural resource management and dryland agriculture, geared to making the trainees development catalysts in their own communities. The course objectives can be broadly described as:

- To train local people in the basic concepts of natural resource management and dryland agriculture applicable in the local environment
- To create institutional capacity building to support existing extension services in the agro-pastoral production systems
- To empower such trained people to practise so as to ensure sustainability

The course was designed to take 10 working days, staggered in two phases. The first phase was an introductory session while the second contained broad subject matter. The training was in the form of plenary discussions combined with practical demonstrations as necessary.

**Trainees and Trainees**

Trainers were drawn from the major stakeholder technical groups such as staff from the Ministries of Agriculture, Livestock and Environment, University of Nairobi, and NGOs. This approach was necessary to ensure the collaboration and networking of the local public and private institutions.

For the APDAs to achieve their role they need to know the following:

- Grazing land management
- Water and moisture conservation
- Multipurpose trees (MPTs)
- Cropland management
- Livestock production
- Animal disease control and prevention
- Social skills
CHAPTER 8
INTEGRATED FOOD SECURITY SYSTEMS IN DRYLANDS:
BEEKEEPING AND CULTIVATION

INTRODUCTION
As already indicated, the ASALs of Kenya are characterised by poor and erratic rainfall. This normally leads to crop failure in four out of six seasons. Communities living in these areas are faced with a myriad of production constraints. Crop failures and drought lead to food shortages. Lack of a cash-earning crop enterprise has encouraged the employment of unsustainable income generation activities that translate into environmental degradation due to charcoal burning and exposure to HIV/AIDS, as the youth and household heads move to urban areas in search of employment. Previous interventions to introduce cash crops have failed due to marketing problems, among others. The agro-pastoralists often find themselves in a situation where they are forced to sell their livestock, which are a capital stock, and some crop harvests to raise cash for pressing basic needs.

Cultivation, particularly of maize, and beekeeping are two major activities carried out by the agro-pastoralists in the project area that are aimed at integrating production for purposes of enhancing food and livelihood security. These production systems and the role of DHP-Kenya in promoting them are discussed in this chapter, starting with beekeeping.

BEEKEEPING
Beekeeping has been practised traditionally since time immemorial. The Old Testament testifies to this, where Moses told his people that he would deliver them to the land of milk and honey (Canaan). It is estimated that the honeybee has been in existence for millions of years, left to nature for survival yet it has survived.

Crane (1979, 1990), Crane et al. (1984), IBRA (1976), Mann (1973) and Tecwyn (1976) point out that beekeeping enhancement in the rangelands serves three important purposes. These include the provision of extra non-perishable food, products such as honey and wax, propolis and pollen (from which farmers could obtain cash income), and a means of pollination for agricultural, horticultural and tree crops, leading to better harvests from existing croplands. It is a natural food with medicinal value. It is only recently that the bee was classified as livestock, hence gaining some form of recognition.

Beekeeping is particularly appropriate in the resource-poor ASALs because it does not compete directly for resources with other agricultural activities; it requires little space (50 hives can be accommodated in a tenth