

Community-based Animal Health Workers in Kenya

A Case Study of Mwingi District

African Union/Interafrican Bureau for Animal Resources
Community-based Animal Health and Participatory Epidemiology Unit



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The views and opinions expressed in this report belong to the team and do not necessarily reflect the position of AU/IBAR or any of the institutions represented in the study team.

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Acronyms

AAK	Action Aid-Kenya
AEZ	Agroecological Zone
AHA	Animal Health Assistant
AHITI	Animal Health and Industry Technical Institute
AHSP	Animal Health Service Provider
AU/IBAR	African Union/Interafrican Bureau for Animal Resources
CBPP	Contagious bovine pleuropneumonia
CCPP	Contagious caprine pleuropneumonia
CAH	Community Animal Health
CAHW	Community-based Animal Health Worker
CAPE	Community-based Animal Health and Participatory Epidemiology Unit, AU/IBAR
CRD	Chronic Respiratory Disease
DVO	District Veterinary Office(r)
DVS	Director of Veterinary Services
FMD	Foot and mouth disease
FVM	Faculty of Veterinary Medicine
GoK	Government of Kenya
GTZ	German Agency for Technical Cooperation
IFSP-E	Integrated Food Security Programme - Eastern
IL	Inner Lowland
JAHA	Junior Animal Health Assistant
KSh	Kenya Shillings
KVA	Kenya Veterinary Association
KVB	Kenya Veterinary Board
LM	Low Midland
LSD	Lumpy skin disease
MoARD	Ministry of Agriculture and Rural Development
NCD	Newcastle disease
NGO	Non Governmental Organization
PRA	Participatory Rural Appraisal
SHG	Self-Help Group
VO	Veterinary Officer



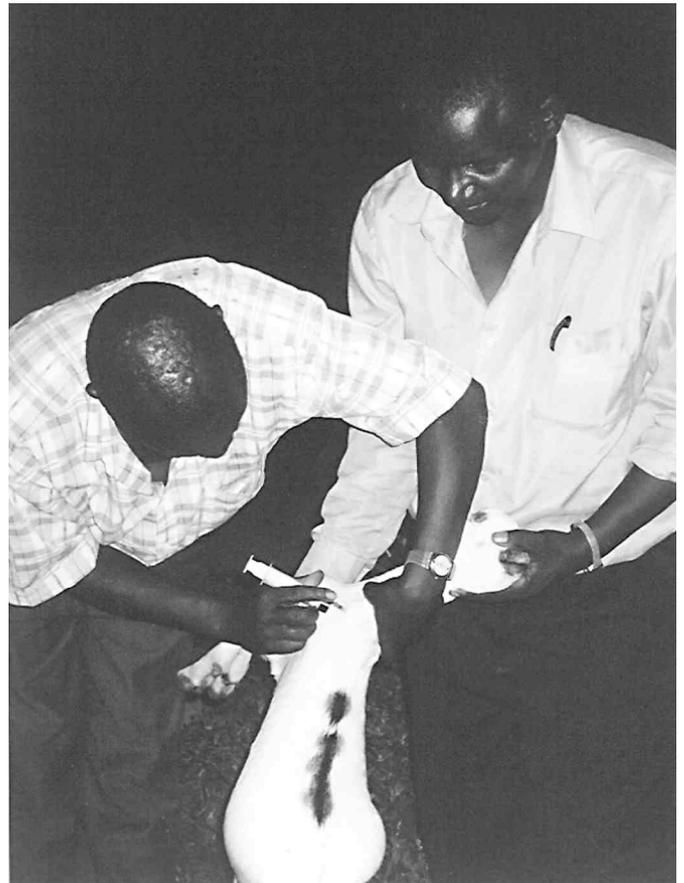
Executive Summary

This report describes a study on the sustainability of community-based animal health (CAH) services in Mwingi District, Kenya. These services began in 1992 and were supported by the District Veterinary Office (DVO) with assistance from the Integrated Food Security Programme - Eastern (IFSP-E), a Kenyan-German bilateral development programme. Over time and using the process of participatory review with multiple stakeholders, the system evolved into a network of community-based animal health workers (CAHWs) who procured veterinary supplies and received supervision from Animal Health Assistants (AHAs) at divisional level. Before the establishment of the CAH services, there were inadequate state and weak private veterinary services in the district. Before 1992, livestock owners were relying on traditional veterinary practices or were using untrained people on a trial and error basis. By the end of the IFSP-E in 2002, 99 CAHWs had been trained in Mwingi District.

The study was carried out between December 2002 and January 2003 and focussed on financial indicators of CAHW performance, the technical competence of CAHWs and the relationships between CAHWs and other animal health service providers. It was found that the CAHWs were trained, deployed and supervised by the DVO. A mutually beneficial and supportive arrangement existed between the CAHWs and AHAs, based on a private drug supply system, referral and backstopping support. The CAHWs derived sufficient income from their veterinary work to maintain their interest in the system, and farmers rated CAHWs very highly against other service providers. Farmer assessment revealed that CAHWs were accessible, affordable, offered a timely service and achieved good recovery rates. Seventy-nine out of 99 (80%) CAHWs in the district were active or very active, as rated by Divisional AHAs. They were continuing to offer adequate animal health services three years or more after their initial training and the withdrawal of donor support. Ninety five percent of sampled CAHWs (n=40) viewed their business as successful and expanding.

Farmers' perceptions of the good quality of the CAH service were supported by an assessment of CAHW technical competence. A test was developed to assess CAHW knowledge of clinical signs of disease, notifiable diseases, zoonoses plus their ability to use veterinary drugs correctly and safely. The test results were very encouraging and 36/40 (90%) of the

sampled CAHWs passed the test. The main weaknesses of the CAHWs were their record keeping and knowledge of zoonoses, but it was proposed that these problems could be overcome by refresher training. It was particularly noticeable that the CAHWs were using veterinary drugs correctly and had good quality drugs in their kits. It was concluded that CAHWs performed with a sufficient level of technical competence to limit problems such as drug resistance, particularly when compared with drug use by farmers and quacks¹. The existence of a referral system for CAHWs and refresher training helped to ensure that CAHW competence and ethical behaviour was maintained.



With regard to the CAHWs' working relationship with other animal health service providers, the study revealed very complementary links between CAHWs and government veterinary staff (AHAs and Veterinary Officers) in the district. The AHAs also owned Agrovet shops at divisional level and supplied CAHWs with veterinary drugs and equipment. There was some competition between CAHWs and informal service providers such as traditional healers and quacks¹, but the general trend was increasing farmer preference for CAHWs due to the perceived higher quality of the

¹The term 'quack' is used in Kenya to describe petty traders of veterinary and human medicines who are unlicensed, untrained and unsupervised but may claim to have technical knowledge of the products they sell.

CAHWs. Considering the agroecological and socioeconomic conditions of the district, CAH can be viewed as an initial stage in the process of extending quality private sector veterinary services.

This study supports many of the recent policy and legislative changes proposed by the Kenya Veterinary Board to both regulate and strengthen linkages between private veterinary practitioners and CAHWs. The study team supports moves towards a clear policy to allow more efficient utilisation of CAHWs via the legal empowerment of veterinarians and para-professionals to trade in veterinary drugs. Licensed CAHWs could then source their drugs from independent and legalised private veterinary drug suppliers. These drug suppliers would ideally be veterinary doctors but where there are no private veterinarians, animal health assistants should be utilised. These private veterinary drug suppliers would be obliged to provide direction to and have responsibility for the CAHWs' work.

Recommendations to the Department of Veterinary Services

- In Mwingi District, basic veterinary services are provided by AHAs who are both government employees and private sector operators. In this situation, the DVS should review the public sector roles of the AHAs and the potential to encourage full privatisation of the system. In such a system, the AHAs would no longer be employed by government but, as private operators, could receive contracts from government for specific public sector tasks (under the supervision of the DVO). It is likely that such an arrangement would be more cost efficient. In addition, savings derived from improved efficiency could be directed towards enabling the DVO to fulfil monitoring and regulatory functions more effectively
- In underserved areas the DVS should facilitate DVOs to provide direct or indirect assistance in the identification, training and temporary supervision of CAHWs according to district-specific needs. Ideally, the trained and licensed CAHWs should be linked to private AHAs and vets for efficient supervision and backstopping. If private AHAs or veterinarians do not yet exist in some areas, every effort should be made to encourage private sector development as CAHWs are trained.
- The licensing of a CAHW should be contingent upon an AHA or veterinarian being identified, on the license, as the supervisor of that CAHW. The study team emphasises that CAHWs should operate in the private sector. Government AHAs and veterinarians should only be supplying drugs to CAHWs in areas where private veterinary practices run by AHAs or vets have yet to be established.
- Care and attention is required to ensure that government employees, including those who are also engaged in private activities, do not prevent the development of fully privatised systems. Supervision and supply of CAHWs by government AHAs and vets should be seen as a temporary measure to improve the quality of veterinary services to underserved livestock owners, rather than a long-term solution.
- The establishment of CAH systems should be based on a Memorandum of Understanding (MoU) between the DVS, DVOs and other relevant agencies in those areas where CAHWs are needed. The content of the MoU should be made available to the veterinary regulatory body (KVB) and other interested stakeholders.
- The DVS should continue to inform those donors and NGOs who support CAH initiatives of the necessity of signing an MoU prior to the commencement of their activities. This will help to harmonise approaches, ensure quality and enable appropriate project design according to the need for immediate and full involvement of the private sector. The DVS should formulate a set of minimum standards and guiding principles that implementing agencies are required to follow and which can form the basis for the MoUs.
- The DVS should support the DVOs to sensitise and prepare the communities to ensure sustainability of CAHW activities.
- Under current arrangements many state veterinary personnel are to be retired by the year 2012. Therefore, there is urgent need to maximise the use of public sector veterinarians and resources for the encouragement of private service delivery. It is likely that contracting out activities such as vaccination and surveillance will play a key role in enabling the private sector in marginalised areas. These contracts will have to be formulated and monitored by the DVS and DVO.
- In collaboration with communities and the AHITs, the DVOs should identify well performing and qualified CAHWs for certificate training. After training, former CAHWs could be licensed to work in their locations as private AHAs.

- Where private veterinarians do exist, private AHAs should work under their supervision. The process of licensing and monitoring is the responsibility of the statutory veterinary body (the KVB) in close collaboration with the DVS. In areas where no private veterinarians are working, the KVB and DVS will need to conduct regular reviews to ensure that government services and/or private para-veterinary professionals are not hindering involvement of private professionals. The aim should be for licensing arrangements to support complementarity linkages and quality services.
- Veterinary investigation laboratories should, where necessary, be facilitated to carry out confirmatory disease diagnostic surveys to confirm local disease distributions. This would help in developing a needs-driven training curriculum for CAHWs in specific areas. Simple diagnostic tests for epizootic or notifiable diseases should be provided at divisional and district levels.
- The veterinary public health division of the DVS should be strengthened to carry out regular spot-checking on animal food products at the market level to determine the actual levels of drug residues and ensure the availability of wholesome foods according to national and international market standards. It is understood that this must be accompanied by efforts to raise the producers' awareness on the effects of the drug usages and withdrawal period on their incomes and on human health.

Recommendations to the Kenya Veterinary Board

- In line with recent reports from the Office International des Epizooties (OIE), the KVB should continue to delegate its supervisory powers to the DVS and DVOs in conjunction with its own capacity to provide field inspection. This would strengthen and widen its regulatory functions countrywide. There is a need to further identify, define and license the various categories of para-veterinary professionals (including CAHWs) practicing in the districts and this information can be compiled in the central KVB registry.
- Registered veterinarians should carry out all training in veterinary-related topics for CAHWs. In Mwingi District there may be scope to increase the initial 14 day training course to 21 days, in order to strengthen training in those topics that were found to be weak among CAHWs viz. record keeping and zoonoses. Other topics that might be



included in the initial CAHW training are minor surgery and wound treatment, some improved livestock production techniques, aspects of business management and organisational development plus exposure to other sources of income such as honey production or preparation of hides and skins (in order to complement income derived from veterinary work).

- Trained CAHWs should be issued with a certificate of training and annually renewable work licenses. The latter should be subject to an annual, combined report of their supervisor and the DVO. Similarly, AHAs should also be regulated by the KVB and their appropriateness as independent private operators should be reviewed regularly.
- The KVB should identify and register suitable trainers and examiners of CAHWs, who might serve as an accreditation board on their behalf. The training of such trainers and examiners needs to be developed. The mechanisms for providing licenses to para-professionals such as CAHWs, through DVOs and the DVS also needs to be developed.

Recommendations to the Kenya Veterinary Association

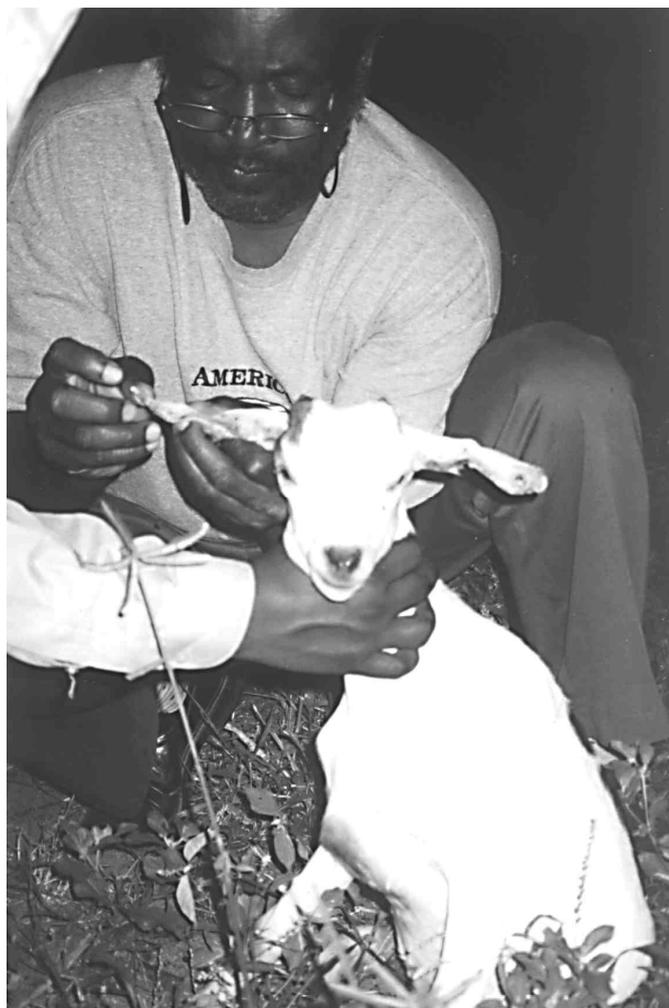
- The KVA should inform its members about the results of this study, particularly with regards the technical competence of CAHWs, the potential to use CAHWs to improve the sustainability of privatised veterinary services in under-served areas and the potential to develop systems based on

mutually supportive relationships between CAHWs, AHAs and veterinarians.

- The KVA should encourage those members interested in establishing private CAH systems to seek appropriate training in subjects related to the design and development of such systems, with a particular focus on sustainability issues. There is a wide range of training and information materials available in written and video formats for those interested (see Annex 9 for a list and sources of relevant materials).
- The KVA should continue to participate actively in policy dialogue concerning CAH systems in Kenya, and encourage the involvement of its members from under-served areas in national-level debates and meetings.
- The KVA should continue to participate in future studies on veterinary service provision, including CAH systems.

Recommendations to the African Union/Interafrican Bureau for Animal Resources

- Based on the study findings, AU/IBAR should continue to advise its partners at policy level on the extension of CAHWs to underserved areas.
- Through its intermediaries e.g. government, NGOs, CBOs and livestock owners' organisations, AU/IBAR should continue to assist national veterinary services to gain the experience and capacity to provide technical and organisational advice to relevant institutions involved in the initiation and management of CAH systems.
- AU/IBAR should continue to work with veterinary faculties and veterinary policy makers to generate reliable information on CAH systems for dissemination to its partners. The involvement of local agencies facilitates and accelerates the learning, attitudinal and institutional change processes.
- As access to appropriate animal health services is a livestock owner's basic right and a key factor contributing to livestock production, AU/IBAR should seek to influence national policy makers to ensure they improve the representation and active involvement of livestock owners at policy levels.



District CAHW organisations

The capacity of CAHW umbrella organisations, where they exist, is still very weak. Enhancing their capacity would go along with empowering the CAHWs to engage with other stakeholders such as the AHA umbrella organisation, livestock owner associations and even the KVB. It could further encourage the development of codes of conduct and other self-regulatory mechanisms, improve linkages amongst CAHWs and with other stakeholders, including private veterinarians.

1. Introduction

1.1 Research needs in community-based animal health service delivery in Kenya

In Kenya, community-based approaches to animal health services have been evolving since the late 1980s. These approaches aim to involve livestock keepers themselves in project design and implementation, and usually train community-based animal health workers (CAHWs) using short, practice-based training courses. Given the conditions in Kenya's arid and semi-arid lands, community-based animal health (CAH) systems have been implemented most widely with pastoral and agro-pastoral communities, who may have limited access to conventional veterinary services.

Previous studies in Kenya have shown the positive impact of CAHWs in terms of decreased livestock morbidity and mortality, and related livelihoods benefits (e.g. Holden, 1997; Odhiambo et al., 1998). However, while it seems that well-trained CAHWs can be effective in reducing livestock disease problems, many projects suffer from poor sustainability. Typically, CAH projects have been set up by NGOs using subsidised systems of drug supply and with limited involvement of the private sector (Catley et al., 2002). This situation applies to Kenya, and policy makers have questioned the viability of CAHW systems in the absence of external financial support.

In Kenya, three major concerns regarding the sustainability of CAHW systems are as follows:

Financial sustainability of CAHW services.

Sustainability of CAHW projects is related to the financial incentives received by CAHWs and in turn, linkages to a reliable supply of quality medicines. When supply chains fail or incentives are low, CAHWs are probably more likely to drop out of the system. This is thought to be a particular problem when NGO projects end and an alternative drug supply system has not been put in place.

Quality of service. Some critics of CAHW systems believe that CAHWs lack the necessary skills, knowledge and ethics to be entrusted with prescription drugs. They argue that CAHWs give unnecessary and wasteful treatments resulting in losses to livestock producers and antibiotic resistance and residues in animal food products.

Relationship between animal health service providers. It has been proposed that the establishment of CAHW systems undermines the provision of services by more qualified service providers such as certificate and diploma holders, or even veterinarians. These concerns relate to the possibility that CAHWs may be able to provide a cheaper service, and operate outside the supervision of more highly trained veterinary workers.

1.2 Research objectives

In Mwingi District of Kenya, 99 CAHWs have been trained and linked to relevant institutions and stakeholders. All the CAHWs have been active for at least two years and some of them have been working since 1992. However, no systematic study has been carried out to assess the sustainability and the quality of services offered by CAHWs or their working relationship with other animal health service providers in the district. In late 2002, the Community-based Animal Health and Participatory Epidemiology (CAPE) Unit of the African Union/Interafrican Bureau for Animal Resources (AU/IBAR) designed a study to investigate sustainability issues in the CAHW system in Mwingi District. It was anticipated that the study findings would assist AU/IBAR in its advisory role to government veterinary services, particularly with regards delivery options in underserved areas.

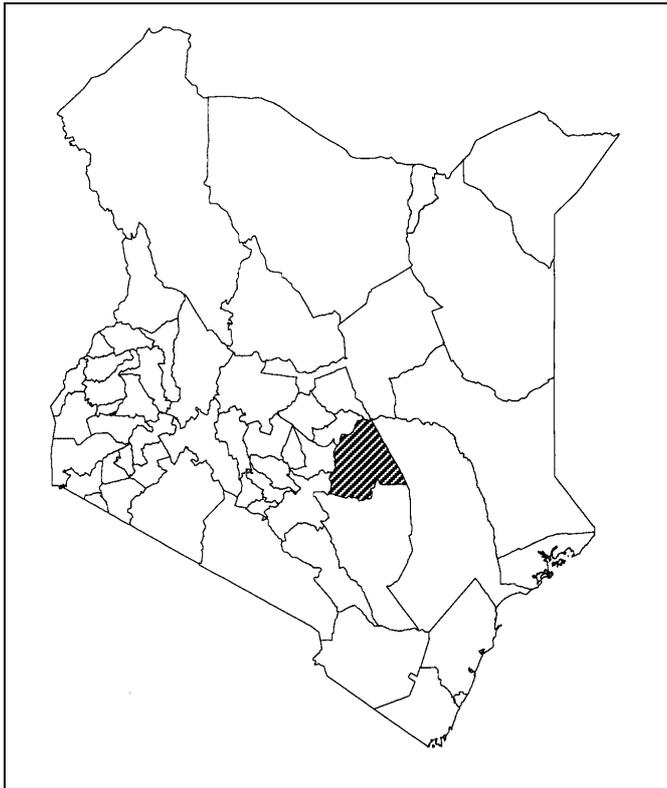
2. Overview of Mwingi District

2.1 Social and physical characteristics

Mwingi district is relatively a new district in Kenya, formed from the old Kitui District. It is one of thirteen districts in Eastern Province. It covers an area of 10,031 km² and has a human population of 355,000 inhabitants grouped in 55,000 households and an average population density of 37 inhabitants/km² (Mwingi District Statistics Report, 2002). The district is mainly semi-arid, with 80% of its landmass classified in the Low Midlands five (LM5) agroecological zone (see Annex 1). The district is drought prone with a 66% probability of crop failures (Office of the Vice-President and Ministry of Planning and National Development, 1997).

The district population is predominantly of Kamba ethnicity (95%). The remaining 5% is divided between the Tharaka ethnic community (4%) and a small mixed ethnic minority e.g. Arabs and others. Social network, mutual support and resource sharing are embedded in Kamba cultural values (Tiffen et al., 1994).

Figure 2.1
Mwingi District, Eastern Province



2.2 Livelihoods

Agro-pastoralism (crops and livestock) is the district population' economic mainstay. Crop and livestock are subsistence (with very minimum use of off-farm inputs), interdependent and equally important to the district farming communities' livelihood. Since there is a 66% of probability of food crop failure, the rural population considerably rely on off-farm food supply from the grain market by selling their animals. At household level, the cash income derived from livestock keeping is estimated at 70% of all cash income. Livestock are therefore used as living banks in case of cash needs (food supply, school fees, etc.). They are also used for ploughing, weeding and draught power. In the year 2000, the district livestock population was estimated at 178,000 cattle (Zebu), 270,000 goats (East Africa, Galla breeds and their crosses), 42,000 sheep (local), 570,000 birds (indigenous chicken) and 55,000 donkeys (Mwingi District Veterinary Office data, 2000).

2.3 Constraints to livestock rearing

While conducting community dialogue in 1994 livestock production constraints listed by farmers comprised ecological, institutional, social and economic factors (IFSPE, 1998). These included:

- Livestock morbidity and mortality due to disease and pests.
- Inadequate fodder and water accessibility during prolonged drought periods (very frequent).
- Inadequate socio-economic infrastructures such as roads and markets.
- Inefficient and almost inaccessible agricultural extension services to the farming communities.
- High poverty levels: 70% of the district population live below poverty line (living on less than one USD per day) and with high malnutrition levels viz. about 48% of the under five children were stunted (Integrated Food Security Programme-Eastern, 1998).
- Inappropriate development interventions, which have facilitated the creation of a dependency syndrome in the population.
- Inadequate and inefficient community based mechanisms and institutions to handle livestock based community development processes.

More particularly, the major constraints pertaining to the inaccessibility of veterinary services were:

- Inadequacy of personnel and facilities to provide veterinary services to the farmers in remote areas of the district. The District Veterinary Office (DVO) had only three district-based veterinarians and nine Livestock Health Assistants (LHAs) heading the very large divisions (each division is about 1000 km²). Therefore, there were no formally trained and employed para-veterinarians to staff the locations and sub-locations.
- No private practitioner (LHA or veterinarian) was reliably operating in the district.
- The rural economy was ill prepared to accommodate veterinary professional fees since 70% of the population was living below the poverty line (as mentioned above) and not prepared to pay for professional quality services.
- No appropriate interventions to address the veterinary service delivery at the community and district levels were forthcoming from the state veterinary services.

Bearing in mind the above conditions, there was a need to devise an appropriate, alternative and sustainable veterinary service delivery system adapted to the local realities (social, economic, technical and ecological). Therefore, a community-based animal health care was initiated with all relevant stakeholders.

3. Historical overview of community-based animal healthcare in Mwingi District

3.1 The World Neighbours project

In 1992 an NGO called World Neighbours set up a CAHW project in Waita village. Thirty farmers were selected, trained and equipped with a basic veterinary drug kit, valued at Ksh. 30,000. With this kit, the CAHWs were supposed to deliver basic veterinary services to the targeted communities and World Neighbours was supposed to replenish the kits. Unfortunately, it is reported that the intervention did not last and only two individuals are still actively offering services². Some of the reasons advanced for the failure for the World Neighbours' initiative were:

- Lack of consultation and inadequate consensus building among the relevant stakeholders prior to the project implementation
- Lack of exit strategy
- Inadequate institutional linkages and support e.g. the DVO was not involved
- The initiative was material-input, supply driven instead of being capacity building oriented.

3.2 The Integrated Food Security Programme - Eastern (IFSP-E)

In 1996 a new CAH system was established in Mwingi District with the support of the Integrated Food Security Programme-Eastern (IFSP-E), a Kenyan-German (GTZ) bilateral development cooperation programme. Initially, three pilot areas called Kyuso, Mumoni and Ukasi were selected although later, the scheme expanded to cover all nine divisions in the district. The CAH system was implemented through the DVO and since 1996 has undergone an evolutionary process of participatory reviews in order to adapt and adjust to emerging scenarios and trends.

3.2.1 Phase I: 1996 to 1998

a. Establishing the CAH system

The first phase of the project involved the selection of project areas, being areas where DVO staff did not have easy access to communities and yet veterinary service needs had been expressed through community dialogues. The project also identified relevant institutional and individual stakeholders who could

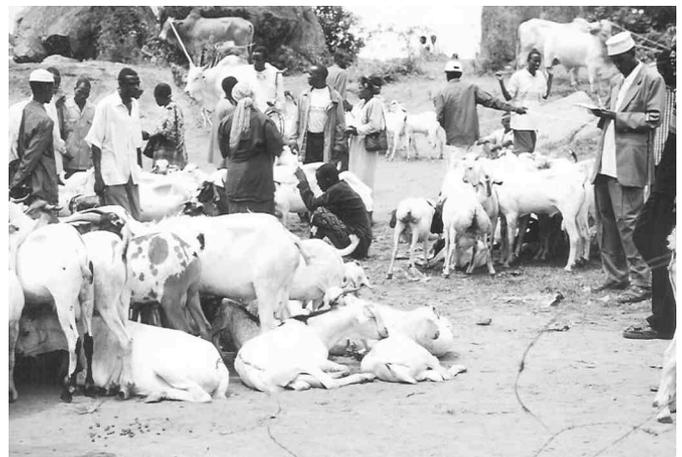
be the partners in carrying out the intervention such as Intermediate Technology Development Group-East Africa (ITDG-EA), Action Aid Kenya (AAK)-Kyuso, World Neighbours and veterinary drug suppliers.

The other key events and activities during Phase I were as follows:

Community dialogues on livestock production, health constraints and solutions were carried out. It was during this time that the farmers identified and ranked prevalent animal diseases, pests and other livestock production and health related constraints. The veterinary service delivery gaps and solutions were also discussed.

Selection of CAHWs was done using criteria jointly developed by the targeted communities and the facilitators (DVO and GTZ staff). Some of the CAHWs' selection criteria included:

- Adequate literacy level in English and Kiswahili languages in order to adequately read and interpret the drug labels and undertake training. Fluency in local community language was an already acquired asset and considered essential for extension purposes
- Social acceptability
- Permanent resident of the area
- Willingness to operate as a business for sustaining the Animal Health Service Delivery (AHSD).



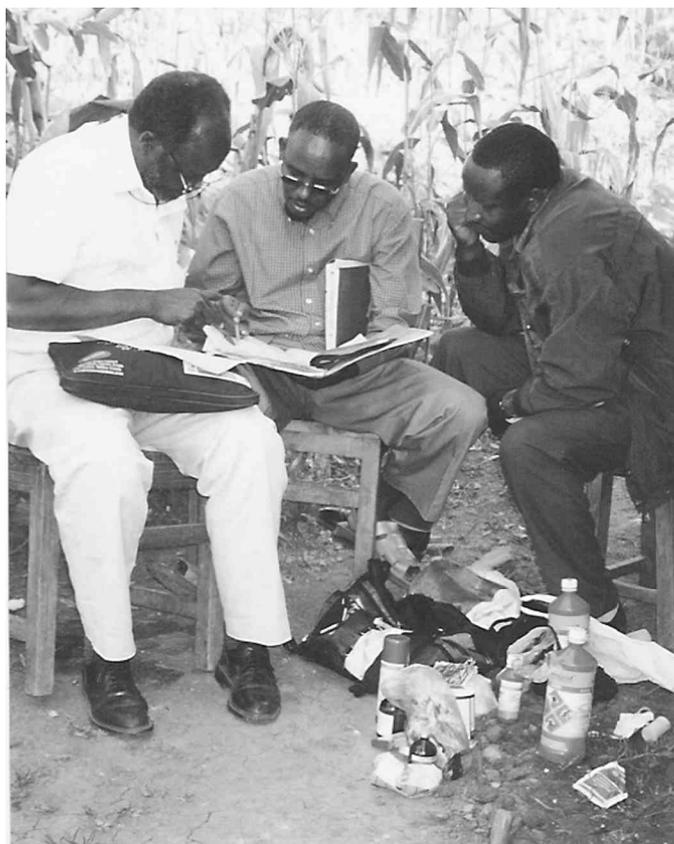
Design of CAHW training manual based on the locally identified constraints. Generally, the training curriculum covered the following topics:

- Relevant stakeholders and their role in the scheme
- Animal body systems
- Basic veterinary pathology
- Local diseases diagnosis, treatment, prevention and control

² This information was given to the investigation team by the DVO Mwingi, livestock owners and CAHWs (two functional and five drop outs) from Waita Location where the project was implemented.

- Identification and reporting of notifiable diseases
- Basic pharmacology and drug label reading and interpretation
- Principles of animal husbandry, efficient communication
- Record keeping and report writing
- Basic extension and communication skills.

The animal health problems covered in the CAHW training are listed in Annex 2.



Training of CAHWs was carried out over two weeks with a one-week break in between the two sessions. The trainers were DVO and GTZ staff. Certificates were issued to trainees who passed a test set by the trainers, and the certificates were to be renewed annually. Trainees who did not pass the test did not graduate and they were not allowed to practice. This information was communicated to their respective communities who were allowed to select other candidates to be trained at a future training opportunity.

Provision of veterinary kits. Newly trained CAHWs were presented to their respective communities and during this event they were issued with a basic veterinary drug kit and a bicycle on a cost-sharing basis. At that same meeting, consensus on the mode of delivering services (cost and payment) was agreed upon by all the relevant stakeholders viz. community

members, local leaders, DVO staff and the CAHWs. The meeting was graced by all relevant stakeholders (DVO, GTZ, local leaders, drug suppliers, local and community based institutions).

Supervision and backstopping. For supervisory and continuous backstopping purposes, the CAHWs were to be supervised and supported by the government staff at divisional levels who were linked to the DVO.

Annual stakeholder reviews of the system were held at district and divisional levels. At community level, livestock owners assessed their respective CAHW's performance.

b. Veterinary drug supply

The first veterinary drug kit that was issued contained drugs valued at Ksh. 11,280 (Annex 3) and each CAHW would treat animals at a fee jointly set by the DVO and CAHWs. The system allowed CAHWs to make a profit of 10% above the cost of the drug as a motivating factor and the remaining 90% was remitted to the DVO staff at divisional level. On behalf of CAHWs, the divisional officer would then obtain drugs equivalent to the remitted money to refill the kit. The remission of money and the refilling of the kit were intended to enable the establishment of a veterinary drug revolving fund scheme under the management of the DVO at district headquarters. The DVO was required to write a monthly progress report to the IFSP-E/GTZ.

This multi-layered revolving fund, with many intermediaries, did not succeed for several reasons:

- a) Some CAHWs were not paid by farmers
- b) Some CAHWs had accrued debts to the revolving funds because they did not submit all due payments to the DVO
- c) Some CAHWs were remitting money to the divisional veterinary staff without being re-supplied with additional drugs
- d) Some divisional veterinary staff were not forwarding the amount of money they were owing to the revolving funds
- e) Sometimes the DVO (district headquarters) was not passing information about the status of the funds to the IFSP-E/GTZ.

c. Project review

In 1998, workshops were held to review the project and the following problems were identified concerning the CAHWs:

- a) Inadequate motivating factors - small profit margins
- b) Inadequate supervision and communication between the CAHWs and the DVO staff.

The complexity related to the money collection and submission complicated the relationships between the involved parties

- c) Incompatibility of function e.g. supervision of CAHWs and the collection of returned money. This resulted into inadequate training and backstopping support to CAHWs
- d) The poor availability of drugs.

The review workshops were quite important, because they allowed the fine-tuning of the intervention and adjustment to the emerging scenarios. Some of the resolutions were:

- The introduction of cost sharing in the initial drug supply to CAHWs as a sign of commitment and ownership of the veterinary drug kit
- The promotion of CAHW self-reliance for acquiring the subsequent drugs, instead of the DVO drug controlled supply system
- Promotion of CAHWs as community-based private animal health service providers in the respective communities and linking them to input suppliers (equal emphasis on business management and organizational development)
- More emphasis on refresher training sessions based of the identified training needs and frequent experience sharing sessions at divisional/district levels and also other horizontal linkages
- Invitation of more experienced CAHWs to participate in the training of new ones to orient/shape and give induction based on their experiences

Thus the second phase of the project was borne.

3.2.2 Phase II: 1998 to 2000

This phase of the project was characterised by: -

- Building on previous experiences
- Identification of new non-served areas to be included following the previous process and district wide expansion
- Training of 64 new CAHWs following the previous procedures except that the veterinary drug kit to the newly graduated CAHWs was reduced to a minimum value of Ksh. 7,000 and the bicycle was now to be purchased 50% on cost sharing basis
- Promotion of the CAHW as a business undertaking in a self-reliant manner and the removal of revolving funds were effected. CAHWs were encouraged to source veterinary drug from private and reliable drug suppliers

- Institutionalisation of participatory evaluation at community, divisional and district state service levels
- Induction of DVO staff on participatory, demand driven, community based extension approaches and skills as a contribution by the IFSP-E to efficiently backstop the CAHWs
- Encouragement of CAHWs to start self-help groups
- DVO staff took the driving seat and were enabled to efficiently backstop the CAHWs.

Achievements during this phase of the project were as follows:

- 64 CAHWs were identified, trained, equipped, presented to their communities and linked to relevant input suppliers and other relevant institutional stakeholders (vertical and horizontal linkages)
- CAHWs changed their attitude from dependency to more self-reliance, and saw themselves as community-based veterinary service providers instead of being part of the DVO staff (as was the case in the previous phase of the project)
- Improved linkages between communities and CAHWs, CAHWs and DVO staff, CAHWs and drug suppliers
- Initiation of CAHWs divisional self-help groups (four groups were already in place).

3.2.3 Phase III: 2001-2002

Annual reviews of the project up to 2000 enhanced community awareness and resulted in demands for CAH services in hitherto excluded areas. However, not all requests could be met and from 36 community requests, 14 new CAHWs were identified, trained, equipped and presented to their communities using the approach previously described. This formed the third phase of the project and was characterised by:

- Small expansion in extremely needy areas, the training of 14 new CAHWs
- Consolidation of the previous achievements
- The CAHWs' self-help groups, which were initiated in second phase, were consolidated and trained on organisational development amongst other topics.

An umbrella body grouping the self-help groups at the district level was formed and facilitated and is now in place and operational.

4. Methods

4.1 Data collection from CAHWs and AHAs

4.1.1 Questionnaire

A questionnaire was used to collect information from CAHWs and AHAs. From the 99 CAHWs working in Mwingi District, 40 were randomly selected from a list provided by the DVO (Annex 4). The selection of AHAs was based on their role as divisional heads, and therefore the questionnaire was administered to seven AHAs³. Thirty-four (85%) of the CAHWs sampled were men and six (15%) were women. In the actual population sample, women comprised 10 (10%) of the total trained 99 CAHWs. All the seven sampled AHAs were men.

The questionnaire was pre-tested on two CAHWs and two AHAs, and the content was adjusted accordingly. All questionnaires were administered by the research team members, and no other enumerators or translators were used.

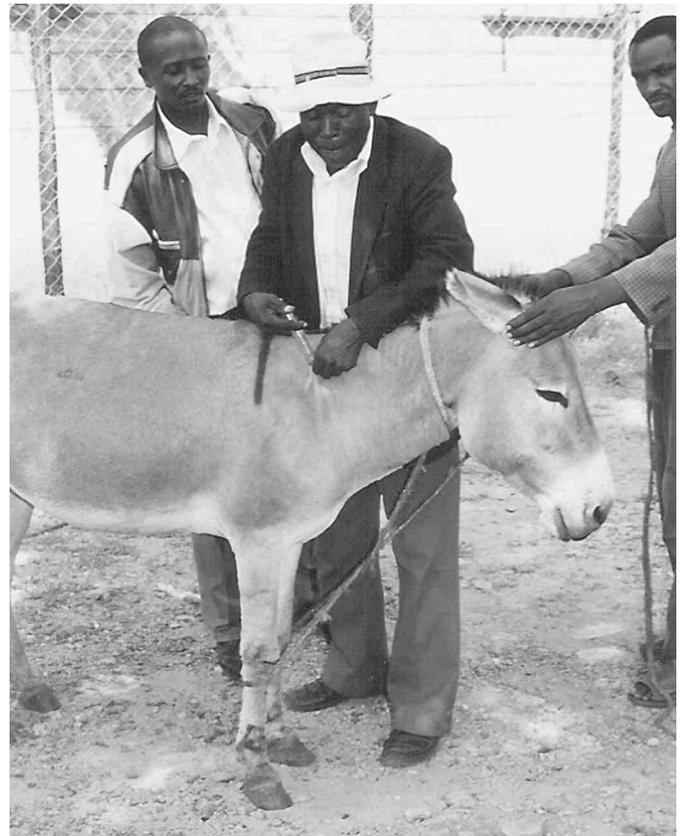
The questionnaire focused on issues related to the financial sustainability of CAHW services and drug supply, quality of services and working relationships with other animal health service providers. A full copy of the questionnaire is available⁴.

Financial sustainability and drug supply

The sustainability of CAHW services was assessed using indicators such as the longevity of their business, clinical and non-clinical workload, business turn-over and trends, service market volume and demand. Information was also collected on drug supply systems, service payment terms and modalities, other non-animal health service related income sources, investment options and disaster coping mechanisms.

Quality

CAHW service quality (which included knowledge, competence and ethical behaviour assessment) was assessed according to their knowledge of clinical signs of disease, identification and reporting on notifiable diseases, aspects of veterinary public health (namely zoonotic diseases), drug dosage and storage, residues in animal food products and disposal of drug containers. A list of diseases that CAHWs were trained to treat or prevent is provided in Annex 2.



Assessment of CAHW knowledge and skills was conducted using a marking scheme, as summarised in Table 4.1. The marking scheme took into consideration the CAHW training curriculum, their field experience and language capacity. Each CAHW was interviewed by a team of two people comprising an AHA and former trainer of CAHWs, and another study team member who did not take part in setting up the CAH scheme in the district nor training of the CAHWs. Assessment of clinical signs of disease was also used with seven AHAs.

The assessment involved questioning the CAHWs, but also visual inspection of their drugs and equipment. For some questions, CAHWs were asked to demonstrate how they conducted a particular task or used a piece of equipment. The component of the assessment called 'veterinary drug and equipment usage' comprised the following sub-components:

- Drug usage in relation to public health issues comprised of drug residue, withdrawal period and container disposal. This aspect was tested by asking about the appropriate advices which should be given to farmers in relation to edible animal products (food items) after dispensing certain drugs such as antibiotics. This was marked out of 12 marks.

³ There were nine AHA divisional heads in the district but only seven participated in the discussions. Of the other two, one was absent and the other was part of the investigation team.

⁴ Contact the CAPE Unit at AU/IBAR, Nairobi.

- Drug usage in relation to dosage issues comprised of drug label reading and interpretation, estimation of cattle weight, dosage of antibiotics and other drugs. This was marked out of 11 marks.
- Drug usage in relation to their storage involved the physical checking of the presence or absence of expired drugs, discoloured tetracycline and drugs exposed to sunlight. This was marked out of 12 marks.
- Presence of essential drugs, appropriate equipments and their common disinfectants in comparison to the initial kit. This was marked out of 12 marks.

Relationships with other service providers

Assessment of the relationships between different types of AHSP entailed identification of existing AHSPs within the CAHWs' areas of operation, their working relationships (competition/complementarity), the referral system (if any), the impact of these relationship on each other's business and suggestions for further improvement in collaboration.

In addition to these three sustainability issues, the questionnaire administered to CAHWs and AHAs also collected other information on the age, educational level, gender, time laps since last training and number of refresher courses attended up to the time of this study. The purpose of these auxiliary data was to determine whether any of these factors had any effect on the three major concerns stated above.

4.1.2 Workshop for AHAs

A participatory workshop for the seven AHAs was also held to discuss their views on the three above-mentioned sustainability issues affecting the CAHWs. A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was used to facilitate discussions.

4.2 Data collection from livestock keepers

Data was collected from livestock keepers using participatory methods and a questionnaire.

4.2.1 Participatory methods

Participatory methods were used with 250 livestock owners from five community groups, randomly selected through Chiefs' barazas in Ciambui (Mumoni Division), Mwangeni (Nuu Division), Kaivirya (Tseikuru Division), Ngomeni (Ngomeni Division) and Kyando (Kyuso Division). Of the 250 participants, 108 were female and 142 were male. Focussed group discussion was the main method used, but this was complemented by other participatory methods as described below.

Estimates of livestock disease prevalence

Two participatory techniques were used to collect information on animal disease prevalence viz. pair-wise ranking and proportional piling.

For pair-wise ranking, the livestock owners listed common diseases affecting their livestock and then compared these diseases in pairs. The level of agreement between the five groups was determined using the Kendal coefficient of concordance W (SPSS version 11.0).

Table 4.1
Summary of marking scheme used to assess CAHW and AHA knowledge

Topic	Total marks (pass mark)
Clinical diagnostic power on common cattle and goat diseases (CAHWs and AHAs)	40 (20)
Notifiable/reportable diseases (CAHWs only)	3 (1.5)
Zoonotic diseases (CAHWs only)	12 (6)
Veterinary drug and equipment usage (CAHWs only)	47 (23.5)
Ticks, tick-borne disease and their control (CAHWs only)	7 (3.5%)
Drug use record keeping (CAHWs only)	6 (3)
Total	115 (57.5)



For proportional piling, each of the five livestock owner groups were given 10 stones per listed disease or animal health problem. For example, if a group selected 12 diseases, they were given 120 stones to pile. Each group then chose a representative to pile the stones according to how they collectively considered the common animal diseases or health problem in their communities. The level of agreement between the five groups was determined using the Kendal coefficient of concordance W (SPSS version 11.0).

Ranks generated by the pair-wise ranking and proportional piling methods were compared using the Mann Whitney test.

Assessment of animal health service providers

Accessibility

Venn diagrams were used to assess the relative accessibility of different AHSPs. The livestock owners in the focus groups listed all the AHSPs they encountered when seeking animal health services and then used a Venn diagram to map out the physical

presence of various service providers in relation to their households. The nearest AHSPs were placed closer to livestock owners' households while the less accessible was placed further away.

Affordability, response times and client satisfaction

In order to assess the affordability, time response and client satisfaction of various AHSPs, a service provider's matrix was used to rank various AHSPs in relation to these criteria. Each of the five groups was asked to award marks ranging from 0 to 3 (don't know = 0; poor = 1; good = 2 and very good = 3).

4.2.2 Questionnaire

Of the 250 livestock keepers who participated in the participatory discussions described above, 85 were selected by their respective communities (based on village representation in the location) to be respondents for a questionnaire. Nineteen (23%) of the livestock keepers were female and 66 (77%) were male. In common with the CAHW/AHA questionnaire, this questionnaire was pretested on two livestock keepers and administered only by the research team.

The questionnaire covered similar sustainability, quality and relationships issues as covered by the CAHW/AHA questionnaire, and a full copy is available⁵. The livestock keeper questionnaire also included questions related to sustainability by assessing livestock density and morbidity, and willingness to pay for clinical and non-clinical services. Livestock keepers' assessment of quality entailed post-treatment outcomes and follow-up in relation to cadres attending cases, plus ranking of their social acceptability, problem solving ability, response time, and physical and economic accessibility.

4.3 Secondary data

In addition to the participatory group sessions and questionnaire, secondary information related to the above areas of assessment was collected through CAHWs financial business analysis (based on monthly business activity). Their monthly reports were used to assess the business success/failure rates, existing clinical workload and potential services demands. The investigators also used some other secondary data from the CAHWs daily case and drug use records, and the DVO reports.

⁵ Contact the CAPE Unit, AU/IBAR, Nairobi.

5. Study findings

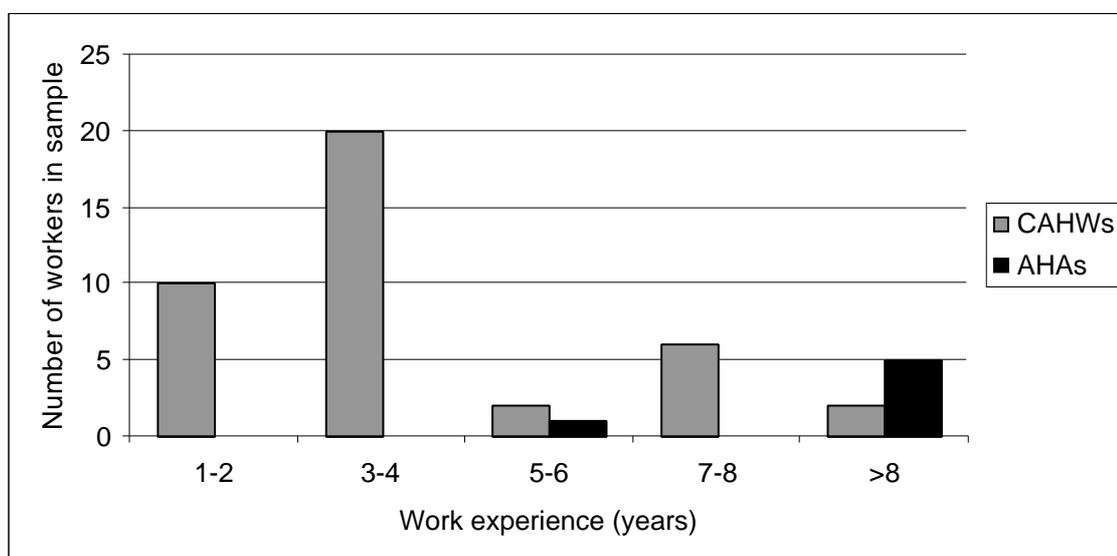
5.1 Age, education and animal health training of CAHWs and AHAs

The mean age of the CAHWs (n=40) was 35.9 years (95 % CI 33.05, 38.85). The mean age of AHAs (n=7) was 41.1 years (CI 38.45, 43.84). As government employees, AHAs were supposed to retire when they reached 55 years of age. Among the CAHWs, 12 had received education to Form IV level, 16 had reached between class 8 and Form III, and 4 were educated to below class 8 level.

The CAHWs in the sample were trained in six groups in years before 1992 (n=1), 1996 (n=5), 1998 (n=6), 1999 (n=14), 2000 (n=3) and 2001(n=11). The duration for the initial training of each group of CAHWs was 14 days and thereafter, three to eight training sessions of three days duration were conducted for each group. Only three out of the 40 CAHWs had not attended any refresher courses and all three were members of the last group to be trained in 2001.

All 7 AHAs were trained at an AHITI for two years, and their work experience varied from 15 to 20 years. No refresher training had been provided to the AHAs apart from participatory extension approaches and project cycle management by the IFSP-E.

Figure 5.1
Work experience of the CAHWs and AHAs



5.2 Financial sustainability and drug supply in the CAH system

As noted in section 3 the CAH system was based on CAHWs receiving medicines from AHAs, with both types of worker acting as private operators. Other than the provision of an initial kit of veterinary medicines immediately after their training, the CAHWs received no external material support i.e. no NGO, government or donor support. Technical support was provided.

5.2.1 Duration of CAHW and AHA work experience

Figure 5.1 shows the number of years that CAHWs and AHAs had been working prior to the study. Thirty (75%) of the CAHWs have been in the business for four years or more without any external material support (e.g. veterinary drugs and equipment). The two CAHWs with more than 8 years work experience had been operating as quacks⁶ before they were selected by their communities for training as CAHWs. These CAHWs had been regarded as elite livestock owners or had worked worked as labourers on former European-owned farms.

5.2.2 Factors influencing service demand

The demand for animal health service is partly dependent on factors such as animal population, types of animals reared, the incidence of different animal health problems and the willingness of livestock keepers to use the service.

⁶ The term 'quack' is used in Kenya to describe petty traders of veterinary and human medicines who are unlicensed, untrained and un-supervised but may claim to have technical knowledge of the products they sell.

Table 5.1
Animal ownership in Mwingi District (n=85 households)

	Cattle	Goats	Sheep	Donkeys	Dogs	Cats	Poultry
Number of households owning livestock (%)	72 (85%)	82 (96%)	32 (38%)	71 (84%)	43 (51%)	51 (60%)	79 (93%)
Mean number of animals in households with animals (95% CI)	7.6 (5.9, 9.3)	19.5 (13.8, 25.2)	6.2 (2.4, 10.0)	2.0 (1.8, 2.4)	1.7 (1.4, 1.9)	1.6 (1.4, 1.9)	21.5 (17.9, 25.1)

Table 5.2
Relative estimates of cattle disease incidence using proportional piling and pair-wise ranking

Diseases	Method		
	Proportional piling: Total score	Overall rank	Pair-wise comparison
Worms	95	1st	1st
Anaplasmosis	62	2nd	2nd
Trypanosomiasis	38	=3rd	4th
East Coast fever	38	=3rd	3rd
Foot and mouth disease	30	5th	5th
CBPP	13	6th	6th
Lumpy skin disease	5	7th	=7th
Blackquarter	7	8th	=7th
Pneumonia	2	9th	9th
Agreement between informant groups ¹ (n=5)		W=0.58 p=0.003	W=0.65 p=0.001

Notes: ¹ Assessed by the Kendal coefficient of concordance W

There was no significant difference between the results of the proportional piling and pair-wise ranking method using the Mann-Witney test.

Table 5.3
Relative estimates of goat disease incidence using proportional piling and pair-wise ranking

Diseases	Method		
	Proportional piling: Total score	Overall rank	Pair-wise comparison
Worms	88	1st	1st
Anaplasmosis	51	2nd	2nd
CCPP	49	3rd	3rd
Orf	11	=4th	4th
Footrot	11	=4th	5th
Goat pox	6	6th	=6th
Mange	5	7th	=6th
Agreement between informant groups ¹ (n=5)		W=0.78 p=0.001	W=0.79 p=0.001

Notes : ¹ Assessed by the Kendal coefficient of concordance W

There was no significant difference between the results of the proportional piling and pair-wise ranking method using the Mann-Witney test.

Table 5.4
Relative estimates of sheep disease incidence using proportional piling and pair-wise ranking

Diseases	Method		
	Proportional piling:		Pair-wise comparison
	Total score	Overall rank	
Worms	71	1st	1st
Anaplasmosis	54	2nd	2nd
Pneumonia	14	3rd	3rd
Diarrhoea	12	4th	4th
Agreement between informant groups ¹ (n=5)	W=0.81 p=0.007	W=0.80 p<0.001	

Notes : ¹ Assessed by the Kendal coefficient of concordance W
There was no significant difference between the results of the proportional piling and pair-wise ranking method using the Mann-Witney test.

Table 5.5
Relative estimates of donkey disease incidence using proportional piling and pair-wise ranking

Diseases	Method		
	Proportional piling:		Pair-wise comparison
	Total score	Overall rank	
Worms	58	1st	1st
Wounds	18	2nd	2nd
Trypanosomiasis	18	2nd	2nd
Skin diseases	11	4th	4th
Pneumonia	10	5th	5th
Rectal prolapse ¹	0	=7th	=6th
Overgrown hooves	0	=7th	=6th
Rabies	5	6th	=6th
Agreement between informant groups ² (n=5)	W=0.44 p=0.03	W=0.55 p=0.007	

Notes : ¹ Associated with emaciation in donkeys ² Assessed by the Kendal coefficient of concordance W
There was no significant difference between the results of the proportional piling and pair-wise ranking method using the Mann-Witney test.

Table 5.6
Relative estimates of dog disease incidence using proportional piling and pair-wise ranking

Diseases	Method		
	Proportional piling:		Pair-wise comparison
	Total score	Overall rank	
Rabies	62	1st	1st
Worms	35	2nd	2nd
Skin diseases	8	=5th	=3rd
Flea infestation	8	=5th	=5th
Distemper	11	3rd	=5th
Wounds	6	7th	8th
Snake bites	0	8th	7th
Venereal disease	10	4th	=3rd
Agreement between informant groups ¹ (n=5)	W=0.63 p=0.014	W=0.59 p=0.021	

Notes : ¹ Assessed by the Kendal coefficient of concordance W
There was no significant difference between the results of the proportional piling and pair-wise ranking method using the Mann-Witney test.

Table 5.7
Relative estimates of poultry disease incidence using proportional piling and pair-wise ranking

Diseases	Method		
	Proportional piling: Total score	Overall rank	Pair-wise comparison
Newcastle disease	75	1st	1st
Tick infestation	45	=2nd	2nd
Fowl typhoid	45	=2nd	3rd
Chronic respiratory disease	27	4th	4th
Fowl pox	9	5th	5th
Fleas	4	7th	=6th
Eye infection	5	6th	=6th
Agreement between informant groups ¹ (n=5)	W=0.58 p=0.008	W=0.58 p=0.008	

Notes : ¹ Assessed by the Kendal coefficient of concordance W

There was no significant difference between the results of the proportional piling and pair-wise ranking method using the Mann-Witney test.

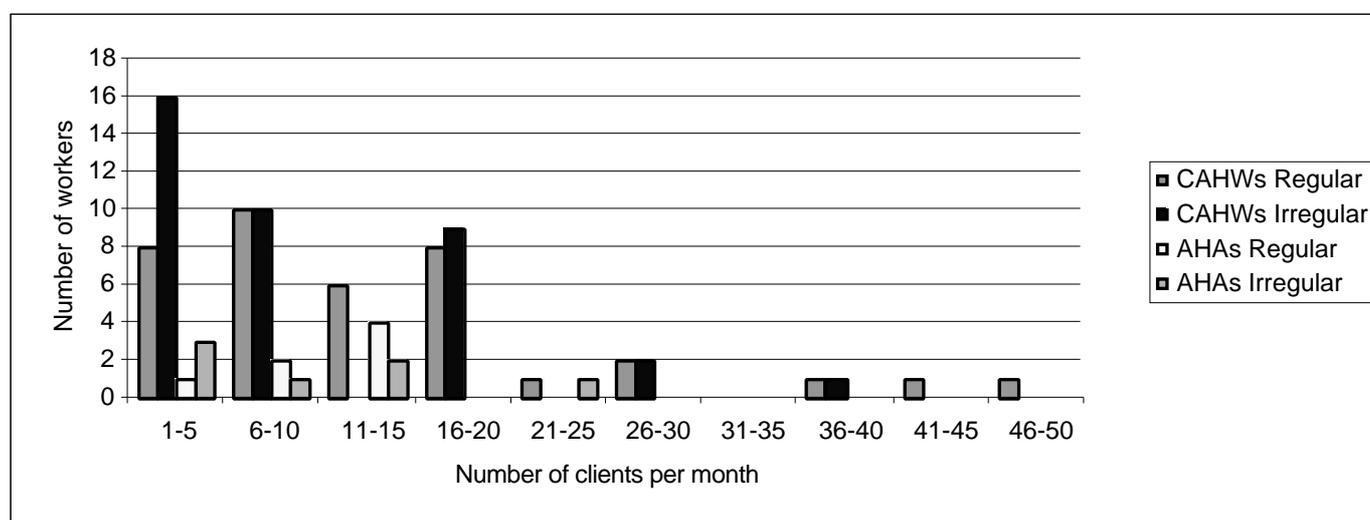
Table 5.8
Livestock keepers' (n=85) willingness to pay for different types of service

Type of service	Willing to pay/not pay (%)	Reasons for willingness to pay (Number of respondents)	Reasons why unwilling to pay (Number of respondents)
Advice or extension	7.3/92.7	Service provider has special skills (3)	No cost incurred by service provider (34); they are expensive (1)
Castration	54.9/45.1	Recognition that the service provider incurs costs (i.e. equipment) (3); labour is involved (18); service provider has specialist skills (4); motivation purposes (1)	No cost incurred by service provider (5); easy, anybody can do it - so why pay? (2)
Hoof trimming	45.8/54.2	Recognition that the service provider incurs costs (i.e. equipment) (1); labour is involved (6); time factor (1)	No cost incurred by service provider (1); Easy, anybody can do it (10); not a serious 'sickness' (1)
Dehorning	28.6/71.4	Physical labour used (4)	Easy, anybody can do it (10)
Vaccination	64.3/35.7	Recognition that the service provider incurs costs (i.e. vaccines) (23); labour involved (1); use of specialist skills (2); time factor (1)	Government should pay (5); these services are funded by donors (2)
Clinical treatment	92.6/7.4	Recognition that the service provider incurs costs (i.e. drugs) (45); time factor (1); use of specialist skills (1)	Government should pay (2); farmers can buy their own drugs (2)
Branding	0/100	-	No cost incurred by service provider(1); they are expensive (2); government should pay (1)
Transport	0/100	-	An added cost that make services expensive (1)
Drenching	83.3/16.7	Due to the cost incurred by the service provider (i.e. drugs) (5)	Easy and anybody can do it (1)

Table 5.9
CAHW and AHA caseloads in Mwingi District

Species	Mean number of cases handled per CAHW (n=40) per month	Mean number of cases handled per AHA (n=7) per month
Cattle	35.8	47.6
Goats	83.7	89.6
Sheep	9.4	9.0
Donkeys	16.6	16.6
Dogs	4.4	-
Cats	0.8	-
Poultry	30.7	-

Table 5.2
Numbers of clients per month as estimated by CAHWs (n=42) and AHAs (n=7)



a. Animal ownership and observed diseases

Table 5.1 summarises data on animal ownership among the livestock keepers (n=85) who participated in the questionnaire survey and Tables 5.2 to 5.7 show the relative incidence of animal diseases as perceived by livestock keepers (n=5 groups).

b. Willingness to pay for services

The livestock keepers who participated in the questionnaire survey listed the types of animal health service they were willing to pay for and explained the reasons behind their decisions (Table 5.8).

The majority of farmers were willing to pay for any intervention that involved the use of veterinary medicines, whereas they tended not to want to pay for skilled interventions (e.g. dehorning) or transport. A list of drug prices is provided in Annex 5. Further

questioning was used to crosscheck these responses. For example, between November and December 2002 (i.e. the period immediately before the study), 71/85 (83.5%) of the livestock keepers requested an intervention from local AHSPs.

This information was further verified by data collected on CAHWs' workload and types of service provided, as detailed in Table 5.9. and Annex 6. The clinical work entailed the diagnosis and treatment of animal diseases and confirms the findings of Table 5.8.

In addition to discussion with livestock owners on their willingness or unwillingness to pay for the services, CAHWs and AHAs were requested to estimate their client base. Figure 5.2 illustrates both the CAHWs and AHAs' regular and irregular monthly client base.

Figure 5.3
How much time do CAHWs (n=39) spend on veterinary activities?

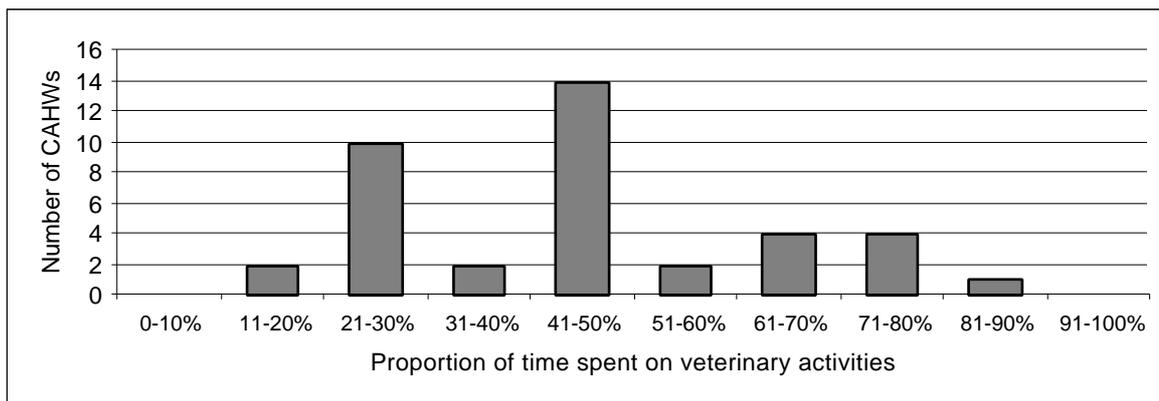


Figure 5.4
CAHW income derived from veterinary activities

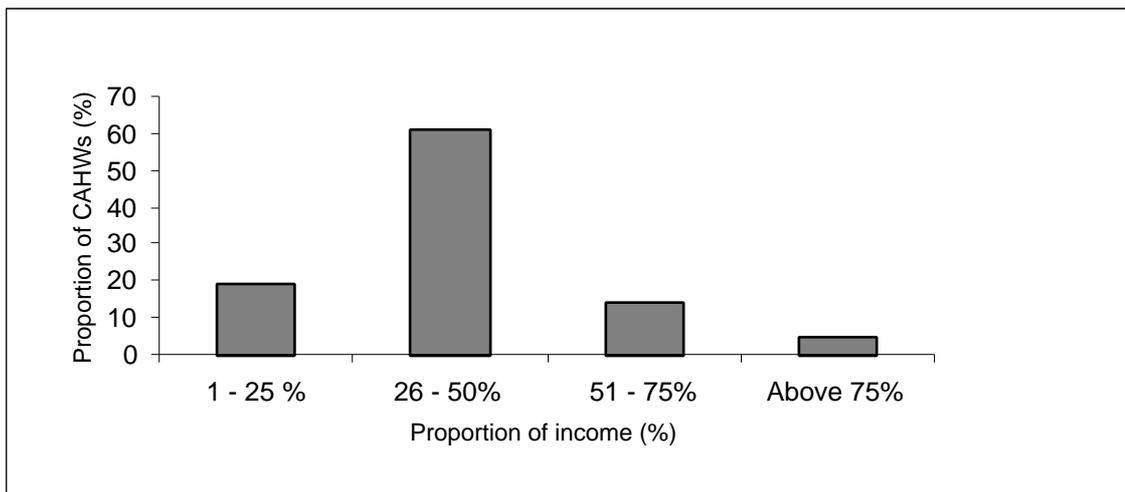


Figure 5.5
Gross monthly income for CAHW 1, 2000 to 2002

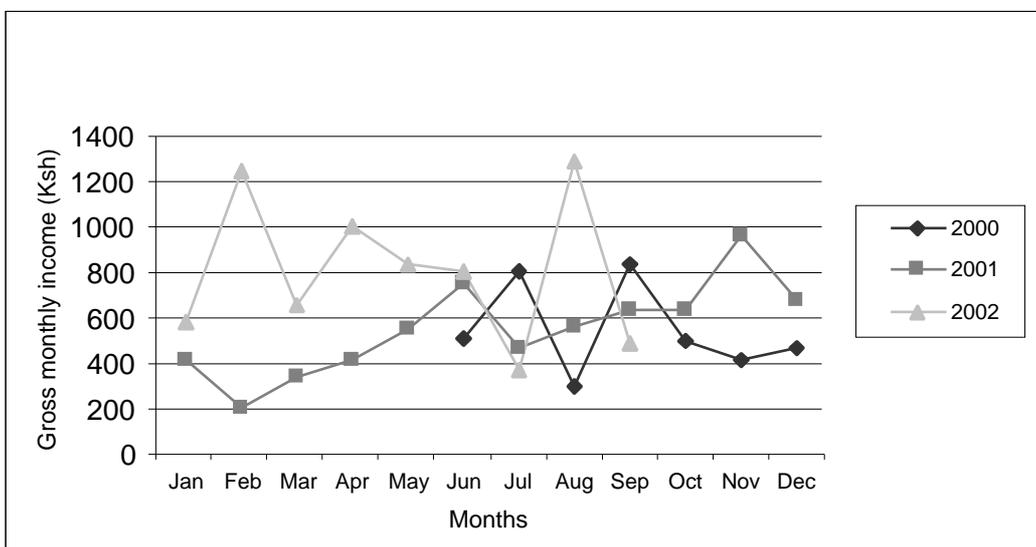


Figure 5.6
Gross monthly income for CAHW 2, 2000 to 2002

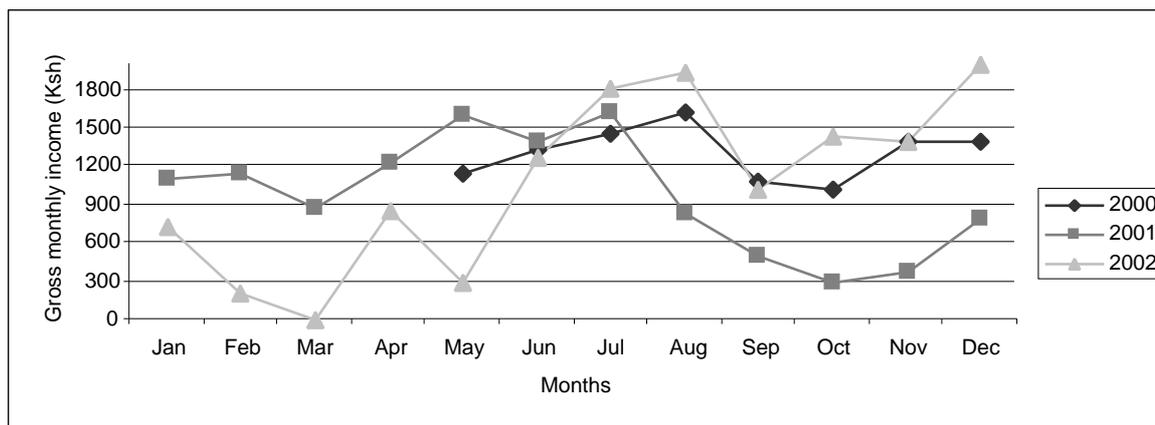


Figure 5.7
Gross monthly income for CAHW 3, 2000 to 2002

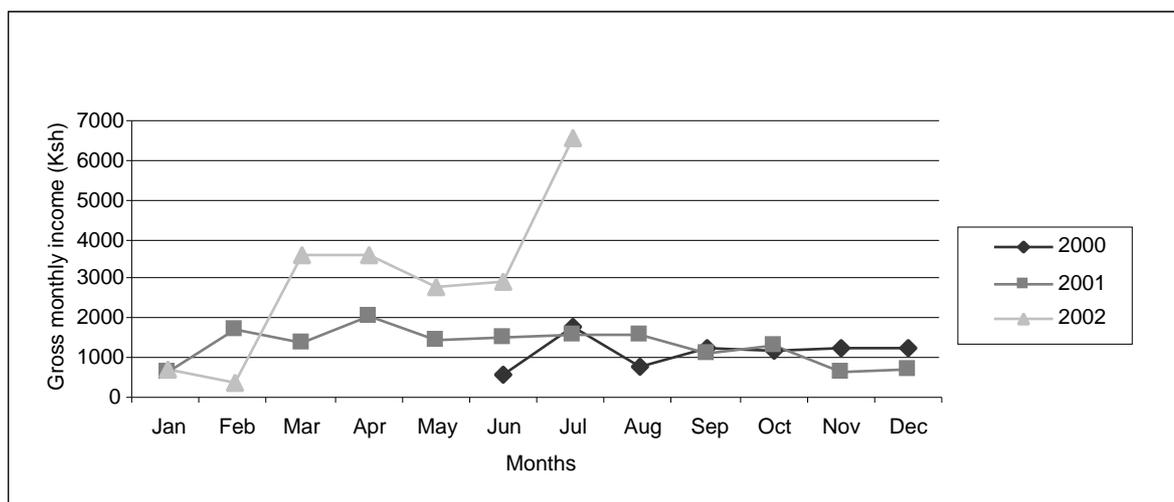


Figure 5.8
Trends in gross monthly income for three CAHWs in Mwingi District, 2000 to 2002

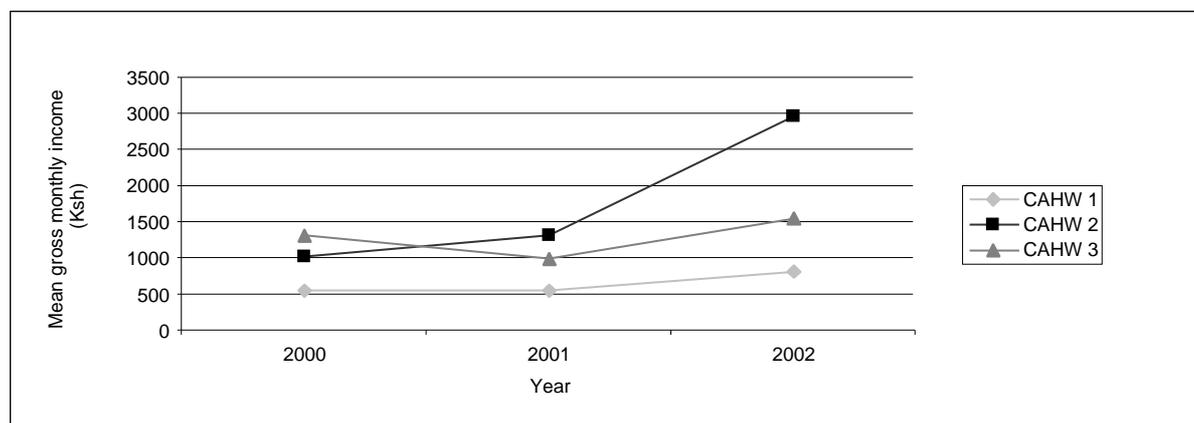


Figure 5.9
Recurrent expenditure incurred by CAHWs

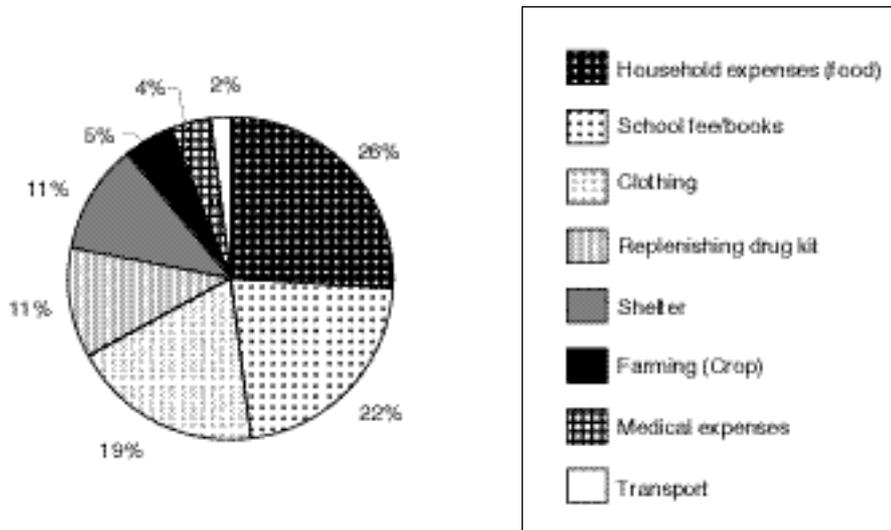
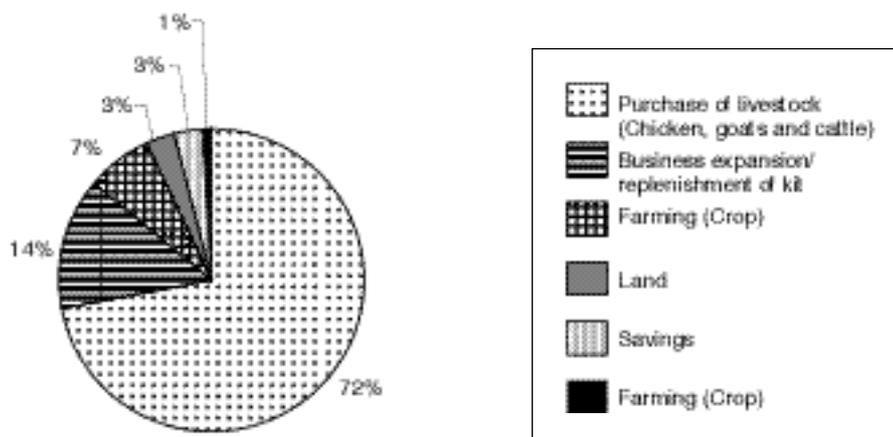


Figure 5.10
How do CAHWs invest their income?



5.2.3 CAHW business viability and trends

a. Time spent on veterinary activities

It was assumed that CAHWs would not spend time doing veterinary work unless they received financial incentives. Figure 5.3 illustrates the time spent by CAHWs (n=39) on animal health care activities relative to other household activities. Twenty-five CAHWs (64.5% of respondents) spent over 40% of their time on veterinary work.

b. Income from veterinary activities

Income derived from veterinary activities by CAHWs as a proportion of total household income is

illustrated in Figure 5.4. Veterinary work constituted a major source of income, with 80% of CAHWs deriving 26% or more of their total income from this source. For 20% of CAHWs, more than 50% of their income came from veterinary work.

The mean gross monthly income was KSh 1996.10 (95% CI 1557.60, 2374.60). Income for three CAHWs was examined over a three-year period and is illustrated in Figures 5.5 to 5.7.

It was observed that business income had been increasing since 2001 for the three sampled CAHWs (Figure 5.8). This was attributed to increasing clientele and awareness. Despite the severe drought of 2001 business still showed an upward trend.

c. Uses of income

On average, CAHWs used 55% of their monthly income on recurrent expenditures such as food items, clothing, family medical care, school fees, books, uniforms and constructions (Figure 5.9). The remaining 45% was used for investments such as the purchase of livestock, veterinary drug kit replenishment, various business expansion activities such as food kiosk and retail shops, farm related activities (crop farming and bee-keeping), purchase of land and cash savings (Figure 5.10).

Being a drought prone area, the investment options (mainly livestock and crop farming) for CAHWs in Mwingi District were heavily influenced by the ability to cope with the frequent droughts. In case of disaster (mainly drought), 72% of the respondents sold their investment, which were mainly livestock, food reserves (grains) and land, 16% got loans from friends, and via social networking (merry-go-rounds); 8% used their savings and the remaining 4% had temporary employment and reduced their recurrent household expenditures in order to sustain the animal health service delivery.

d. Specific expenditure incurred by CAHWs related to veterinary activities

While delivering the animal health services, the CAHWs incurred recurrent expenses on items like transport costs, purchase of syringes and needles, veterinary drugs costs and miscellaneous expenses. Table 5.10 summarises these expenses. The drugs constituted the largest expenditure while delivering animal health services. Since the CAHWs were covering long distances on foot or bicycle, the transport expenditure was limited to repairing the bicycle or bus fares when they procured drugs or delivered services to clients.

Table 5.10
Mean monthly CAHW expenditure patterns in relation to veterinary activities

Item	Mean monthly expenditure (Ksh) and range
Bicycle/Transport	750 (0-1500)
Syringes	50 (0-140)
Drugs	1200 (0-3190)
Miscellaneous	350 (0-700)

e. CAHW preferences for drug suppliers

In relation to the drug supply system, the study showed that CAHWs sourced essential drugs on their

own within an average distance of 15km. The drugs were sourced from two major suppliers namely agroveterinary ('Agrovet') shops at the divisional and district headquarters. The majority of these divisional Agrovet shops belonged to AHAs who were DVO staff at the divisional level, but also ran these private businesses. Qualified pharmacists, veterinary surgeons or AHAs owned the Agrovet shops at district level. It was observed that the prices offered by each player determined supplier's competitiveness. In general, price variations between small Agrovet shops at the divisional level and the district town pharmacies were minor.

Most CAHWs purchased their drugs at divisional level and had been sourcing drugs independently from these suppliers for more than four years. However, the choice of a particular supplier at either level was determined by several factors as illustrated in Table 5.11 below.

Table 5.11
Reasons why CAHWs (n=40) choose their veterinary drug suppliers

Reason	Frequency (%)
Accessible	18 (43.9)
Low cost	12 (29.3)
Is my supervisor	4 (9.8)
Knows about and stocks the best drugs	3 (7.3)
Is a friend	2 (4.9)
Offers credit	1 (2.4)
Reliable	1 (2.4)

Eighty-eight percent of the CAHWs purchased their drugs in cash. It appeared that a limited group of drugs were popularly used by CAHWs and this indicated the nature of problems commonly attended by them. Following discussions with the CAHWs and physical inspection of their veterinary drug kit and drug usage records kept over a three year period, the 'fast-moving' drugs in a descending order were as follows: Vetworm/Wormicid (levamisole), Oxykel (oxytetracycline), Penstreptomycin, Veriben (berenil), Novidium (homidium) and Alamycin (oxytetracycline). More detailed information on drugs procured by CAHWs in provided in Annex 7.

5.2.4 Business expansion and growth

Analysis of business records and discussions with CAHWs revealed that their services had experienced a series of positive and negative changes.

Table 5.12
Major factors contributing to success or failure

Type of worker	Success factors (Percentage of workers citing factor)	Failure factors (Percentage of workers citing factor)
CAHW	Clients' service satisfaction, farmer's confidence, and CAHWs' knowledge/ giving right drug and doses (19%) Good relationship with clients (12%) Accessibility of the CAHW (8.4%) Refresher training attained (6.9%) Fair means of transport (Bicycle) (6.1%) Farmers' willingness to pay due to awareness (6.1%) Increase in clients/demand (6.1%) Personal commitment (5.3%) Loyalty/honesty/Trustworthiness (3.8%) Marketing of services using public barazas (3.8%)	Debts (25%) Poor means of transport (Bicycle), preferred motorcycle (9.8%) Drought leading to low demand and poor payment (6.1%) Increase in cost of drugs (6.1%) Unfair competition from "quacks/bush doctors" (4.9%) Inadequate diagnostic knowledge leading to poor treatment (4.9%) Lack of capital (Drugs) (4.9%) Sparse population (3.7%) Farmers are not able to afford services (3.7%) Involvement in other activities (2.4%)
AHA	Prompt response to cases (14.2%) Reasonable charges (14.2%) Reliable transport from the government (14.2%) Salary that enables them to procure drugs (14.2%) Confidence/knowledge/skills (14.2%)	Lack of adequate diagnostic tools leading to poor treatment (14.2%) Farmers were not willing to pay because they thought services were free from the government Long distance to get drugs (for those without adequate transport means) (14.2%) Farmers are not able to afford services (14.2%)

Table 5.13
Reasons for debts and non-payment of services as perceived by CAHWs (n=40)

Reason	Frequency of responses
No ready cash until farmers sell the produce/market day	15
Farmer have money but don't want to pay	7
Low economic income of farmers/cash flow	4
Farmers who think CAHWs are employed/volunteer to offer free services	4
Farmers want to pay after seeing the outcome	2
Gender discrimination against female CAHWs	1
Migrated/not around	1

a. Positive changes

Thirty eight of the CAHWs (95%) noticed a positive business trend. Indicators of this trend included rising incomes, more drugs in their kits and more CAHWs viewing their work as a form of self-employment. Thirty four of the CAHWs (85%) suggested that this trend was due to an increasing demand associated with increased livestock owners' awareness and satisfaction. The remaining 6 CAHWs (15%) attributed the change to a stable demand but good crop harvests that had boosted livestock owners' liquidity.

b. Negative changes

Two CAHWs (5%) noticed a negative business trend. The major reason contributing to the failure was drought that reduced the number of clients and their ability to pay for services. Other reasons for failures were loss of veterinary drug kit, late issuance of the kit and increase in the cost of drugs.

When asked to detail the factors that might have contributed to the business success or failure, both

CAHWs and AHAs enumerated major factors as shown in Table 5.12.

c. Suggestions for improvement

Both CAHWs and AHAs were asked to suggest ways to improve veterinary services in a sustainable manner in the district. Their responses were summarised as follows:

CAHWs

- Advanced/further training (AHA level)
- Loan for purchase of veterinary drugs, basic equipment i.e. spray pumps and means of transport (bicycle, motorcycles)
- Training in vaccination

AHAs

- Advanced/further training (Diploma level)
- Better salary
- Storage of vaccine at divisional level

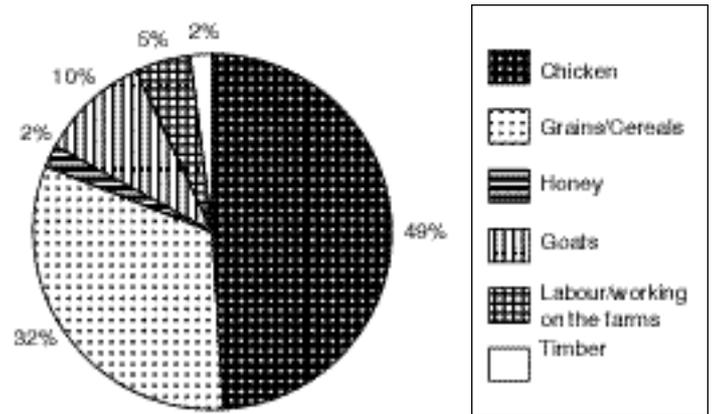
Regarding the CAHW proposal for training in vaccination and the AHA wish for vaccine storage at divisional level, 64.3% of livestock owners interviewed were willing to pay for vaccination services (Table 5.8).

d. Non payment for services and debts

Table 5.12 above shows that debts were considered to be a major factor in business failure. When asked to give reasons why they incurred debts, 90% of CAHWs and AHAs associated non-payment with socio-economic conditions of their communities viz. poverty and subsistence production systems. Table 5.13 provides more details on causes of debt.

Considering the importance of debt as a cause of business failure, CAHWs were requested to indicate how they recovered debts from their clients and whether or not they accepted payment in kind. About 70% of CAHWs waited until their clients paid the debt or the CAHWs continued reminding their clients until they paid. About 25% of the CAHs sought alternative ways of debt recovery such as seeking assistance from provincial administration (Chiefs). About 4% of CAHWs accepted payment in kind, including provision of manual labour (Figure 5.11). The respondents explained that the number (value) of items paid in-kind was based on the market value of any one item at the time.

Figure 5.11 In-kind payments for CAHW services



5.3 Quality of CAHW services

5.3.1 Assessment of the technical competence of CAHWs and AHAs

A marking scheme for testing CAHW knowledge was based on a total score of 115 marks and a pass mark of 57.5 marks (Table 4.1). The test results are summarised in Table 5.14 and show that 36 (90%) of CAHWs passed the test despite a very short period of training (14 days initially followed by three-day refresher courses).

a. Knowledge on clinical signs of disease

This part of the test carried 40 marks and the results are presented in Table 5.15. This test was also given to the seven AHAs and all seven passed the test (mean score 28.4 marks).

It was notable that some CAHWs were able to describe diseases that were not covered in their training e.g. canine distemper (kwekethya) in dogs, and colic-like disease syndrome and rectal prolapse in donkeys.

b. Knowledge about reportable diseases

CAHWs knowledge and practices related to notifiable diseases were evaluated by asking them to name at least two notifiable/reportable cattle diseases. It was marked out of 3 marks. The pass mark was 1.5 marks. Thirty-six (90%) of the CAHWs passed the test and were able to convey relevant information to the veterinary authorities in their areas of operation.

c. Knowledge and practices about zoonotic diseases

During this part of the test CAHWs were asked to name three zoonotic diseases, state how they were contracted and to give methods of prevention.

Table 5.14
Overall CAHWs score distribution on quality of services

Topic (Total marks/pass mark)	Mean score	Proportion of CAHWs passing the test (%)
Clinical signs of disease (40/20)	22.0	67.5
Notifiable/reportable diseases (3/1.5)	2.4	90.0
Zoonotic diseases (12/6)	4.0	52.5
Veterinary drug and equipment usage (47/23.5)	30.5	93.0
Ticks and tick-borne disease control (7/3.5)	4.9	88.0
Drug use record keeping (6/3)	3.2	72.5
Total (115/57.5)	70.8	90.0

Table 5.15
Assessment of CAHW knowledge on clinical signs of disease

Score	Proportion of workers achieving score (%)	
	CAHWs (n=40)	AHAs (n=7)
10-14	7.5	0
15-19	25.0	0
20-24	27.5	14.3
25-29	27.5	42.9
30-34	12.5	42.9
35-40	0	0
Total	100.00	100.0

Notes

The pass mark for this component of the assessment was 20 marks. 67.5% of CAHWs and 100% of AHAs passed the test.

It was shown 21 CAHWs (52.5%) passed this section of the test. Thus a large proportion of the CAHWs were weak in this area.

d. Knowledge and practice on veterinary drug usage, residues, withdrawal periods and veterinary equipment

This part of the test covered knowledge and actual use of veterinary drugs, including estimation of dosages and safe use of veterinary drugs and equipment. Results are summarised in Table 5.16 and show that 37 CAHWs (93.5%) passed the test.

Table 5.16
Test score distribution for CAHWs' knowledge and use of veterinary drugs and equipment usage

Score	Number of CAHWs achieving score (%)
18-23	3 (7.5)
24-29	13 (32.5)
30-35	19 (47.5)
36-41	4 (10)
42-47	1 (2.5)
Total	40 (100)

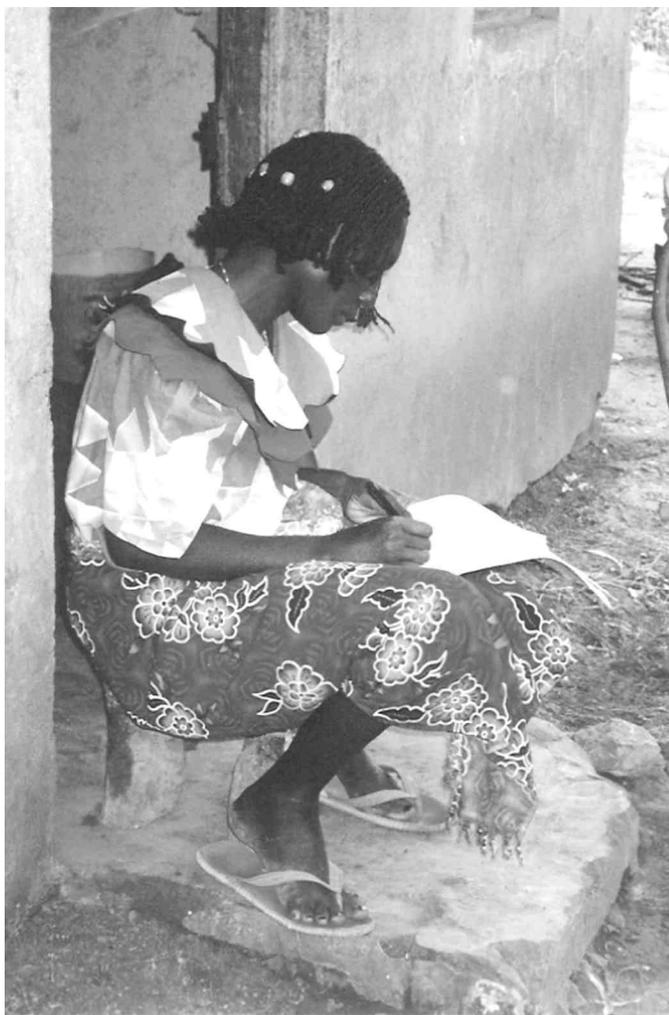
Notes

The pass mark for this component of the assessment was 23.5 marks. 93.5% of CAHWs passed the test.

The study revealed that CAHWs were knowledgeable, skilled and ethical in administering and storing essential drugs and equipment. However, 30% of the respondents mentioned the need for refresher training in topics such as drug residues and withdrawal periods. According to both the DVO and CAHWs, these aspects of public health were not well covered during the initial and subsequent training.

e. Knowledge on ticks and tick control

The section of the test dealing with ticks and tick control included correct dilution of acaricide. Thirty-five CAHWs (87.5%) passed the test and overall, their knowledge and practice was considered to be adequate.



f. Record keeping

This section comprised checking the availability of records on drugs usage and the reliability of the records. Twenty-nine CAHWs (72.5%) passed the test. Although the majority of CAHWs passed, a few CAHWs need to be reminded on this vital aspect of service provision.

g. Future training to improving service quality

In relation to the length of the initial training of the CAHWs (14 days), the relevance of the topics covered and the provision of any refresher courses (if any), the CAHWs were asked to provide information on these aspects and how they were relevant to their field experiences. They were also requested to suggest ways in which each of these factors could be improved in future trainings.

All CAHWs said that both the initial and refresher trainings were relevant to their field experiences. However, certain aspects needed to be added or thoroughly re-visited, as knowledge gained in these areas appeared to have been inadequately covered by the trainers based on CAHWs field experiences. A section of the trainers (AHAs) also expressed some knowledge gaps in some areas.

Animal diseases

The majority of CAHWs and AHAs suggested that the training in donkey and poultry diseases needed to be expanded to cover details about locally endemic diseases and newly reported diseases. Dog, sheep and goat diseases followed this closely. It was also felt that more information and knowledge on notifiable diseases was needed.

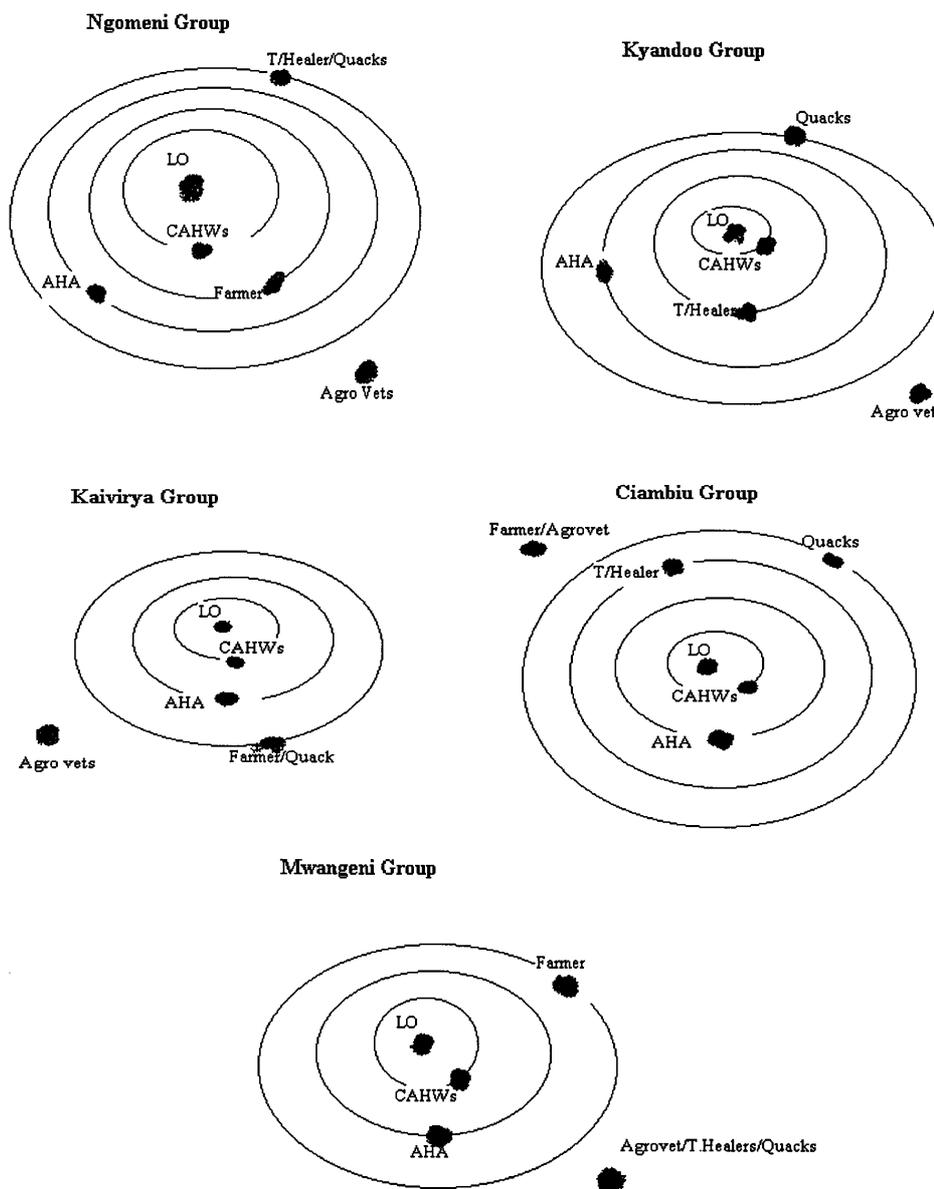
Clinical course

On clinical subjects the majority of CAHWs suggested that their training should touch on basic obstetrics and minor surgery. Although some information was provided on drug use (basic pharmacology) during their initial training, the respondents felt that the coverage was inadequate and CAHWs would like more exposure in the topic. There was also need for more training on vaccines, vaccine storage and vaccination techniques in all animals. A few CAHWs suggested also that the training should cover post mortem, plant poisoning, and disease diagnosis techniques. It would be prudent to train CAHWs on some basic sampling techniques, handling and submission to the supervisory/referral level where a basic confirmatory diagnostic facility (laboratory) was available.

Animal husbandry

The majority of CAHWs suggested that training should cover topics on castration of dogs and donkeys. Some CAHWs also suggested inclusion of some topics on animal husbandry such as animal breeding, including artificial insemination (AI). Basic information about advantages and disadvantages of AI could be taught to the CAHWs in order to strengthen their positions as field extension agents.

Figure 5.12
Accessibility of animal health service providers to livestock owners in Mwingi District



Institutional and business development

Most workers expressed knowledge gaps on institutional development, business management and report writing. These topics were not touched in either initial or refresher courses. Our fieldwork confirmed the need for the inclusion of these topics in the CAHW/ AHA training.

5.3.2 Perceptions of livestock keepers

In addition to the above assessment of CAHWs' competence, skills and ethical attitude in delivering veterinary services, other AHSPs operating in the district were also assessed by livestock owners in comparison to CAHWs. The customers' satisfaction was assessed using the following criteria:

- Accessibility of service (physical distance and service cost)
- Response time
- Service outcome
- Other social responsibilities, if any

The results produced by Venn diagramming of service providers are shown in Figure 5.12 and indicate close proximity of CAHWs to livestock owners relative to other service providers.

Table 5.17
Livestock owners' assessment of different animal health service providers

Indicator	Median score (range)					
	AHA	CAHW	Farmer	Traditional Healer	Agrovvet	Quack
Affordability	2.2 (1-3)	2.6 (2-3)	0.6 (0-1)	0.8 (0-2)	0.4 (0-1)	0.2 (0-1)
Response time	2.0 (1-3)	2.6 (2-3)	0.6 (0-1)	0.8 (0-3)	0.6 (0-1)	0.2 (0-1)
Clients service satisfaction	2.4 (2-3)	2.4 (2-3)	0.8 (0-2)	1.0 (0-1)	0.6 (0-1)	0.2 (0-1)

Notes : N=5 informant groups; there was significant agreement between the informant groups (Kendal coefficient of concordance W =0.69. Each informant group scored each animal health service provider using scores of 0 to 3 (0=do not know, 1= very poor, 2=good and 3=very good).

Table 5.18
Livestock owners' satisfaction of different animal health service providers

Indicator	Percentage of informants (n=85) satisfied with:					
	AHA	CAHW	Farmer	Traditional Healer	Agrovvet	Quack
Affordability	69.1	82.3	63.6	55.6	50.0	0
Response time	61.8	85.5	50.0	66.7	25.0	100
Service outcome	87.3	90.3	54.6	0	50.0	0

Table 5.19
Required qualities of CAHWs as perceived by livestock keepers (n=85)

Characteristic	Frequency of responses (%)
Socially accessible/responsible (honest/faithful/transparent)	37.7
Available/reliable/resident (reliable/family man)	11.9
Active/likes and interested in his work (hard work)	11.3
Education (preferably above Standard 8/ literate/can read and write)	10.1
God fearing, humble, patient, mindful and merciful	7.9
Quick response	6.6
Volunteer	6.2
Can be male or female	3.0
Preferably a man	1.7
Good health	1.7
Livestock farmer	1.4

The use of ranking methods with the same informant groups who constructed the Venn diagrams showed the relative response time, service outcome and overall client satisfaction, as summarised in Table 5.17.

The results derived from ranking methods (Table 5.17) were cross-checked against data from the questionnaire survey with livestock keepers (Table 5.18).

On general, the results derived from the participatory methods and the questionnaire were similar. The main points were as follows:

- CAHWs were highly ranked for offering affordable services with timely response and a satisfactory service outcome. They were closely followed by the AHAs
- Traditional healers and quarks had particularly poor post-treatment outcomes
- The Agrovet stores were relatively inaccessible to farmers and therefore tended to be ranked low.

Although no quantitative associations between service outcomes and factors such as accessibility and timely response were calculated, informants suggested that CAHWs achieved good recovery rates because of their nearness and timely response. A CAHW 'on the spot' would get a better recovery rate because of early treatment compared with a veterinarian arriving a day later.

Regarding the social activities of CAHWs, 84% of CAHW respondents participated in leadership roles in their communities. These responsibilities included leadership roles in self-help groups, school committees and church and volunteer organizations. This might be an indication that their leadership skills were considered during their selection. CAHWs involvement in social responsibility was also a vehicle in marketing their services. Those who were involved in other social responsibility tended to perform better in providing AHS.

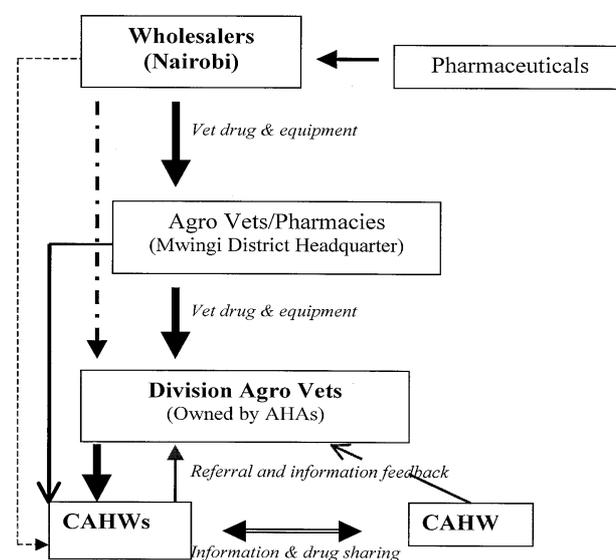
Since the success of CAHWs heavily depended on their selection criteria, livestock owners were asked to state what characteristics would be used in selecting candidates to be trained as CAHWs. Table 5.19 shows the suggestions provided by livestock owners. The five top characteristics (80%) were criteria which could only be set and evaluated by the community itself (livestock owners).

5.4 Working relations between different animal health service providers

5.4.1 Collaboration

Formal, semi-informal and informal animal health service providers operated in the district. The formal sector comprised agrovet and state veterinary service providers viz. six Junior Animal Health Assistants (JAHAs), nine AHAs and three VOs (including the DVO)⁷. An organogram of the system is shown in Annex 8. The informal sector comprised herbalists, traditional healers and quacks while the semi-informal sector comprised of CAHWs. The study revealed good and complementary working relationships between CAHWs and AHAs, who shared veterinary equipment and drugs. They also shared knowledge, skills and a bi-directional case referral system depending on the case complexity. This model of operation, linking CAHWs to AHAs extended the coverage of quality services, allowed viable business volume and kept the service cost low, thus reducing the poor quality service provided by the less qualified but competitive informal sector. The system is illustrated in Figure 5.13.

Figure 5.13
Drug supply system/technical linkages in the Mwingi District CAH system



Key

- Main drug/equipment channel to CAHWs
- Alternative drug/equipment channel to CAHWs
- Alternative drug/equipment channel to Div. Agro vets
- Occasional drug/equipment channel to CAHWs
- Referral and information feedback by CAHWs
- Information & drug sharing among CAHWs

⁷ JAHAs have a certificate in animal health (course duration of 1 year), AHAs are diploma holders in animal health (course duration of 2 years), VOs are graduate veterinarians.

Table 5.20
CAHW and AHA suggestions on ways to improve collaboration

CAHWs	AHAs
<p>Capacity building</p> <ul style="list-style-type: none"> • Hold regular joint meetings/workshops with other AHSPs • Go for exposure tours • Increase the number of monitoring visits by state veterinary staff • Conduct participatory monitoring • Collaboration should be stressed during trainings • Strengthen and empower interest groups e.g. CAHW organisations <p>Service marketing</p> <ul style="list-style-type: none"> • Sensitise farmers through barazas to seek veterinary services when their animals are sick • Discourage farmers from buying their own drugs • Encourage the establishment of quality local drug supply systems • Deploy more AHAs to be closer to CAHWs at field level 	<p>Capacity building</p> <ul style="list-style-type: none"> • Hold regular meetings/workshops • Hold field days to help educate farmers about benefits of veterinary care • Go for exposure visits/ tours <p>Service marketing</p> <ul style="list-style-type: none"> • Harmonise the extension approach to farmers

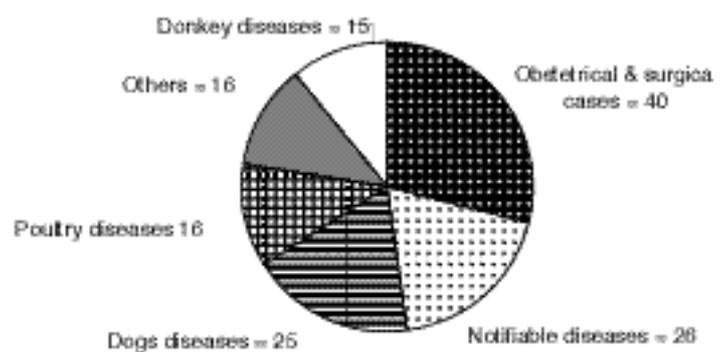
When asked to suggest how they would further enhance the existing positive collaboration, CAHWs and AHAs gave different suggestions, as summarised in Table 5.20.

CAHWs' suggestions on how to improve their collaboration included reference to a specific organisation for CAHWs. It was observed that a district level umbrella association called the Mwingi District Wasaidizi Association (MDWA) had been established and this association comprised three smaller divisional Wasaidizi self help groups. Some of the functions of these groups include:

- Enhancing the CAH system
- Regulation of their code of conduct (the code of conduct was agreed upon between the DVO and the CAHWs, and was functional)
- Promotion of their socio-economic welfare.

The newly formed association was still facing some challenges especially in the areas pertaining to organisation development and managerial capacities. In our view, the formation of this association augurs well for the sustainability and quality of CAH delivery systems and good inter-service provider relationships.

Figure 5.14
Type of referral cases and number of CAHWs making referrals (n=40)



CAHW often referred difficult cases to AHAs and Figure 5.14 gives an overview of the type of cases referred and the frequency of referral. The distance to the referral points i.e. where the nearest AHA could be reached, ranged from 4 to 40 kilometres with the majority (70%) of CAHWs referring to a distance of between 4 to 20 kilometres, as illustrated in Figure 5.15.

Figure 5.15
Cases referred by CAHWs as distance to the nearest AHA

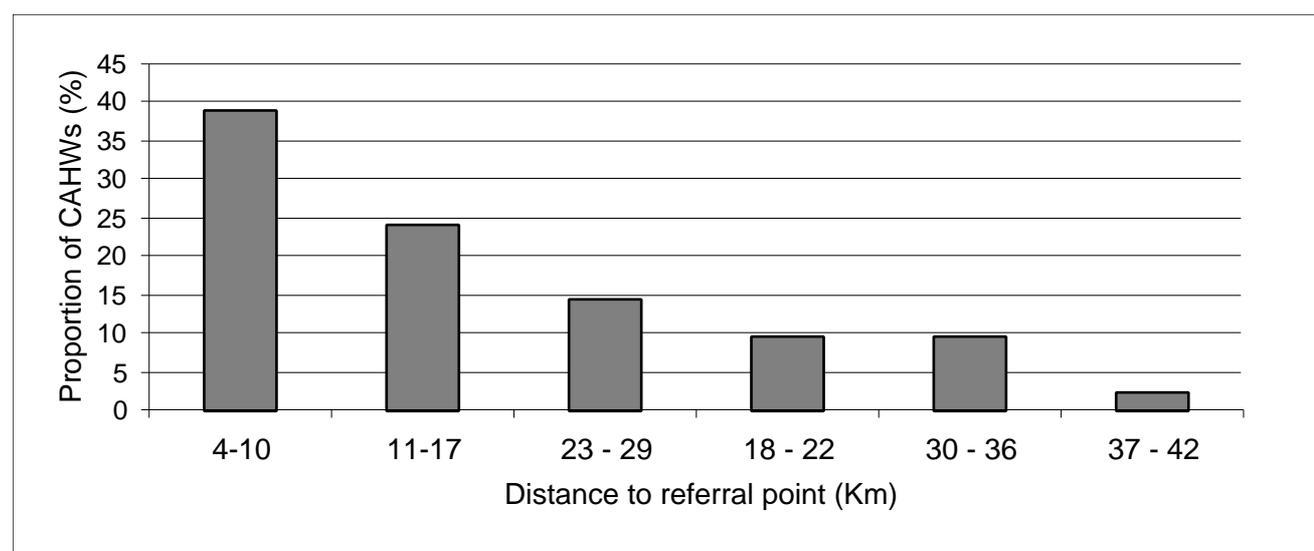


Table 5.21
Attendance of clinical cases by different animal health service providers in Mwingi District

Species	CAHWs	AHAs	Farmer (self)	Quacks	Traditional healers	Not attended
Cattle	38.6	29.8	17.5	5.3	1.8	7.0
Goats	54.8	17.7	19.4	4.8	0	3.2
Sheep	50.0	0	33.3	16.7	0	0
Donkeys	37.5	31.3	0	12.5	0	18.8
Dogs	13.3	40.0	13.3	0	0	33.3
Poultry	12.8	12.8	38.5	10.3	0	25.6

Note: Data derived from the questionnaire survey of livestock keepers (n=85).

Table 5.22
Relationships between CAHWs and other animal health service providers, as perceived by CAHWs

	Positive	Negative
Other CAHWs	13 CAHWs reported that they shared ideas, knowledge, they sometimes loaned/shared vet drugs.	5 CAHWs regarded other CAHWs as competitors, therefore reducing their profit margins and service demands.
AHAs	20 CAHWs viewed AHAs as advisers and trainers to whom they referred difficult cases and who supervised their work. They also viewed them as their drug suppliers, assisted them when they were not around and popularised their work.	5 CAHWs viewed AHAs having a negative impact on their business due to competition, which reduced their profit margin and service demand.
Traditional healers	13 CAHWs viewed traditional healers operating in the area as complementary because they shared ideas, knowledge and assisted in their absence. They also dealt with different diseases and used different medicines.	1 CAHW reported traditional healers operating in his area as competitors because they reduced his profit margin and service demand

Farmers	7 CAHWs viewed farmers who offered the same services as positive and complementing their work. They said that they shared ideas, exchanged knowledge, reduced their workload, assisted in their absence and also helped in offering first aid to cases	31 CAHWs reported farmers as competitors who lowered their service demand, misleading other farmers to reject their services since CAHWs were not GoK staff, making wrong diagnoses, using fake drugs, under-dosing their patients and hence might cause drug resistance
Quacks	1 CAHW saw quacks' activities as being positive and complementing their services and sharing knowledge.	11 CAHWs saw quacks as unskilled competitors who reduced their profit margin, misled farmers, made wrong diagnoses, gave wrong treatments, used fake drugs and therefore believed that they caused deaths in animals
AgroVet	4 CAHWs saw agro-vets as their drugs suppliers and sometimes offered them drugs on credit.	None

Table 5.23
Relationships between AHAs and other animal health service providers, as perceived by AHAs

	Positive	Negative
CAHWs	All 7 AHAs reported that CAHWs offered first aid to cases and assisted where they could not reach, complementing their work, reduced animal death rates and hence increased animal productivity	5 AHAs viewed CAHWs as form of competitors who overcharged farmers, under dosed animals therefore caused drug resistance and lowered farmers' confidence in AHSPs work
Other AHAs	2 AHAs viewed private AHAs ¹ as complementarity because they assisted in areas where they could not reach, helped in first aid cases, reduced animal death rates and hence increased animal productivity	One AHA said that private AHAs ¹ were negative to the profession because they did not give reports nor monitored disease situation in their areas of operation
Traditional healers	None	None
Farmers	4 AHAs viewed farmers as positive because they referred cases to them, helped in first aid cases, thereby reducing their workload.	6 AHAs viewed farmers as competitors who reduced their profit margins, gave wrong diagnoses and under dosed animals under their care, causing drug resistance
Quacks	3 AHAs reported that quacks referred difficult cases to them, shared ideas and knowledge with them, and helped in first aid cases,	5 AHAs viewed quacks as competitors who reduced their profit margins, gave wrong diagnoses, under dosed animals under their care, causing drug resistance and therefore lowered farmers confidence in AHSPs work
AgroVet	None	None

¹ There were two private AHAs; one was a student who operated during holidays and the other was retired GoK staff who operated sporadically. We were not able to meet them during the fieldwork

5.4.2 Competition

Minor competition existed against CAHWs and the formal sector from the informal sector. As shown in Tables 5.17 and 5.18, livestock owners preferred to use the semi-informal sector (CAHWs) and the formal sector (AHAs), mainly due to the poor service outcome when informal service providers were used. The relative attendance of cases by different service providers is summarised in Table 5.21 and supports data on livestock keepers' perceptions of the accessibility, affordability and service outcomes.

Table 5.21 also shows that a considerable untapped market for CAHWs and AHAs existed, being the cases currently handled by farmers, traditional healers, quacks or cases not attended. This volume of business appeared to be a significant opportunity for CAHWs and AHAs. It was possible that livestock owners using the informal sector are far from current CAHWs or any other qualified service.

Looking specifically at different species, sheep were either attended to by livestock owners or referred to less expensive AHSPs such as CAHWs; sheep did not constitute a significant proportion of household animal ownership (Table 5.1). Poultry formed a very significant proportion of household animal ownership but were mainly attended to by livestock owners themselves because of two major reasons:

- livestock owners were not aware of modern veterinary medicines for the treatment of poultry diseases;
- a major problem was Newcastle disease and their birds died despite being attended to by CAHWs and AHAs.

When livestock owners felt less knowledgeable about a particular problem, they preferred to use better-trained service providers such as CAHWs and AHAs. Tables 5.22 and 5.23 show the perceptions of CAHWs and AHAs regarding their relationships with other service providers.

6. Discussion

Many studies have been conducted on CAH systems in Kenya. These include assessments focussing on impact on livestock disease and benefits to livestock keepers (Holden, 1997; Odhiambo et al., 1998; The IDL Group and McCorkle, 2003), assessment of the performance and sustainability of CAHWs (Mugunieri et al., 2003) and a review of the economic viability of different delivery models involving CAHWs (Okwiri et al., 2002). Furthermore, the economic rationale for

the privatised delivery of veterinary services including the use of para-veterinary professionals is well known (McDermott et al., 1999; Leonard et al., 2003) and specific experience of private veterinarians working with CAHWs is starting to emerge (e.g. Ririmpoi, 2002). Our study in Mwingi District agrees with the general findings of these previous studies in other areas of Kenya, namely that CAHWs are an appropriate way to improve basic veterinary services in areas which are under-served by veterinarians. Our study examined the sustainability of CAH in Mwingi District and concluded that the existing system based on CAHWs linked to AHAs performed well with regards financial indicators and quality of service.

6.1 The AHA-CAHW system in Mwingi District

The study provided useful information on the financial sustainability, quality and system linkages of CAHW services in Mwingi District. These three aspects of sustainability were considered to be closely inter-related. It was concluded that CAHW services were of adequate quality and complemented the activities of AHSPs in the district, most notably the AHAs. From the 40 CAHWs sampled, only two (5%) were inactive and offering only intermittent services.

The CAHW services in Mwingi District were considered to be sustainable. The CAHWs were very self-reliant with regards procuring relevant inputs and they were motivated by income derived from their veterinary work and the social recognition they received. Table 5.8 shows that livestock keepers were most willing to pay for clinical services (including drenching), vaccination, castration and hoof trimming. This finding was supported by information on CAHW caseloads, showing that they handled substantial numbers of cases per month (particularly cattle and goats) (Table 5.9). Furthermore, information on CAHW incomes indicated that income derived from veterinary work was sufficient to keep them involved in the system (Figures 5.4 to 5.7). Although some livestock keepers still felt that the government was responsible for providing assistance such as clinical and vaccination services (Table 5.8), the overall trend was a rising demand for CAHW services. More livestock owners were requesting the services of the existing CAHWs and there were requests to extend the system into areas not covered by CAHWs. When compared to others AHSPs in the district, CAHWs were highly rated in terms of their accessibility (Figure 5.12) and affordability, timely response and overall client satisfaction (Table 5.17 and 5.18).

The CAHWs were able to establish a mutually beneficial relationship with other AHSPs, especially the AHAs. The introduction of the CAH system in the district facilitated a new arrangement for the delivery of veterinary services. Each cadre exploited a niche service market built on a bi-directional referral system and comparative advantages. Most of the time, AHAs focused on difficult cases, supplying veterinary drugs and providing backstopping services to CAHWs. This complementarity between CAHWs and AHAs for the private supply of supervised, clinical services agrees with the findings of previous studies in Kenya (e.g. Holden, 1997). Also, an economic assessment of different models of veterinary service delivery in Wajir, Marsabit, Turkana, Kajiado and Meru districts concluded that privatised networks of AHAs linked to CAHWs were the most economically feasible approach to provision of sustainable primary-level services (Okwiri et al., 2001). In common with our study, this economic review noted the relatively low salary expectations of CAHWs and AHAs, their acceptance by communities and their willingness to live and work in rural areas (compared with veterinarians). In addition, our study showed that CAHWs were able to handle non-cash payments for their services, including payments in livestock, grain and labour (Figure 5.11). It seems unlikely that higher levels of veterinary worker, such as veterinarians, would be satisfied with these types of payment.

The drug supply system to the CAHWs was found to be effective. It was adhered to by the CAHWs probably because of the necessity to obtain an annually renewable practice licence from the DVO. These DVO-CAHWs linkages also assisted in the sourcing of appropriate veterinary drugs. It was noticeable that during the study, only a single case of fake trypanocidal drug was encountered amongst the 40 CAHWs' kits. This is likely to maintain quality of the CAHWs' services and is also compatible with the current memorandum of understanding between the DVS and DVOs for purposes of CAHW utilisation and supervision.

In common with many other rural areas of Kenya, conventional clinical veterinary service delivery based on private vets providing case-side diagnosis and treatment is not currently feasible in much of Mwingi District. The poor infrastructure in the district, subsistence livestock production systems and high transport costs for a private veterinarian means that profits would probably be too low to support a conventional veterinary practice. In contrast to the needs of a veterinarian, our study showed that CAHWs and AHAs were able to operate private services and had been doing this for a number of

years. The system would be strengthened by the involvement of veterinarians running pharmacies in the main urban centres to supply and supervise the work of AHAs and the overall service. This approach deserves further assessment and should take account of the fact that a private AHA system already exists and has proven to be robust and well-suited to the economic conditions in the district. Veterinarians wishing to establish new businesses would need to be confident that their work would add value to the existing system and would be paid for by livestock keepers.

At present, AHAs in Mwingi District are both public sector employees and private sector owners of Agrovets shops at divisional level. This dual role of the AHAs seemed to be appropriate in 2003 for the particular conditions of the district, though it is important that AHAs do not have responsibility for inspecting their own businesses. The DVO has overall responsibility for ensuring that the Agrovets shops are stocking good quality drugs, but to inspect these shops and monitor the AHAs and CAHWs, the DVO requires adequate resources.



If, in the future, private vet services are demanded by owners it will be important to ensure semi-privatised AHAs (partly working in government) do not hinder their development. The DVS and KVB would be wise to monitor this situation carefully.

In Mwingi District it was noticeable that the strong links between CAHWs and AHAs was partly based on a referral system. As shown in Figure 5.14, all the CAHWs interviewed referred obstetrical and surgical cases to AHAs, plus cases where a diagnosis was not made or could not be handled by the CAHW.

In contrast to the AHA-CAHW relationship, there was some competition between CAHWs and informal service providers (farmers, quacks and traditional healers) (Table 5.22). This did not seem to affect the CAHWs very much, possibly because many cases in the district were not attended (Table 5.21). Therefore, further market penetration was still possible for CAHWs. In addition, farmers often noted that CAHWs had taken over the clientele of quacks because people recognised the better quality of the CAHWs.

6.2 Technical competence of CAHWs

An important aspect of sustainability is service quality. The quality of service is not only a professional and ethical issue, but also relates to a service-marketing strategy and association between service sustainability and customer satisfaction.

The study looked at service quality from the perspective of livestock keepers (e.g. the client satisfaction responses in Table 5.17) and conducted a formal assessment of CAHW skills and knowledge. Based on this formal assessment, the majority (90%) of the CAHWs in the study sample were judged to be competent in providing services with required diagnostic skills, ethical behaviour (including post treatment follow-ups) and correct use of drugs and equipment (Table 5.14). Although professional veterinary associations and other bodies often express concerns that CAHWs use drugs wrongly and encourage drug resistance (The IDL Group and McCorkle, 2002), the findings of our assessment dispute these views. Even with a short initial training of only 14 days duration followed by refresher trainings, CAHWs were technically competent. This finding indicates that duration of CAHW training is not a useful measure of training quality and that policy makers should not automatically reject courses that appear to be of short duration relative to more formal training approaches. Participatory approaches to CAHW training based on the principles of adult learning are recommended (Iles, 2002).

According to Taylor (2003), referral systems and refresher training in CAH systems are useful ways to maintain and improve diagnostic capacity and use of drugs, and thereby limit the emergence of drug resistance. Both a referral system and refresher training were features of the CAH system in Mwingi District.

The main technical weaknesses of the CAHWs were poor record keeping and knowledge on zoonotic diseases. It was interesting to note that both these areas could be viewed as non-profit making activities

but nevertheless, further training and follow-up was required.

6.3 Some reasons for success

We concluded that the sustainability of the CAH system in Mwingi District was related to careful design and management of the system. Important factors during project design and implementation were as follows:

- The need to respond to a major need of the livestock owners themselves, being improved accessibility of veterinary services.
- Adequate community participation in setting up and managing the CAHW services.
- The role of the DVO in initiating, steering and providing continuous support to the CAHWs.
- Reliable and continuous technical support from the IFSP-E to the DVO until the end of the IFSP-E programme in 2001.
- Involvement of other relevant stakeholders in the district to broaden ownership e.g. local leadership and veterinary drug suppliers.
- Stakeholder determination of their roles and responsibilities leading to harmonization of different players in the system.
- An iterative and process-oriented approach, with regular participatory reflection sessions to adjust activities and ensure regular two-way communication within the system.
- Selection of appropriate candidates for training as CAHWs viz. candidates with social back-ups, personal interests in delivering animal health services and adequate literacy levels.
- Development of a relevant CAHW training curricula and training approaches with emphasis on practical sessions and use of proper training needs assessments.

In addition to the factors above, an understanding of the willingness of farmers to pay for services in a free market enabled the programme to be designed accordingly and with long-term sustainability in mind.

7. Recommendations

The current state of veterinary legislation in Kenya and proposed reforms to better support community-based animal health delivery systems (CAHS) and privatisation in marginalised areas were described by Munyua Muchina and Wabaka (2003). Our study supports many of the policy and legislative changes proposed by the KVB to strengthen linkages between private veterinary practitioners and CAHWs. We support moves towards a clear policy to allow more efficient utilisation of the CAHWs via the legal empowerment of veterinarians and para-professionals to trade in veterinary drugs. The CAHWs could then source their drugs from and be supervised by independent and legalised private veterinary drug suppliers. In this context the proposed certification of veterinary pharmacies or Agrovets shops would go a long way to solve the problem of drug supply to this market in the future.

Recommendations to the Department of Veterinary Services

- In Mwingi District, basic veterinary services are provided by AHAs who are both government employees and private sector operators. In this situation, the DVS should review the public sector roles of the AHAs and the potential to encourage full privatisation of the system. In such a system, the AHAs would no longer be employed by government but, as private operators, could receive contracts from government for specific public sector tasks (under the supervision of the DVO). It is likely that such an arrangement would be more cost efficient. In addition, savings derived from improved efficiency could be directed towards enabling the DVO to fulfil monitoring and regulatory functions more effectively.
- In underserved areas the DVS should facilitate DVOs to provide direct or indirect assistance in the identification, training and temporary supervision of CAHWs according to district-specific needs. Ideally, the trained and licensed CAHWs should be linked to private AHAs and vets for efficient supervision and backstopping. If private AHAs or veterinarians do not yet exist in some areas, every effort should be made to encourage private sector development as CAHWs are trained.
- The licensing of a CAHW should be contingent upon an AHA or veterinarian being identified, on the license, as the supervisor of that CAHW. The study team emphasises that CAHWs should operate in the private sector. Government AHAs and veterinarians should only be supplying drugs to CAHWs in areas where private veterinary practices run by AHAs or vets have yet to be established.
- Care and attention is required to ensure that government employees, including those who are also engaged in private activities, do not prevent the development of fully privatised systems. Supervision and supply of CAHWs by government AHAs and vets should be seen as a temporary measure to improve the quality of veterinary services to underserved livestock owners, rather than a long-term solution.
- The establishment of CAH systems should be based on a Memorandum of Understanding (MoU) between the DVS, DVOs and other relevant agencies in those areas where CAHWs are needed. The content of the MoU should be made available to the veterinary regulatory body (KVB) and other interested stakeholders.
- The DVS should continue to inform those donors and NGOs who support CAH initiatives of the necessity of signing an MoU prior to the commencement of their activities. This will help to harmonise approaches, ensure quality and enable appropriate project design according to the need for immediate and full involvement of the private sector. The DVS should formulate a set of minimum standards and guiding principles that implementing agencies are required to follow and which can form the basis for the MoUs.
- The DVS should support the DVOs to sensitise and prepare the communities to ensure sustainability of CAHW activities.
- Under current arrangements many state veterinary personnel are to be retired by the year 2012. Therefore, there is urgent need to maximise the use of public sector veterinarians and resources for the encouragement of private service delivery. It is likely that contracting out activities such as vaccination and surveillance will play a key role in enabling the private sector in marginalised areas. These contracts will have to be formulated and monitored by the DVS and DVO.
- In collaboration with communities and the AHITIs, the DVOs should identify well performing and qualified CAHWs for certificate training. After

training, former CAHWs could be licensed to work in their locations as private AHAs.

- Where private veterinarians do exist, private AHAs should work under their supervision. The process of licensing and monitoring is the responsibility of the statutory veterinary body (the KVB) in close collaboration with the DVS. In areas where no private veterinarians are working, the KVB and DVS will need to conduct regular reviews to ensure that government services and/or private para-veterinary professionals are not hindering involvement of private professionals. The aim should be for licensing arrangements to support complementarity linkages and quality services.
- Veterinary investigation laboratories should, where necessary, be facilitated to carry out confirmatory disease diagnostic surveys to confirm local disease distributions. This would help in developing a needs-driven training curriculum for CAHWs in specific areas. Simple diagnostic tests for epizootic or notifiable diseases should be provided at divisional and district levels.
- The veterinary public health division of the DVS should be strengthened to carry out regular spot-checking on animal food products at the market level to determine the actual levels of drug residues and ensure the availability of wholesome foods according to national and international market standards. It is understood that this must be accompanied by efforts to raise the producers' awareness on the effects of the drug usages and withdrawal period on their incomes and on human health.

Recommendations to the Kenya Veterinary Board

- In line with recent reports from the Office International des Epizooties (OIE), the KVB should continue to delegate its supervisory powers to the DVS and DVOs in conjunction with its own capacity to provide field inspection. This would strengthen and widen its regulatory functions countrywide. There is a need to further identify, define and license the various categories of para-veterinary professionals (including CAHWs) practicing in the districts and this information can be compiled in the central KVB registry.
- Registered veterinarians should carry out all training in veterinary-related topics for CAHWs. In Mwingi District there may be scope to increase the initial 14 day training course to 21 days, in order

to strengthen training in those topics that were found to be weak among CAHWs viz. record keeping and zoonoses.[L39] Other topics that might be included in the initial CAHW training are minor surgery and wound treatment, some improved livestock production techniques, aspects of business management and organisational development plus exposure to other source incomes such as honey production or preparation of hides and skins (in order to complement income derived from veterinary work).

- Trained CAHWs should be issued with a certificate of training and annually renewable work licenses. The latter should be subject to an annual, combined report of their supervisor and the DVO. Similarly, AHAs should also be regulated by the KVB and their appropriateness as independent private operators should be reviewed regularly.
- The KVB should identify and register suitable trainers and examiners of CAHWs, who might serve as an accreditation board on their behalf. The training of such trainers and examiners needs to be developed. The mechanisms for providing licenses to para-professionals such as CAHWs, through DVOs and the DVS also needs to be developed.

Recommendations to the Kenya Veterinary Association

- The KVA should inform its members about the results of this study, particularly with regards the technical competence of CAHWs, the potential to use CAHWs to improve the sustainability of privatised veterinary services in under-served areas and the potential to develop systems based on mutually supportive relationships between CAHWs, AHAs and veterinarians.
- The KVA should encourage those members interested in establishing private CAH systems to seek appropriate training in subjects related to the design and development of such systems, with a particular focus on sustainability issues. There is a wide range of training and information materials available in written and video formats for those interested (see Annex 9 for a list and sources of relevant materials).
- The KVA should continue to participate actively in policy dialogue concerning CAH systems in Kenya, and encourage the involvement of its members from under-served areas in national-level debates and meetings.

- The KVA should continue to participate in future studies on veterinary service provision, including CAH systems.



Recommendations to the African Union/Interafrican Bureau for Animal Resource

- Based on the study findings, AU/IBAR should continue to advise its partners at policy level on the extension of CAHWs to underserved areas.
- Through its intermediaries e.g. government, NGOs, CBOs and livestock owners' organisations, AU/IBAR should continue to assist national veterinary services to gain the experience and capacity to provide technical and organisational advice to relevant institutions involved in the initiation and management of CAH systems.
- AU/IBAR should continue to work with veterinary faculties and veterinary policy makers to generate reliable information on CAH systems for dissemination to its partners. The involvement of local agencies facilitates and accelerates the learning, attitudinal and institutional change processes.
- As access to appropriate animal health services is a livestock owner's basic right and a key factor contributing to livestock production, AU/IBAR should seek to influence national policy makers to ensure they improve the representation and active involvement of livestock owners at policy levels.

District CAHW organisations

The capacity of CAHW umbrella organisations, where they exist, is still very weak. Enhancing their capacity would go along with empowering the CAHWs to engage with other stakeholders such as the AHA umbrella organisation, livestock owner associations and even the KVB. It could further encourage the development of codes of conduct and other self-regulatory mechanisms, improve linkages amongst CAHWs and with other stakeholders, including private veterinarians.

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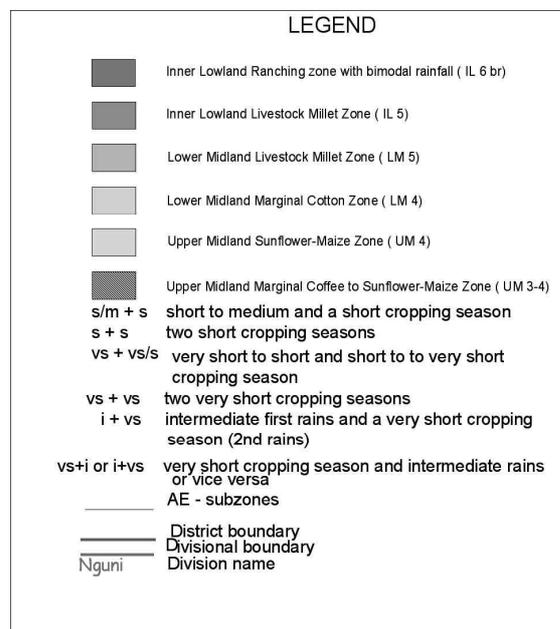
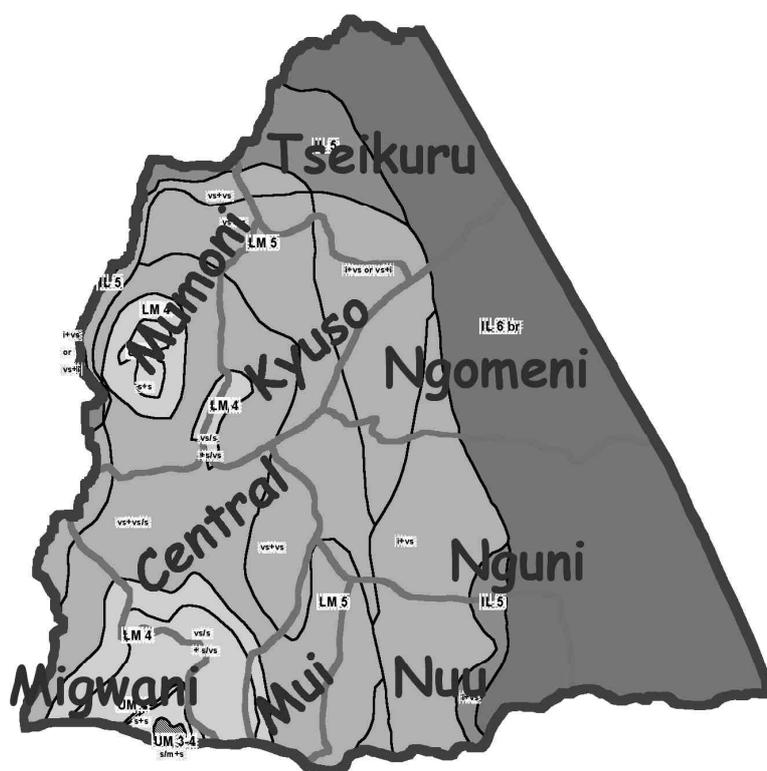
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Annex 1

Agroecological zones in Mwingi District



Annex 2

Animal health problems covered and not covered during CAHW training

Cattle	Goats	Sheep	Poultry	Dogs	Donkeys				
Trained on Trypanosomiasis FMD Anthrax Blackquarter CBPP Anaplasmosis Rinderpest East coast fever Diarrhoea Worms Babesiosis Rectal/uterine Prolapse Rabies Heartwater	Not Trained but treating Bloat LSD Mastitis Diarrhoea	Trained on CCPP/ Pneumonia Anaplasmosis Anthrax Worms Mange Foot rot	Not Trained but treating Eye infection Orf	None Worms	Trained on Newcastle disease Fowl pox Worms Fowl typhoid	Trained on Rabies Venereal disease Mange Worms	Not Trained but treating Mange	Trained on Rabies Worms Rabies	Not Trained but treating Colic

Annex 3

Sample of veterinary drug kit composition



KENYA
(IFSP-E)

Deutsche Gesellschaft fuer
Eastern
Technische Zusammenarbeit (GTZ) GmbH

Integrated Food Security Programme -

Name of Msadizi: **Signature:**

.....

ID No:..... Division: **Location:**

.....

S/location: **Village**

Witnesses (three members of the community):

1 Name of Witness:

Signature

ID

2 Name of Witness

Signature

ID

3 Name of Witness

Signature:

ID

Item	Unit size	Quantity
1. Wormicid	One litre	3
2. Alamycin	100 ml	3
3. Multivitamin	100 ml	1
4. Pen-streptomycin	50 ml	3
5. Berenil	1 g sachet	10
6. Novidium	1 g tablet	10
7. Plastic syringe (durable)	30 cc	1
8. Furaxol	50 g	3
9. Sevin dust	100 g	3
10. Tetracycline spray	200 g	1
11. Ascarex Powder	30 g	3
12. Eye ointment	1g	4
13. Triatix	100 ml	2
14. Hydrogen peroxide	100 ml	1
15. Stop bloat	100 ml	2
16. Needles	16 1/2	5
17. Needles	18 1/2	5
18. Ascaten	6	12 tablets
19. Syringe disposable	20 ml	4
20. Healing oil	240 ml	1
21. Kaolin Powder	0.5 kg	1
22. Epsom salt	0.5 kg	1
23. Cotton wool	200 mg	1
24. Rug sack		1
25. Bicycle		1

Annex 4

List of CAHWs in Mwingi District

Sampled CAHWs are in bold type

No.	Name	Location	Division	Sub-Location	Year Training	Level of Education
1	Sammy K. Ngui*	Tseikuru	Tseikuru	Ngalange	1996	Form III
2	Musembi Musyoka*	Musavani	Tseikuru	Useuni	1999	Form II
3	Mwendwa Mututa*	Musavani	Tseikuru	Kyenini	1999	Std. 8
4	Pauline Kikuu*	Masyungwa	Tseikuru	Kitovoto	1999	Form IV
5	Muthengi Kisaili*	Musavani	Tseikuru	Ngereni	1999	Std. 7
6	Kivilu Musyoka*	Masyungwa	Tseikuru	Kathiani	1999	Std. 7
7	Kilonzo Vere	Tseikuru	Tseikuru	Kasyathuni	1999	Form IV
8	Sammy Musyimi	Musavani	Tseikuru	Kaningo	2001	Form IV
9	Kirema Kivui*	Tseikuru	Tseikuru	Ngongoni	2001	Form IV
10	Munwoki Musyoka	Masyungwa	Tseikuru	Kandani	2001	Form V
11	Julius S. Maithya*	Tseikuru	Tseikuru	Kaivirya	2001	Form IV
12	John Mwendwa*	Tharaka	Mumoni	Gacigongo	1996	Std. 8
13	John Magondu	Tharaka	Tseikuru	Gacigongo	1999	Form IV
14	Musyimi Ngili*	Waita	Central	Waita	2000	Std. 4
15	David Kyele*	Waita	Central	Waita	1998	Std. 6
16	Njoki Kimwele*	Endui	Central	Enziu	1998	Std. 7
17	Domnic Kitheka	Kyethani	Central	Wikithiki	2000	Std. 8
18	Andrew Ndingu	Kiomo	Central	Kairungu	2000	Form IV
19	Nicholas Munyoki	Mwingi	Central	Enziu	2000	Form IV
20	Kilonzo Nduku	Waita	Central	Ndithi	2000	Form IV
21	Martha Simon	Endui	Central	Mutuangombe		Std. 7
22	Mutua Kiteme	Nzeluni	Central	Nzatani	2001	Form IV
23	Muthengi Nzau	Endui	Central	Nyanya	1989	Std. 6
24	Gideon Mwendwa	Mumbuni	Central	Katalwa	2001	Form IV
25	John K. Kimotho*	Kyuso	Kyuso	Gai	1992/1996	AHITI-Kabete
26	David Musyoki Muli*	Kamuwongo	Kyuso	Kamuwongo	2001	Std. 8
27	Jennifer K. Muvinzu	Mivukoni	Kyuso	Manzuva	1999	Std. 8
28	Peter Mwendwa Mukiti	Mivukoni	Kyuso	Katuka	2001	Std. 7
29	Robert M. Kiteme*	Kamuwongo	Kyuso	Itiva Nzou	2001	Std. 8
30	Francis Mwema Masoso	Kimangau	Kyuso	Maseki	1999	Std. 8
31	Jackson M. Mwangangi	Kamuwongo	Kyuso	Tulanduli	1996	Std. 7
32	John Kimanzi Kaliu	Kyuso	Kyuso	Gai	1996	Std 4
33	Johnson M. Muthengi	Kyuso	Kyuso	Gai/Matooni	1996	Std. 6
34	John Musyoka Kalei	Mivukoni	Kyuso	Kamula	1996	Std. 8
35	Aberdneco M. Kitheka	Kyuso	Kyuso	Ngaiye	2001	Std. 8
36	Muthengi Nguna	Kimangau	Kyuso	Kivangwa	1996	Std. 7
37	Sylvia Kitondo Kitheka	Mivukoni	Kyuso	Mataka	2001	Form IV
38	Peter Kimwele*	Mitamisyi	Ngomeni	Kamusiliu	2001	Form IV
39	P. M. Kisilu	Mitamisyi	Ngomeni	Ndatani	1996	Form II
40	Mukiti Ndo*	Mitamisyi	Ngomeni	Kimela	2001	Form IV
41	Metemi Kitheka*	Ngomeni	Ngomeni	Kavani	1998	Form IV
42	Joseph Kisinga*	Ngomeni	Ngomeni	Maringani	1999	Form II
43	David Mbithi Mwiu*	Ngomeni	Ngomeni	Kalwa	1999	Std. 8
44	Ben Mutemi	Mitamisyi	Ngomeni	Mitamisyi	1996	Form IV
45	Jackson Mwanzia	Mitamisyi	Ngomeni	Kamusiliu	1999	Form IV
46	Paul Mulei	Ngomeni	Ngomeni	Manguu	1999	Form II

47	Rose Kivonya*	Ngutani	Migwani	Kitulani	2001	Form IV
48	Fredrick Nzitu Tungu	Ngutani	Migwani	Nzala	2000	Form IV
49	Jonathan Kasuki	Ngutani	Migwani	Nzala	2001	Form IV
50	Francis Boyano	Thana Nzau	Migwani	Inzuva	2000	Form II
51	Bornface Kamotho*	Thana Nzau	Migwani	Winzyeei	2000	Form II
52	Simon Siilu	Thana Nzau	Migwani	Thaana	2000	Form IV
53	Shadrack K.Kanyalu*	Ngutani	Migwani	Nzawa	2000	Form IV
54	Mwalimu Musya*	Wingemi	Nuu	Malawa	1999	Form II
55	William M. Muthui	Wingemi	Nuu	Kyangati	1999	Std. 8
56	Safari Muthuka*	Mutyangome	Nuu	Ngieni	2001	AHITI
57	Kananda Mutinda	Nyaani	Nuu	Nyani	1999	Std. 7
58	Jane Nundu Kiseu*	Mutyangome	Nuu	Mwangeni	1999	Std. 8
59	Munyoki Mbuvi		Nuu	Kamengo	2001	
60	Clement Mathuva	Karitini	Mui	Yumbu	1999	
61	Ngati Mathuva*	Mui	Mui	Ngoo	2001	Form IV
62	Francis S. Solomon	Mui	Mui	Kathonzeni	1999	
63	K. Mutia	Ukasi	Nguni	Mwalali	2001	Form IV
64	Jackson S. Kasyoka*	Ukasi	Nguni	Mbuvi	1999	Std. 7
65	Joel M. Nyalu*	Ukasi	Nguni	Mwalali	2001	Form IV
66	Charles Kimanzi*	Nguni	Nguni	Mathyakani	2001	Std. 7
67	Malusi Mwasya	Ukasi	Nguni	Mwalali	2001	Form IV
68	Joel K. Musya	Ukasi	Nguni	Mwalali	1999	Std. 7
69	Beth Kanana*	Nguni	Nguni	Mwasuma	1992	Std. 4
70	Mwangangi Mwanzia*	Nguni	Nguni	Kyavyuka	2001	Form IV
71	David Mwasi	Nguni	Nguni	Kyavyuka	1999	Form IV
72	John Kimanya*	Tharaka	Mumoni	Kariini	1996	Form IV
73	John Muciini*	Tharaka	Mumoni	Ngoru	1999	Form IV
74	John Kibara*	Tharaka	Mumoni	Gachigongo	1999	Form IV
75	John Mwenga	Tharaka	Mumoni	Kamayagi	1996	Std. 8
76	John Ndagara	Tharaka	Mumoni	Kanyengya	1999	Form IV
77	Julius Njeru	Tharaka	Mumoni	Ciatungu	1996	Form II
78	Daniel Kondiki*	Tharaka	Mumoni	**	1999	Std. II
79	David Mbagi*	Kanthungu	Mumoni	Uvete	1999	Std. IV
80	Jonnes Munoi*	Kanthungu	Mumoni	Eturamula	1999	Form IV
81	John Nthumbi	Kanthungu	Mumoni	Kiuga	1999	Form IV
82	John Muteria Kivya	Kanthungu	Mumoni		1996	Form IV
83	David Karurunguru	Kanthungu	Mumoni	Kamaidi	1999	Form IV
84	Scholar K. Mutemi*	Katse	Mumoni	Mbarani	1998	Form II
85	Muthengi Mwasya*	Katse	Mumoni	Kamathitu	1998	Std. 8
86	Job M. Mwinzi	Katse	Mumoni	Mbarani	1998	Form IV
87	James Maithya	Katse	Mumoni	Konyu	1998	Std. 7
88	John Kivole*	Katse	Mumoni	Mbarani	1996	Form IV
89	Lucas K. Mwenga	Mutanda	Mumoni	Kaisinga	1996	Form IV
90	Kathini Mukiti	Mutanda	Mumoni	Kininge	1998	Std. 8
91	Peter Musyimi	Mutanda	Mumoni	Wangutu	1998	Std. 8
92	Sammy Kilonzo	Nguku	Mumoni	Kata	1998	Form IV
93	Jonna M. Muimi	Kakuyu	Mumoni	Kalatine	1998	Form IV
94	Peter Mukiti*	Kakuyu	Mumoni	Ngungani	1998	Form IV
95	David Ndeto	Kakuyu	Mumoni	Mukonga	1998	Form IV
96	Peter Ndei	Kakuyu	Mumoni	Mukonga	1996	
97	Karungu Maluki*	Kakuyu	Mumoni	Tyaa Kamuthale	1996	Std.8
98	Peter munywa	Kakuyu	Mumoni	Ikongo	1996	
99	Joseph Muthungu	Kakuyu	Mumoni	Mukonga		Std. 7

Annex 5

Prices of veterinary drugs and equipment in Mwingi Town

	Price List (KShs)		
	Wholesale	Retail	AHA/CAHW Special price
Antibiotics			
Alamycine (100mls 10%)		180	
Adamycin (100mls 10%)	250	290	280
Penstrep (100mls 10%)	320	380	350
Oxyteracycline (Oxykel) (100mls 10%)	160	180	170
Supportive Drugs			
Oxytet spray (200g)	200	250	215
Multivitamin (100mls)	250	270	
Sulphur based drugs			
Fuzol (120mls)	55	70	60
S-dine (100mls)	75	90	80
Acaricide			
Acaricide (Triatix) (100mls)	160	180	170
Sevin (sachet)	68	80	75
Anti-protozoal			
Novidium (tablet)	50	70	60
Berenil (1g sachet)	50	70	60
Norotryp (1g sachet)	50	60	60
Veriben (1g sachet)	50	70	60
Anthelmintics			
Ascarex (Sachet 30g)	45	65	50
Levamisole (1 Litre)	190	240	220
Ascaten tablet	10	15	12
Vetworm/Wormicid (1 Litre)	190	240	220

Annex 6

Caseloads of CAHWs and AHAs

Table A6.1: Cases of cattle diseases/problems attended by CAHWs (n=40) per month

	Worms	Tryps.	Anaplas.	CBPP/ Pneumonia	Abscess/ wounds	Babesiosis	Footrot	Diarrhoea	FMD	Mastitis	Bloat	Obstetrical	Heartwater
Number of CAHWs attending the cases/month (%)	37 (92.5%)	31 (77.5%)	25 (62.5%)	23 (57.5%)	16 (40%)	12 (30%)	7 (17.5%)	5 (12.5%)	4 (10%)	4 (10%)	3 (7.5%)	3 (7.5%)	3 (7.5%)
Mean number of cases attended by CAHWs/month (95% CI)	18.1 (12.8-23.4)	6.1 (2.2-10)	6.8 (4.3-9.3)	6.5 (4.2-8.8)	3.2 (1.9-4.5)	4 (2.3-5.7)	8.9 (1.3-16.4)	7 (-1.6-15.6)	3.8 (-1.7-9.2)	1.5 (0.6-2.4)	2.3 (-1.5-6.1)	2.3 (-1.5-6.1)	5.3 (-2.7-13.3)

Table A6.2: Cases of goat disease/problems attended by CAHWs (n=40) per month

	Worms	Anaplas.	CCPP/ Pneumonia	Tryps. wounds	Abscess/ wounds	Footrot	Diarrhoea	Mange	Mastitis	Obstetrical	Heart water	Skin disease
Number of CAHWs attending the cases/month (%)	35 (87.5%)	40 (100%)	39 (97.5%)	10 (25%)	12 (30%)	7 (17.5%)	6 (15%)	66 (15%)	5 (12.5%)	4 (10%)	3 (7.5%)	3 (7.5%)
Mean number of cases attended by CAHWs/month (95% CI)	30.5 (18.8-42.3)	19.4 (14.0-24.9)	24 (15.2-32.7)	6.1 (1.7-10.5)	9.8 (4.3-15.3)	15.1 (3.6-26.7)	9.7 (-1.1-20.4)	26.5 (-0.5-13.5)	4.6 (-2.7-11.9)	3.5 (-3.4-10.4)	13 (-21.1-47)	3.3 (-2.4-9)

Table A6.3: Cases of sheep disease/problems attended by CAHWs (n=40) per month

	Worms	Anaplasmosis	Footrot	Trypanosomiasis
Number of CAHWs attending the cases/month (%)	20 (50%)	11 (27.5%)	4 (10%)	3 (7.5%)
Mean number of cases attended by CAHWs/month (95% CI)	8.7 (4.1-13.2)	11.5 (6.7-16.2)	13 (-6.0-32.0)	7 (-10.9-24.9)

Table A6.4: Cases of donkey disease/problems attended by CAHWs (n=40) per month

	Worms	Tryps	Abscess/ wounds	Rectal prolapse	Pneumonia	Anaplasmosis	Bloat	Diarrhoea	Babesiosis	Tetanus
Number of CAHWs attending the cases/month (%)	33 (82.5%)	13 (32.5%)	13 (32.5%)	10 (25%)	7 (17.5%)	4 (10%)	3 (7.5%)	3 (7.5%)	3 (7.5%)	3 (7.5%)
Mean number of cases attended by CAHWs/month (95% CI)	11.7 (7.8-15.6)	6.9 (-1.3-15.2)	3.9 (1.1-6.8)	1.2 (0.9-1.5)	4.7 (0.7-8.8)	8 (-10.1-26.1)	7.3 (-2.1-16.7)	6.7 (-13.4-26.8)	3.3 (-2.9-9.6)	2.3 (-1.5-6.1)

Table A6.5: Cases of dogs disease/problems attended by CAHWs (n=40) per month

	Worms	Canine distemper	TVT	Wounds
Number of CAHWs attending the cases in a month (%)	21 (52.5%)	7 (17.5)	5 (12.5%)	3 (7.5%)
Mean number of cases attended by CAHWs/month (95% CI)	7.5 (3.1-11.9)	3.0 (-1.8-37.0)	3.2 (-1.6-8.0)	1.3 (-0.1-2.8)

Table A6.6: Cases of cats disease/problems attended by CAHWs (n=40) per month

	Worms	Mange
Number of CAHWs attending the cases /month (%)	7 (17.5%)	1 (2.5%)
Mean number of cases attended by CAHWs/month (95% CI)	3.6 (-0.5-7.6)	10 (nc)

Table A6.7: Cases of poultry disease/problems attended by CAHWs (n=40) per month

	Worms	Fowl Typhoid	NCD
Number of CAHWs attending the cases /month (%)	16 (40%)	12 (30%)	9 (22.5%)
Mean number of cases attended by cases /month (95% CI)	43.5 (16.7-70.5)	23.3 (6.2-40.4)	27.8 (5.7-59.9)

Notes for Tables A6.1 to A6.7

Only cases reported by more than 2 CAHWs were considered except mange in cats; nc = not calculated

In each Table, the mean number of cases attended by CAHWs/month refers only to those CAHWs who attended cases for the disease/problem in question.

Table A6.8: Cases of cattle disease/problems attended by AHAs (n=7) per month

	Worms	Anaplas.	Tryps.	CBPP/ Pneumonia	Obstetrical	Mastitis	Babesiosis	ECF	Wounds
Number of AHAs attending the cases/ month (%)	7 (100%)	7 (100%)	3 (42.9%)	2 (28%6)	2 (28%6)	2 (28%6)	1 (14.3%)	1 (14.3%)	1 (14.3%)
Mean number of caseattended by AHAs/month (95% CI)	23.7 (-7.4-55.3)	8.7 (2.7-14.8)	12.3 (-17.3-42.0)	17.5 (-14.3-42.0)	11 (-103.7-125)	2.5 (-3.9-8.9)	1 (nc)	3 (nc)	4 (nc)

Table A6.9: Cases of goats disease/problems attended by AHAs (n=7) per month

	Worms	CCPP/ Pneumonia	Anaplas.	Obstetrical	Foot rot	Mastitis
Number of AHAs attending the cases/ month (%)	7 (100%)	7 (100%)	5 (71.4%)	2 (28%6)	1 (14.3%)	1 (14.3%)
Mean number of cases attended by AHAs/month (95% CI)	40.7 (-5.0-86.4)	18.9 (10.6-27.1)	32.2 (-25.3-85.7)	20.5 (-227.1-268.7)	8 (nc)	1 (nc)

Table A6.10: Cases of sheep disease/problems attended by AHAs (n=7) per month

	Worms	Pneumonia	Anaplasmosis
Number of AHAs attending the cases/ month (%)	3 (42.9%)	2 (28.6%)	1 (14.3%)
Mean of cases attended by AHAs/ month (95% CI)	11 (2-20)	10 (nc)	10 (nc)

Table A6.11: Cases of donkey disease/problems attended by AHAs (n=7) per month

	Worms	RAB/ Rectal prolapse	Pneumonia
Number of AHAs attending the cases/month (%)	5 (71.4%)	2 (28.6%)	2 (28.6%)
Mean of cases attended by AHAs/month (95% CI)	12.6 (-13.5-38.7)	15 (-48.5-78.5)	12 (-89.7-113.7)

nc = not calculated

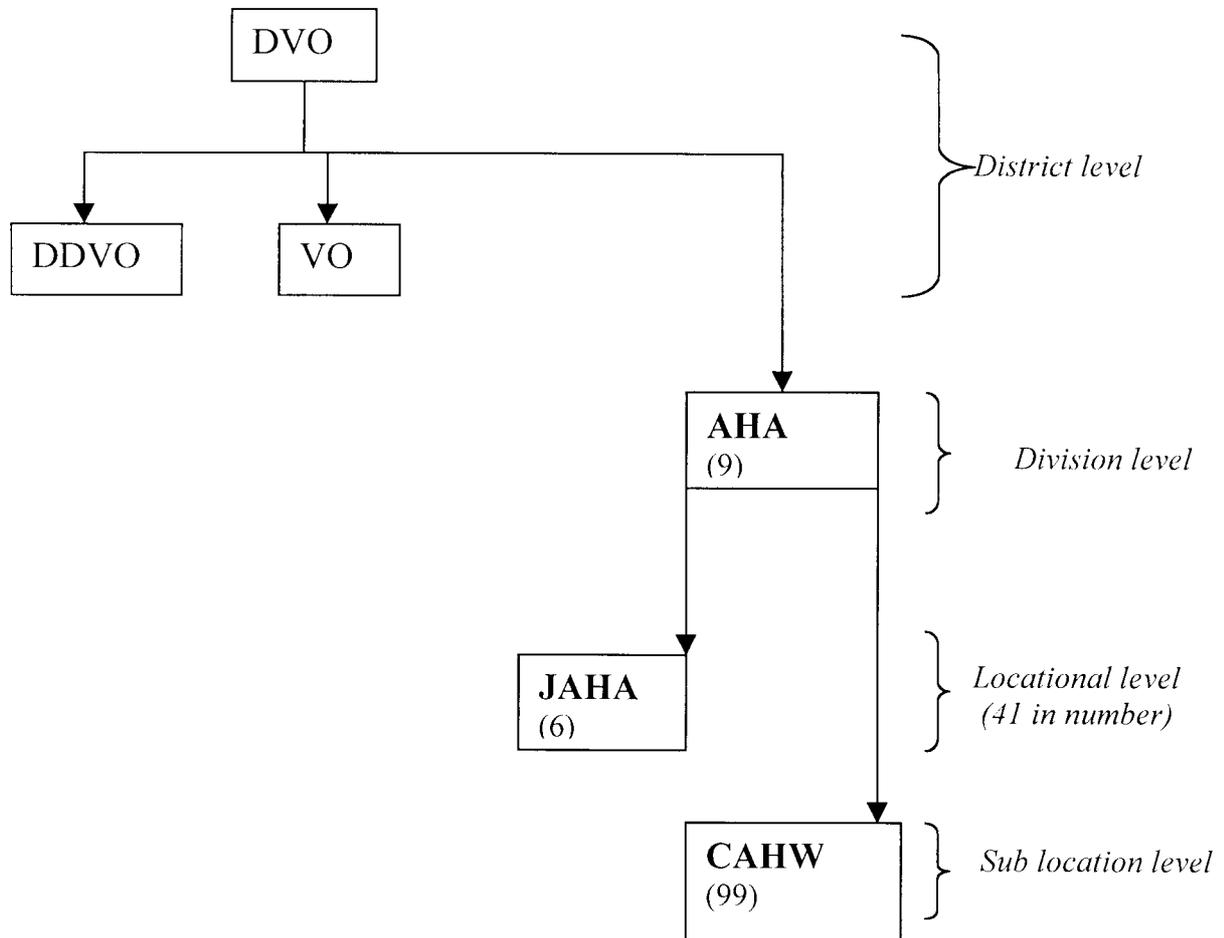
Annex 7

List of fast-moving drugs via CAHWs

	Number of times cited by CAHWs (n=40)
Vetworm/Wormicid	40
Oxytetracycline	32
Penstrep	29
Veriben	17
Novidium	15
Furaxol	9
Oxytet spray	6
S-dine	6
Ascaten tablets	5
Alamycine	5
Sevin	4
Disseptoprim	3
Triatix	3
Healing oil	3
Epson salt	3
Multivitamin	3
Adamycine	3
Eye ointment	2
Stop bloat	2
Ascarex	2
Steladon	2
Berenil	2
Fuzal	1
Dust powder	1
Intramammary tubes	1
Amitrax	1
Levacide	1
Accaricide	1
Wound powder	1
Wormicid Bolus	1
Vetmycine	1
Wormita	1

Annex 8

Organogram of the CAH system in Mwingi District



Annex 9

Reports, books and videos on CAH

Books, reports, training manuals and policy issues

African Union/Interafrican Bureau for Animal Resources (2003). Policy on Community-based Animal Health Workers. <http://www.cape-ibar.org>

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Areas Under Market Liberalization: A case for Community-based animal health workers. 2020 Vision Network for East Africa Report 3. Institute of Policy Analysis and Research, Nairobi and International Food Policy Research Institute, Washington DC. <http://www.ipar.or.ke>

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Videos

Available from the CAPE Unit at AU/IBAR:

Community-based Animal Healthcare: The How-To-Do-It Videos 1 and 2

These 'How-To-Do-It' videos describe the key issues to consider when setting up a community-based animal health system. The videos will be useful for veterinarians who work for government, NGOs or the private sector who want to establish a community-based project, or improve an existing project.

Video 1 covers the following topics:

- Community Participation
- Sustainability
- The Role of Vets

Video 2 covers the following topics:

- Participatory Approaches to Adult Learning
- Project Monitoring and Evaluation
- How to Influence Policy

Community-based Animal Healthcare: Issues for Policy Makers

This video presents the key issues for policy makers to consider when assessing community-based animal health systems. The video also describes ways to involve policy makers in learning more about community-based approaches and formulating appropriate policies.