OPERATIONAL BARRIERS TO APPLYING LEGS

Research Report

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CONTENTS

1. INTRODUCTION AND PURPOSE OF THE OPERATIONAL RESEARCH ... 4
2. BACKGROUND AND CONTEXT FOR THE THREE TESTS ... 6
   - 2.1 Test 1 (Ethiopia) ... 6
   - 2.2 Test 2 (Zimbabwe) ... 9
   - 2.3 Test 3 (Kenya) ... 13
3. RESEARCH MODEL AND KEY ELEMENTS ... 17
4. RESEARCH METHODOLOGY ... 20
5. RESEARCH FINDINGS ... 22
   - 5.1 Functioning community animal health system ... 22
   - 5.2 Veterinary Pharmaceutical Supply Chain and Quality ... 32
   - 5.3 Community awareness and behaviour ... 40
   - 5.4 Voucher scheme ... 42
   - 5.5 Monitoring system ... 45
   - 5.6 Policy Context ... 46
6 ANALYSIS AND CONCLUSIONS ... 49
   - 6.1 Review of tests against the research model elements and criteria ... 49
   - 6.2 Conclusions regarding proof of concept for the model ... 61
7. RECOMMENDATIONS ... 62
   - 7.1 Recommendations for Voucher Models ... 62
   - 7.2 Recommendations for Community Based Animal Health Projects ... 65
   - Annex A: Original Research Protocol and Model ... 68
   - Annex B: Details on Research Methodology ... 78
   - Annex C: PVP Selection Criteria and Process ... 93
   - Annex D: Test 2 CAHW Training Curriculum ... 97
   - Annex E: Report from Online Survey ... 99

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List of Abbreviations

Agritex	Agricultural Technical and Extension Services (Zimbabwe)
AHA	Animal Health Assistant (Ethiopia)
AHT	Animal Health Technician (Ethiopia)
AHSP	Animal Health Service Provider
ASALs	Arid and Semi-Arid Lands
ATM	Automated teller machine
CAHW	Community Animal Health Worker (Ethiopia, Zimbabwe)
CBAH	Community Based Animal Health
CBV	Community Based Vaccinators (Zimbabwe)
CDR	Community Disease Reporter (Kenya)
CVSZ	Council of Veterinary Surgeons of Zimbabwe
DLVS	Department of Livestock and Veterinary Services (Zimbabwe)
DVO	District Veterinary Officer (Zimbabwe)
DVS	Department of Veterinary Services (Kenya)
DVS	Division of Veterinary Services (Zimbabwe)
ETB	Ethiopian Birr
FAO	United Nations Food and Agriculture Organization
FGD	Focus group discussions
FMD	Foot and Mouth Disease
GDPs	Good Disposal Practices
GSPs	Good Supply Practices
KAP	Knowledge, Attitudes, Practice
KII	Key Informant Interviews
KSh	Kenyan shillings
KVB	Kenya Veterinary Board
LEGS	Livestock Emergency Guidelines and Standards
MCAZ	Medicines Control Authority of Zimbabwe
ND	Newcastle Disease
OIE	World Organisation for Animal Health
POS	Point of sale machine (Kenya)
PVP	Private veterinary pharmacy
PVS	Performance of Veterinary Services
SOPs	Standard Operating Procedures
USAID	United States Agency for International Development
OFDA	Office of US Foreign Disaster Assistance
VDFACA	Veterinary Drug and Feed Administration and Control Authority (Ethiopia)
VEWs	Veterinary Extension Workers (Zimbabwe).
VMD	Veterinary Medicine Directorate (Kenya)
VMGDs	Veterinary Medicines General Dealers (Zimbabwe)
VMP	Veterinary Medicinal Products (Zimbabwe)
VSVP	Veterinary Surgeons and Veterinary Paraprofessionals (Kenya)

1. INTRODUCTION AND PURPOSE OF THE OPERATIONAL RESEARCH

This report presents the findings of the LEGS Operational Research project, funded by USAID/OFDA, entitled *Operational Barriers to Applying LEGS.* The research was carried out by the LEGS Project (hosted by Vetwork UK) and three partner projects in Ethiopia, Kenya and Zimbabwe.

The Livestock Emergency Guidelines and Standards (LEGS)[1] are a set of international standards and guidelines for the assessment, design, implementation and evaluation of livestock interventions to assist people affected by humanitarian crises. The ultimate aim of LEGS, a companion to the Sphere standards, is to improve the quality and livelihoods impact of livestock-related projects in humanitarian situations. Specific LEGS interventions are grouped into six categories: destocking, veterinary support, ensuring feed supplies, provision of water, livestock shelter and settlement, and provision of livestock.

LEGS is recognised and promoted by a growing number of donors globally and is implemented by a broad range of operational organisations, including NGOs as well as international agencies such as the Food and Agriculture Organization (FAO) and the International Committee of the Red Cross. Donors such as the Office of US Foreign Disaster Assistance (USAID/OFDA) also support the LEGS Project through funding, and USAID/OFDA has institutionalised the LEGS framework in its livestock programming.

Donors (and some implementing agencies) require that the procurement and distribution of livestock-related commodities meet certain quality standards, particularly veterinary pharmaceuticals, to ensure that these commodities are safe, effective, of good quality and at an acceptable cost. These regulations are particularly important given growing concerns about the poor quality of veterinary medicines in developing countries - either imported or locally manufactured – and weak testing and licensing procedures. USAID/OFDA procedures specifically include regulations on the sourcing of veterinary pharmaceuticals, and the need to apply for individual approval to purchase from non-prequalified wholesalers[2]. Other donors may have similar requirements.

Where NGOs procure veterinary medicines it is sometimes the case that they are then provided free. These livestock health humanitarian 'hand-outs' can undermine the development of the private primary animal health service delivery system and create a legacy of dependence. LEGS recognises the importance of the local private sector both during and after emergencies, and recommends support to local veterinary pharmacies and the use of community-based animal health workers where available. LEGS also recommends the use of voucher systems in emergency response as an effective and efficient method in areas where markets are working, as vouchers ensure targeting of vulnerable beneficiaries and support the existing private sector veterinary system.

Anecdotal reports indicate that some USAID/OFDA-funded implementers are facing difficult management decisions around how to provide beneficiaries with animal health service vouchers, as

[1] See https://www.livestock-emergency.net

[2] Pre-qualified wholesalers are recognised by USAID as 'consistently able to provide safe, effective, and quality essential medicines, and other medical commodities'. There are only 11 worldwide, and only one of these (in Jordan) stocks veterinary medicines. (USAID/OFDA Proposal Guidelines Pharmaceutical & Medical Commodity Guidance, January 2019)

advocated by LEGS, whilst also being fully compliant with USAID/OFDA regulations regarding the procurement, storage and distribution of veterinary pharmaceuticals. Such operational barriers may be particularly relevant in drought-affected regions in the Horn of Africa, East Africa and Southern Africa, where many organisations are currently implementing livestock projects including destocking, livestock feed supplementation and emergency animal health livelihoods-based livestock interventions as part of disaster related activities. The application of LEGS is critical in these and other livestock responses to ensure that best practice standards are met.

USAID/OFDA therefore awarded a grant to the LEGS Project to conduct Operational Research that would identify and test alternative programme models for the application of LEGS, while complying with key donor regulations specifically in the area of animal health. The research question was presented as: *What are the potential models that will allow the application of the LEGS standards on the use of the local veterinary private sector, and within the quality assurance requirements of USAID/OFDA?* Three partner projects were selected in three countries that were either currently funded or about to be funded by OFDA, and which included veterinary activities for livestock keepers affected by crisis. The Operational Research took place during 2019 and involved the development and testing of models to address the research question in order to develop a proof of concept in partnership with the three implementing partners and with USAID/OFDA.

The Operational Research was conducted in three Test sites and monitored using a range of data collection methods including: a pre- and post- Knowledge, Attitudes and Practice (KAP) survey using participatory approaches; key informant interviews with Community Animal Health Workers (CAHWs), Private Veterinary Pharmacies (PVPs), government veterinarians and partner staff; observational site visits; and finally a global survey of humanitarian actors worldwide. Samples of veterinary medicines were collected from CAHWs and PVPs for laboratory quality analysis, with secondary data from partner project documents as well as monitoring reports analysed to assess project progress and accomplishments.

A summary of the research findings was presented at three Learning Events, in Nairobi, Addis Ababa and Harare, at the end of November/beginning of December 2019, with the involvement of representatives of all three Test partners as well as a range of invited stakeholders including local government and donor representatives. Feedback and key points from the discussions have been incorporated into this report.

In Section 2 of this report the background and context of the Operational Research Test sites is summarised. Section 3 outlines the research model and test elements. Section 4 presents the research methodology. Section 5 provides an analysis of the research findings against the research model and elements. Section 6 presents an analysis and conclusions, and section 7 provides future recommendations. Annexes A – E contain further details, whilst the summary data tables are presented in an Appendix that is submitted separately to this report.

2. BACKGROUND AND CONTEXT FOR THE THREE TESTS

Three partner projects were identified for the Operational Research. In Ethiopia (hereafter referred to as Test 1), the partner OXFAM GB was implementing the "Integrated Emergency Response and Early Recovery Support in Somali Region, Ethiopia" project. In Zimbabwe (hereafter referred to as Test 2) the partner International Rescue Committee was implementing the "Supporting Resilience Building of Smallholder Livestock Farmers in Chiredzi and Chipinge District, Zimbabwe" (SURE) project, whilst in Kenya (hereafter referred to as Test 3) the partner Concern Worldwide was implementing the "Integrated Drought Recovery Program for Drought Affected Populations in Marsabit County'' programme. All three partner programmes/projects were funded by USAID/OFDA.

2.1 TEST 1 (ETHIOPIA)

BACKGROUND INFORMATION

Ethiopia, with a land mass of 1.104 million km^2 is home to the largest number of livestock resources in Africa. According to the national Central Statistical Agency[3], Ethiopia has 55 million cattle, 27.3 million sheep, 28 million goats and 4 million camels. Livestock forms a strong livelihood base for rural populations, with livestock production contributing to over 45% of the total agricultural GDP of the country, and an estimated 70% to 80% of the livelihoods of Ethiopia's agro-pastoral and pastoral communities[4]. The livestock sub-sector is constrained by several factors, including inadequate public and private animal health services, lack of market orientation, and an inability to comply with international health and quality standards.

Somali National Regional State is one of Ethiopia's largest regions, covering more than 350,000 km^2. Altitude varies from 1500 metres in the north west to about 300 metres in the far south, around the Wabi Shebelle river. The livelihoods of the pastoral and agro-pastoral communities of the region are affected by many factors, including conflict, environmental degradation, natural and man-made disasters, and changing livelihoods strategies. Livestock owners face a precarious socio-economic situation—plagued by food insecurity, limited access to basic social services and economic infrastructure, poor livelihood opportunities, shifting land ownership and access patterns, and a diminishing natural resource base. Consecutive years of drought and nutritional crises have deepened the hardships, depleting communities' coping mechanisms and resilience.

Test 1 was conducted in Jarar Zone, one of the 10 zones in Somali National Regional State and located in the north east of the region. It has a total population of 478,168[5]. The zone's arid and semi-arid land is suitable for the livestock production that is the major livelihood for the pastoral community. The partner project here is aimed at ensuring a comprehensive package of support is provided to drought affected communities in six woredas (districts) in Jarar Zone, and includes the provision of veterinary services through training of Community Animal Health Workers (CAHWs), mass animal vaccination campaigns and voucher-based animal treatment services.

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[3] https://cgspace.cgiar.org/bitstream/handle/10568/92057/LSA_Ethiopia.pdf?sequence=3&isAllowed=y
[4] https://www.igad.int/attachments/714_ETHIOPIA%20BRIEF%20(1).pdf
[5] http://www.csa.gov.et/census-report/complete-report/census-2007

POLICY CONTEXT

Animal Health Policy Context

The Livestock Resource Development State Ministry under the Ministry of Agriculture is the regulatory body responsible for veterinary services, with six directorates that include disease prevention and control, epidemiology and animal welfare. In Somali National Regional State the regional veterinary service department under the Regional Bureau of Livestock and Pastoral Development is the responsible body.

Ethiopia has over 19 endorsed or draft proclamations, regulations, strategies, standards and directives in relation to animal health and production services. Those of relevance to animal health services include: the Animal Diseases Prevention and Control Proclamation No. 267/2002; Minimum standards and guidelines for the establishment of CAHWs (2009); Directive for the Protection of Animals in Ethiopia; Veterinary Professions and Para-professions Regulation (draft); Regulation for the Prevention and Control of Animal Diseases (draft); and Veterinary Professions and Para-professions Proclamation (draft). There is little evidence of how these are applied and monitored.

As yet there is no veterinary statutory body in Ethiopia. In general, the Ministry of Agriculture, and in particular the Veterinary Directorate, are the primary responsible bodies for the policies, strategies and directives in relation to animal health services. In addition, the Regional Bureau of Livestock and Pastoral Development, along with the administration, and in particular the Veterinary Office, are the bodies responsible for local strategies and directives that should be in line with those at federal level. There is a loose connection however between the federal and regional governments, as regions consider themselves as the responsible government bodies for their own regions.

Veterinary Pharmaceutical Policy Context

The Veterinary Drug and Feed Administration and Control Proclamation No. 728/2011 is applicable to regulatory activities in respect of veterinary drugs, feed and veterinary drug professionals. The Veterinary Drug and Feed Administration and Control Authority (VDFACA) has two major provisions that define its scope:

1) Setting standards in relation to veterinary drugs, feed and veterinary drug professionals; and
2) Regulating trans-regional veterinary drug and feed production, distribution, promotion, storage and quality control and veterinary drugs, and feed import and export activities.

Though the regulation defines these two areas of work for the VDFACA, the monitoring and regulation of veterinary drugs, particularly at regional states and lower levels of administration, is weak. Retail traders and (PVPs), for example, are not under the control of the federal authorities.

The draft Veterinary Professions and Para-professions Regulation and Proclamation are each expected to set out training, registration and responsibilities of veterinarians and para-professionals, including certification of veterinary service facilities (veterinary clinics, pharmacies, laboratories) as well as support to CAHWs.

ANIMAL HEALTH SERVICES

Public and private veterinary systems exist in Jarar Zone, and a community-based animal health service delivery system has been widely used here long before it was officially endorsed by the Ethiopian government.

Public Animal Health Services

The Veterinary Service Department and the Regional Veterinary Laboratory are the responsible bodies for animal health activities in the region, with the structure being decentralised at woreda level to the woreda Livestock and Pastoral Development Office. Offices are staffed by Animal Health Technicians (AHT) of which there are 32 and/or Animal Health Assistants (AHA) of which there are 27. In Jarar Zone there is no qualified veterinarian. Animal health posts are found at kebele (ward) level, staffed by AHTs and in some cases CAHWs. The public animal health service has expanded recently in terms of staff and infrastructure, but most health posts have no basic diagnostic tools and lack veterinary drugs.

Private Animal Health Services

There are 18 PVPs in five of the six targeted woredas within Test 1. Nearly 45% of the PVPs are concentrated in Deghabour Woreda, the capital of Jarar Zone. Most PVPs are functioning well, but their activities are limited to dealing with veterinary pharmaceuticals rather than clinical examination and case treatment. Free drug distribution by UN agencies and the government, and the prevalence of illegal drugs coming through the border with Somalia, are challenges that affect the growth and expansion of private service delivery. PVPs, whether located in zones, district or in villages, are registered and licensed in the regional capital by the regional offices (the professional license by the agriculture and/or livestock bureau and the trade license by the trade and industry bureau), but inspection and follow up is done by the zonal or woreda office. There is no periodical or random monitoring: Although monitoring is usually done at the time of licence renewal there is no feedback from these licence renewal visits that help with PVP capacity building.

Community-based Animal Health Services

CAHWs are recognised by law and trained through a government approved standardised training curriculum[6]. Community-based animal health (CBAH) services in Jarar Zone were started 20 years ago by the South Eastern Rangeland Project, with different NGOs then taking up support for the initiative and over 96 CAHWs being trained and deployed. CBAH systems now cover a substantial area of the project partner's target woredas (with 106 CAHWs), and the systems aim to link trained CAHWs with PVPs so as to strengthen the privatised system at the grass roots level. There are between one and three CAHWs per kebele depending the size of the area they cover, their remoteness and livestock population. However, most CAHWs are not equipped with essential kits and drugs due to a weak veterinary drug supply chain and have limited support from woreda authorities once NGO operations end. They are not very active and are mostly involved in the administration of drugs purchased by the community from a PVP or government animal health post.

[6] Community Animal Health Workers Training Manual in Ethiopia, Facilitation guide; Ministry of Agriculture and Rural Development, Federal Democratic Republic of Ethiopia (2009).

Veterinary Pharmaceutical Supply and Distribution Chain

The VDFACA has a mandate to monitor the quality, safety, potency and efficacy of veterinary pharmaceutical products, however it has limited capacity to control veterinary drugs in all the states in the federation. It is made harder due to the control and regulation of drugs being the responsibility of the regional states, including monitoring of retail traders and PVPs. VDFACA is now establishing branch offices in the regional states to enable them to address their mandate. At federal level VDFACA licenses pharmaceutical importers and wholesalers, whilst the Ministry of Trade provides the business licenses. In principle, at regional state level, VDFACA provides the licenses for wholesalers, however in the Somali regional capital Jigjiga, the Livestock and Pastoral Development Bureau licences the wholesalers and the Trade and Industry Bureau provides the trade licences.

The drug supply chain in Test 1 site has two elements, private and public:

1. Private supply chain

Drugs are sourced either from importers/wholesalers in Hargeisa (Somaliland), an illegal route, or through the legal route in Addis Ababa. They are then supplied to the wholesaler in Jijiga or the PVP in Deghabour town, who then supplies the PVPs operating in the woredas and kebeles. There is no quality control for drugs sourced from Hargeisa, but all the pharmaceuticals sourced through Addis Ababa based importers and wholesalers pass through VDFACA quality control systems.

2. Public/Government supply chain

The public pharmaceutical supply chain follows the government structure, whereby the Regional Bureau is authorised by the woreda to facilitate the process of drug procurement from Addis Ababa. The woreda offices supply drugs to the Animal Health Post, who then sells drugs directly to the CAHWs and/or to the pastoralists. Public veterinary services are delivered on a subsidy basis and vaccinations against certain notifiable diseases are given free. UN Agencies and some NGOs implementing livestock emergency response interventions procure drugs from importers in Addis Ababa and hand them over either to the region or to their operational woredas to be supplied via the government structures, but on the basis of free distribution and/or through a voucher-based system.

Somali National Regional State is in close proximity to several other countries - Somaliland, Puntland, Kenya and Djibouti. Most of the borders are very porous, and the distances vast, making them conducive to the influx of illegal goods, including veterinary pharmaceuticals. This has led to drug supply and distribution chains having reduced product quality assurance and low adherence to regulations.

2.2 Test 2 (Zimbabwe)

Background Information

Zimbabwe has a total land area of 390,757 km^2 and is divided into 10 administrative provinces and 62 districts. The estimated human population is 13.061 million based on the 2012 census. The country is divided into five agro-ecological regions, also known as Natural Regions (NR). The potential for crop farming declines from NR I through to NR V. The country's economy has been in hyperinflation for the past decade, largely attributable to the sanctions imposed on the country after the Fast Track Land Reform Programme, which allowed acquisition of state lands and white-owned large-scale farms and estates for re-distribution to 150,000 farmers under two models, A1 and A2. The A1 model allocated

small plots of land to smallholder farmers, landless and poor people. The A2 model allocated large-scale farms and estates to those who had the skills and resources to farm commercially[7].

The LEGS Operational Research project was implemented in Chiredzi District, Masvingo Province, which is in agro-ecological regions IV and V. The district has low and often unpredictable rainfall patterns that are unsuitable for crop production. Livestock production is the main livelihood strategy for the farmers especially when there is crop failure. Chiredzi District is prone to severe food insecurity due to frequent and prolonged dry spells, and fodder scarcity and livestock disease outbreaks are perennial problems. Due to the economic situation, and its borders with South Africa and Mozambique, Chiredzi experiences cross border migration of men at their most productive years, resulting in many female-headed households[8].

In Test 2 site, the implementing partner had already carried out several livestock-based emergency interventions in wards 4, 5 and 10 of Chiredzi District, including destocking and livestock feed supplementation. Baseline interviews with PVPs and a literature review found that in other non-project wards in Chiredzi District, several NGOs had also used vouchers to allow beneficiaries to access animal health services from Community Based Vaccinators (CBVs) or directly from the PVP after receiving prescriptions from the government veterinary or agriculture extension workers. In 2013 Heifer International implemented the "Small Livestock for Household Wealth Creation" project that trained 80 CAHWs (of which 60 per cent were women) to help in livestock disease surveillance and treatment.

Policy Context

Animal Health Policy Context

Animal health services are regulated by the Department of Livestock and Veterinary Services (DLVS) under the Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement. Under the DLVS is the Division of Veterinary Services (DVS) that has the overall mandate to regulate the animal health services sector. There is no overarching veterinary policy or strategy, but there are several parliamentary acts that regulate the welfare and health of animals. The main acts include The Prevention of Cruelty to Animals and Scientific Experiments on Animals Act, and the Animal Health Act; the latter setting out regulations and guidelines for the management of economically important diseases. The Animal Health Act has several amendments (Statutory Instruments) that set regulations and guidelines for the management of economically important diseases. These mostly involve declarations of infected/ quarantine areas, movement restrictions, or give power to destroy wild animals if necessary for disease control as well as to erect veterinary fences and establish veterinary cordons[9]. The DVS is responsible for administering the Animal Health Act.

The Veterinary Surgeons Act (chapter 27:15) regulates animal health professionals in Zimbabwe. The act established the Council of Veterinary Surgeons of Zimbabwe (CVSZ) that has been in existence since 1962

[7] Grasian Mkodzongi and Peter Lawrence (2019) The fast-track land reform and agrarian change in Zimbabwe, *Review of African Political Economy*, 46:159, 1-13. https://doi.org/10.1080/03056244.2019.1622210

[8] Heifer International website https://www.heifer.org/blog/empowered-tshangani-women-hail-community-animal-health-worker-training.html

[9] Thomson, G and Penrith, M-L (2011) Animal Health Policy, Legislation and Trade in Beef in the Five Participating States of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA). Technical Report to the Wildlife Conservation Society's AHEAD Program. 132 pp. http://www.wcs-ahead.org/kaza/rpt_policy&legislation_tad_sci_ltr_final.pdf

and acts as the self-regulatory body of the veterinary profession. The CVSZ performs its core functions in line with the Veterinary Surgeons Act (chapter 27:15), which is currently being reviewed to include the roles and responsibilities of laboratory technologists and veterinary paraprofessionals that may include CAHWs. The CVSZ Annual Report of 2015 states that the country has 333 registered public and private veterinary surgeons, but does not indicate how many veterinary nurses and paraprofessionals are registered with the council[10].

Veterinary Pharmaceutical Policy Context

The Medicines Control Authority of Zimbabwe (MCAZ) is a regulatory body established by the Medicines and Allied Substances Control Act (Chapter 15:03) and its Statutory Instrument 150 of 1991. The MCAZ mandate is to control the manufacture, importation and sale of veterinary medicines to ensure they are safe, efficacious and of good quality. MCAZ licenses manufacturers, wholesale dealers, pharmacies, dispensing veterinary surgeons or veterinary medicines general dealers (VMGDs). MCAZ has a website that is updated regularly with a list of approved veterinary medicinal products (VMPs), guidelines on VMP registration, as well as guidelines on how to acquire and retain a personal and premise licence that will allow distribution and dispensing of VMPs. The MCAZ March 2016 guidelines outline the minimum requirements for premises meant for use as a VMGD outlet.

MCAZ categorises VMPs into three categories for distribution, as indicated by their registration details on the labels. The first category are veterinary prescription preparations that require a prescription from a veterinary surgeon and can only be dispensed or sold from a pharmacy or a licensed dispensing veterinary surgery, and should not be stocked by a VMGD outlet. The second category are over-the-counter veterinary medicines which are sold by approved VMGD outlets, pharmacies or dispensing veterinary surgeons, while the third category are household remedies that are sold from any shop with a valid trading licence including supermarkets. The guidelines indicate that all persons or businesses intending to sell veterinary medicines are required to be licensed as manufacturers, wholesale dealers, pharmacy, dispensing veterinary surgeon, VMGDs or household remedy veterinary medicines—with all licensed or approved premises required to have their licences or permits displayed prominently [11].

Animal Health Services

Animal health services are carried out as a joint effort between the public and private sector, the liaison between the state and non-state veterinary personnel being the work of the DVS. The main mandate of the DVS is to prevent the entry, establishment, spread and resurgence of animal diseases and pests of economic and zoonotic importance. The DVS concentrates on highly contagious and zoonotic animal pests and disease of a trans-boundary nature, and those which can be spread through trade in animals and animal products. The DVS, as provided for in the Animal Health Act, also has the authority to operate through delegation of powers to non-government veterinary players.

The DVS is continuously faced with low budget allocation and has therefore had to restructure and streamline service delivery to concentrate on core business, and shed non-core activities to the private sector through the introduction of cost recovery mechanisms for core functions. These include dipping

[10] Council of Veterinary Surgeons of Zimbabwe (CVSZ) website annual reports retrieved from https://www.cvsz.co.zw/annual-reports/

[11] MCAZ website https://www.mcaz.co.zw/index.php/downloads/category/9-regulations-guidelines?download=73:march-2016-guidelines-on-operating-veterinary-medicines-general-dealer-shop&start=10

to prevent tick-borne diseases, vaccination for priority trade sensitive diseases such as Foot and Mouth Disease (FMD), anthrax and black quarter, as well as certification and provision of permits. Farmers are expected to pay for drugs and other treatments, while the government pays for the salary and transport of the service providers. The cost recovery generates revolving funds that can be used to supplement limited government funding. The government has also privatised the sale of drugs and vaccines along with veterinary clinical services for domestic and wild animals.

Public Animal Health Services

The World Organisation for Animal Health (OIE) Performance of Veterinary Services (PVS) Pathway Gap Analysis report of 2014 found that there was a critical human resource gap that stood at 33% in the public sector, especially at veterinary surgeon level. At paraprofessional level the human resource gap was more positive however. The 2014 PVS report was in line with a 2006 study that found that the country had 47 public veterinarians supported by 2,673 veterinary paraprofessionals. Responding to the recommendations of the PVS reports, the Public Services Commission interviewed 56 veterinarians, but by 2017 the vacancies had still not been filled due to the economic hyperinflation. This inability to adequately fund recurrent and capital budgets has caused the collapse of public sector services that once relied on an epidemiological surveillance network of infrastructure comprising eight Provincial Veterinary Offices, 53 District Veterinary Offices, and 412 sub-district animal management and health centres. The country has one central veterinary laboratory in Harare and three provincial diagnostic laboratories. Before the Fast Track Land Reform Programme, the DVS provided cattle dipping services to smallholder farming areas through which there were over 2,660 dip tanks and about 4,000 in the commercial farming sector. Limited budgets now prevent the DVS from offering these services, resulting in the establishment of endemic status of the once controlled diseases such as FMD, Newcastle Disease (ND) and tick-borne diseases[8]. Chiredzi District is located next to wildlife national parks/reserves, making it particularly vulnerable to frequent FMD outbreaks.

Private Animal Health Services

There are 32 private veterinary surgeries in Zimbabwe, located mainly in large urban centres. They mostly provide clinical services to pet owners, but some also provide clinical and advisory services to commercial farmers[8]. The project partner's SURE project had already trained several farmers as feedlot managers and was targeting them to join the already existing CBVs to provide community animal health services for the LEGS Operational Research project. The DVS is considering the introduction of CAHWs to increase the workforce at the primary point of care, as well as to reduce costs. The DVS staff at district level together with NGOs have initiated several community-based animal health initiatives across the country by training farmers as CBVs, for example as for ND poultry vaccinators and as CAHWs[12].

Veterinary Pharmaceutical Supply and Distribution Chain

The regulation of the veterinary pharmaceutical supply and distribution chain is under the mandate of MCAZ. As of September 2019, MCAZ had registered 319 VMPs, the majority being tetracycline antibiotics, acaricides and vaccines (for poultry and companion animals). The MCAZ website indicates that as of August 2018 the country had two VMP manufacturers, 40 VMP wholesalers, 12 veterinary surgeons who own practices that dispense prescription and over-the-counter VMPs, and 269 VMGDs

[12] Alec Bishi, Pious V. Makaya and Andrew Chamisa (2006). Zimbabwe's agricultural revolution revisited https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/10038/Eicher,C.K.,Tawonezvi,P&Rukuni,M.%20Snythesis%20(book%20chapter).pdf?sequence=1

that dispense over-the-counter VMPs. MCAZ conducts random spot checks to ensure premises are complying to set standards and that they are selling MCAZ licensed products; however due to the current economic crisis, MCAZ has staff shortages and is unable to adequately carry out its regulatory mandate[13]. The 2015 CVSZ Annual Report indicates that that there is a rampant practice of VMGDs selling prescription preparations, farmers accessing illegal and unlicensed VMPs, and laypersons carrying out veterinary activities[14]. Chiredzi District, due to its remote location, has only 2 licensed VMGD stores and is therefore not able to meet the local VMP demand. In addition, the district has international borders that make it a high-risk smuggling entry point for illegal and often counterfeit VMPs.

2.3 TEST 3 (KENYA)

BACKGROUND INFORMATION

Kenya has a total land area of 580,367 km² and is divided into 47 geographical administrative units called counties, of which 23 are classified as Arid and Semi-Arid Lands (ASALs) and constitute approximately 80% of the country's landmass. The ASALs are generally marked by low human development indicators, high levels of poverty, low literacy rates, overall low population densities but high growth rates, and poor levels of infrastructure investment and development. The ASALs are endowed with a rich and diverse natural resource base that supports 90% of the country's wildlife, 70% of its livestock[15] and 33% of the country's human population—which currently stands at 47.6m based on the recently released 2019 Kenya Population and Housing Census[16].

Test 3 was implemented in Marsabit County, which is predominantly arid and is the second-largest county in Kenya. Pastoralism is the main viable livelihood option as a result of the low and erratic precipitation which has high temporal and spatial variability. The county is highly susceptible to climate-related extreme events, such as droughts and floods, that have increased in frequency and intensity. A recent government climate risk report found that drought in Marsabit County occurs every three years. The report estimates that in March 2017 pastoralists in the county lost over 60% of their livestock due to the prolonged drought, and highlights that floods in the county have increased in frequency and now also occur during the short rainy season[17].

The Test 3 partner had previously piloted an electronic voucher system in Marsabit County, dubbed E-wallet, that gave beneficiaries automated teller machine (ATM) cards to allow them to access money through a local bank and use it to buy livestock feeds or veterinary drugs at designated Sidai franchise PVP shops. The success of the E-wallet model led to the partner's involvement in Test 3.

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[13] Gwatidzo, S.D. , Murambinda, P.K. , Makoni, Z. Medicines counterfeiting in Africa: a view from Zimbabwe. Med Access @ Point Care. 2017; 1(1): 82–86. https://doi.org/10.5301%2Fmaapoc.0000017

[14] CVSZ website https://www.cvsz.co.zw/annual-reports/

[15] Kenya Country Situation Assessment: Working paper produced by the Pathways to Resilience in Semi-arid Economies (PRISE) project. https://www.prise.odi.org/wp-content/uploads/2016/01/Low-Res_Kenya-CSA.pdf

[16] 2019 Kenya Population and Housing Census Volume I: Population by County and Sub-County; Kenya National Bureau of Statistics. https://www.knbs.or.ke/?wpdmpro=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county&wpdmdl=5615&ind=MNvFq7lrj1-Gxuh34D_gMkjI0ukV4XxfCwFuhfsUq1wwxYxr-cfYZapdWYflQl57

[17] Kenya County Climate Risk Profile Series. Climate Risk Profile Marsabit County. https://ccafs.cgiar.org/publications/kenya-county-climate-risk-profiles

POLICY CONTEXT

Animal Health Policy Context

The 2015 Veterinary Policy outlines the road map for the development and growth of the animal health sector in Kenya, supported by 26 acts of parliament that constitute the legal framework governing the animal resource industry[18]. Veterinary services are under the control of the Department of Veterinary Services (DVS), whilst the Kenya Veterinary Board (KVB) regulates the training and licensing of animal health practitioners. Both DVS and KVB enforce the acts of parliament. Veterinary services in Kenya are devolved with most functions assigned to county governments. The national government has retained its regulatory, standard-setting, licensing, policy development and enforcement roles[19]. In ASAL counties, access to quality animal health services is challenging due to the infrastructure underdevelopment hindering private sector investment. The policy decisions taken in the 1980's to privatise animal health services, and in 1998 to stop the training and use of CAHWs without proposing alternative options,[20] has further contributed to marginalisation of the ASALs.

Veterinary Pharmaceutical Policy Context

The Veterinary Medicines Directorate (VMD), established under the Veterinary Surgeons and Veterinary Paraprofessionals (VSVP) Act CAP 366 of 2011, has a mandate to oversee the manufacture, importation, exportation, registration, distribution, prescription and dispensing of veterinary medicines. Through the Kenya Gazette LEGAL NOTICE NO. 209 SPECIAL ISSUE 1343, the VSVP Act outlines guidelines for registering of veterinary medicine and pesticides, veterinary importers, wholesalers and retailers, as well as setting guidelines for establishing veterinary pharmacies. The VSVP Act categorises VMPs into various categories. Categories I and II are Prescription Only Medicine, and are only dispensed by veterinary surgeons or veterinary paraprofessionals with over five years practicing experience: they are mainly opiods, analgesics, anaesthetic and trypanocidal agents. Categories III and IV are VMPs licensed for general sales, and do not require a prescription, but should be sold by licensed premises: they include anthelmintics, antibiotics and anti- inflammatory drugs. Category III and IV drugs are over-the-counter drugs that can be sold to livestock keepers [21].

ANIMAL HEALTH SERVICES

The DVS is the animal health authority for the country. To enhance reporting and control of animal diseases the DVS has designated certain diseases, that lead to high economic losses or are zoonotic, as notifiable. Disease reporting is the mandate of all livestock value chain actors, while control of notifiable diseases is the responsibility of national and county governments. Control of other non-notifiable diseases is the responsibility of accredited private sector service providers. The public and private sector will often partner up however in the control and management of notifiable animal diseases. The distribution of professionals and paraprofessionals is skewed against the ASALs where the technical-staff to livestock keepers ratio is 1:1000 at best[22]. To help improve the quality of training and to address gaps in veterinary service delivery, in 2017 the DVS in partnership with KVB began a one year internship

[18] Draft Kenya Veterinary Policy (2015). https://www.kenyamarkets.org/wp-content/uploads/2016/06/Kenya-Veterinary-Policy-January-2015-Draft.pdf

[19] http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/VeterinarySurgeonsandVeterinaryPara-ProfessionalsAct__No29of2011.pdf

[20] Animal Health Care in Kenya: The Road to Community-based Animal Health Service Delivery (2003). Working Paper 214, Overseas Development Institute. https://www.odi.org/publications/working-papers/214-animal-health-care-kenya.pdf

[21] https://infotradekenya.go.ke/media/Legal%20Notice%20No.%20209%20Vet.%20Surgeons.pdf

[22] Draft National Livestock policy (February 2019). http://www.kilimo.go.ke/wp-content/uploads/2019/02/Draft-reviewed-National-Livestock-Policy-February-2019.pdf

programme with a target of training 1,000 animal health graduates annually. Despite these efforts, the ASALs still have a critical human and infrastructure resource gap that allows untrained individuals to offer services, as well as engage in trade of sub-standard or counterfeit pharmaceutical products.

Public Animal Health Services

At county level, the County Director of Veterinary Services is in charge of animal health services. Devolution of animal health services has allowed county governments to set their own agenda, and some ASAL counties have not recruited Animal Health Service Providers (AHSPs) to fill the human resource gap. Marsabit County has only 38 public AHSPs to serve the expansive county. Most of the public AHSPs are only found at sub-county or ward level, and due to the lack of offices most of the staff are not based at their duty stations. To address the shortage of skilled AHSPs, Marsabit County has more than ten interns attached to the department of veterinary services.[23,24]

Private Animal Health Services

The few private AHSPs in the county run PVPs and offer minimal clinical services due to lack of transport. Livestock keepers have a high dependency syndrome due to the *ad hoc* emergency responses from government, NGOs and development agencies that offer free clinical services and veterinary medicines, undermining private sector opportunities. Livestock keepers therefore have to rely on themselves or other experienced herders to diagnose and treat their livestock at other times.

Veterinary Pharmaceutical Supply and Distribution Chain

The VMD has very few staff at the national level and no staff at county level, and cannot effectively fulfil its regulatory mandate. Most importers, who also act as repackaging points and wholesale distributors, strictly adhere to the quality and regulation standards. However, the supply and distribution chains at retailer levels have reduced product quality assurance and low adherence to regulations due to the formal and informal channels that exist especially in ASAL areas. VMD regulations stipulate that all retail veterinary pharmacies are required to pay for a one-off premises inspection fee of KSh 15,000 and have annual random spot checks. VMD also requires the veterinary pharmacy stores to pay an annual veterinary pharmacy retail practice fee of KSh 10,000[25].

The formal retail distribution channel of veterinary medicines is through veterinary pharmacy stores, the majority of which are franchise stores of a wholesaler. The retail stores are licenced by the county government through an annual single business permit licence, however the retail outlets often do not conform to the VMD retail veterinary pharmacy regulations. Most grocery shops, and commodity traders in livestock markets, sell veterinary medicines directly to livestock keepers, although many of these products are of sub-standard quality or are counterfeit products. There are wholesalers specialising in products for either/both low rainfall pastoral areas and high rainfall agricultural and dairy production areas.

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[23] Stakeholders' Workshop on Veterinary Service Delivery in Underserved ASAL Counties of Kenya: Transition from VSD by CBAHWs to VSD by KVB Registered Practitioners. https://www.galvmed.org/animal-health-experts-discuss-future-veterinary-service-delivery-kenyas-arid-semi-arid-lands/

[24] Marsabit county capacity needs assessment report livestock sector (January 2018). Publication was prepared by Bridge Africa ADC for the Millennium Water Alliance - Kenya RAPID Program https://www.academia.edu/37637056/Marsabit_County_Capacity_Needs_Assessment_for_the_Livestock_Sector

[25] http://www.vmd.go.ke/downloads/

The county government has tried to regulate the informal channel by conducting random spot checks and confiscating products. However, the shortage of staff, lack of logistical support and the fact that regulation is a national VMD mandate not a county one, allows the informal channels to remain unchecked and presents unfair competition to the formal private retail channels.

3. Research Model and Key Elements

In response to the research question, *What are the potential models that will allow the application of the LEGS standards on the use of the local veterinary private sector, and within the quality assurance requirements of USAID/OFDA?* a research protocol and model was developed. The model drew from the USAID/OFDA pharmaceutical requirements and guidance[26], and the LEGS Handbook guidance on community-based animal health care and vouchers[27].

The Operational Research would aim to test a model of an animal health treatment voucher scheme, comprising a CAHW focused model implemented in Test 1 and Test 2, and an e-voucher scheme for an AHSP focused model implemented in Test 3. Annex A explains the proposed Operational Research study procedure, including how the project partners would be supported by the LEGS Project to put in place the pre-requirements for the model. Support from the LEGS Project would include guidance on:

- procurement of veterinary inputs including market assessments, selection and USAID/OFDA approval of wholesaler(s), and determination of the process to identify PVPs and build their capacity to ensure good practice in the procurement, storage and distribution of quality USAID/OFDA-approved drugs
- the voucher scheme process so as to ensure targeting of vulnerable beneficiaries as well as helping to strengthen the veterinary input market in emergency situations
- community awareness creation and training of animal health service providers as well as putting in place monitoring structures.

The appendices within Annex A explain the five steps that project partners would go through to establish, implement and then monitor the CAHW/AHSP voucher model. The key elements of the research model being:

1) Functioning CBAH system
2) Veterinary pharmaceutical supply chain and quality
3) Community awareness and behaviour
4) Voucher scheme
5) Monitoring system
6) Policy context.

The key criteria for each of these elements were identified as follows:

1. Functioning private CBAH system:
    a. Appropriate training curriculum for the local disease context, including cost recovery and business skills
    b. CAHWs/AHSPs with skills to provide quality service appropriate to the local context based on a valid animal health provider-owner-animal relationship that includes taking a history, physical examination, diagnosis and treatment choice

[26] USAID/OFDA Proposal Guidelines Pharmaceutical & Medical Commodity Guidance, January 2019

[27] See LEGS (2014) in particular: page 119 on community animal health workers; pages 65 and 66 on veterinary vouchers; Clinical Veterinary Services Standard 1: Service design, Key Actions and Guidance Note 4 on pharmaceutical quality; Core Standard 2 on preparedness; and Core Standard 3 on competencies.

c. CAHWs/AHSPs trained in drug protocols and maintaining quality of veterinary pharmaceuticals including dosage, withdrawal periods, storage and disposal
d. Appropriate CAHW/AHSP equipment
e. Effective links with public/private sector veterinary professionals for monitoring, referrals and support
f. Market-based system for service provision which includes service fee for providers

2. Veterinary pharmaceutical supply chain and quality:
    a. USAID/OFDA approved veterinary pharmaceuticals supplied by USAID/OFDA approved wholesalers, and procured by nationally registered/licensed PVPs identified by partners using selection criteria approved by USAID/OFDA
    b. Approved wholesalers and registered/licensed PVPs able to procure, store, and supply approved pharmaceuticals to project CAHWs/AHSPs
    c. Memoranda of understanding between key actors in the supply chain (where possible allowing market forces to drive the supply chain)
    d. PVPs trained in drug protocols and maintaining quality (as defined above)
    e. Quality supply chain not compromised, based on: quality pharmaceutical products, storage, distribution, dosage, and disposal - according to USAID/OFDA requirements
    f. Random selection of pharmaceuticals tested to confirm active ingredients and purity/safety
3. Community awareness and behaviour:
    a. Community engagement in planning activities, including prioritisation of diseases
    b. Community involvement in selection of CAHWs/AHSPs
    c. Community involvement in selection of target beneficiaries
    d. Community awareness on quality of drugs, value of services provided and how cost recovery is calculated
    e. Creation of community animal health committees or use of existing community structures to support the process
4. Voucher scheme:
    a. Elements 1-3 above incorporated into a voucher scheme that ensures good coverage and targets vulnerable community members
    b. Vouchers designed based on consultation with the private sector to determine the redemption period, and appropriate values for delivery of animal health services, including drug fronting vouchers and service vouchers where appropriate
    c. All key stakeholders including government understand and are engaged in the scheme based on MOUs
    d. Voucher redemption system established and working
    e. Beneficiary satisfaction with scheme and positive impact on livestock
5. Monitoring system:
    a. Checking batch numbers, packaging and source of drugs from CAHWs/AHSPs and PVPs
    b. Random inspection of CAHW/AHSP kit contents and storage
    c. Random laboratory drug quality testing where possible at both PVP and CAHW/AHSP levels
    d. Random inspection of CAHWs, PVPs and suppliers including: drug management, storage and distribution preferably based on Standard Operating Procedures (SOPs), Good Supply Practices (GSPs) and Good Distribution Practices (GDPs)

e. Collection and tracing of used vouchers (or monitoring of electronic system) to ensure inclusion of only targeted beneficiaries and use of vouchers only for approved services
f. Baseline and endline studies of beneficiaries - CAHWs/AHSPs, PVPs and suppliers

6. Policy context:
    a. Appropriate policies in place in support of privatised community-based animal health system
    b. Veterinary pharmaceutical regulatory policies, including licensing and inspection procedures for wholesalers and PVPs, ensure that quality pharmaceuticals are available for privatised community-based animal health services
    c. Key actors, including wholesalers, PVPs, CAHWs/AHSPs and implementing partners are aware of and adhere to relevant regulations.

In Test 3 the model was adapted because the national private and public animal health service in Kenya does not incorporate the cadre of CAHWs, therefore the voucher scheme was based on private animal health service providers of various cadres—from certificate, diploma, and a degree in animal health—as the key players in service provision.

4. RESEARCH METHODOLOGY

The three partner projects were identified following a search and selection process based on the following criteria:

- operational partners providing veterinary support in emergency situations;
- currently in receipt of, or in the process of applying for, USAID/OFDA funding for this work;
- willingness of project management and staff to work with the LEGS Project and USAID/OFDA on the Operational Research, including a commitment to testing the models developed.

In each case the project proposal submitted to USAID/OFDA was modified or adjusted to include a voucher scheme based on the relevant model, and to enable the Operational Research to be carried out alongside project implementation.

Following a review of relevant secondary data, including USAID/OFDA regulations and requirements regarding the purchase of veterinary pharmaceuticals, the research model was finalised in collaboration with USAID/OFDA, and joint work plans developed with the three partners. Monitoring and evaluation and data collection were initiated on commencement of the project. The research methodology was based on a multi-method research approach using both quantitative and qualitative data collection methods, which can be summarised as follows (full details of the methodology are presented in Annex B):

1. Knowledge, Attitudes, Practice (KAP) baseline and endline studies using Focus Group Discussions (FGD) with community members
2. Key Informant Interviews (KII) on animal health service delivery with CAHWs/AHSPs, PVPs, government staff, and Test partner project staff
3. Observational site visits and spot checks to review veterinary pharmaceutical quality with PVPs and CAHWs/AHSPs
4. Laboratory tests to check the stability of the active ingredients of the veterinary pharmaceuticals in use
5. Global online stakeholder survey administered via the LEGS website and mailing list to consult practitioners and policy makers around the world about their experiences of providing veterinary support in emergencies (see Annex E for survey report).
6. USAID/OFDA also carried out field visits to the three Test sites during the research period.

Detailed checklists were developed for each method. Data collection took place between March and September 2019. Delayed implementation of the Test 1 voucher scheme meant that only baseline and partner staff data could be collected from that project. Data from each partner project was transcribed into data collection sheets which were then collated and summarised according to type, and then pulled together by country. (This information is presented in a separate appendix to this report).

KEY METHODOLOGY CONSTRAINTS AND CHALLENGES

Constraints and challenges to the implementation of the Operational Research included the following:

- The identification of appropriate partners proved very challenging and took more time than originally planned. This was in part a reflection of the reluctance of many implementing organisations to undertake the steps involved in meeting USAID/OFDA veterinary pharmaceutical requirements – the issue which had led to the research in the first place. The majority of potential project partners were

focussing on seed vouchers and cash distribution. A number of locations were also ruled out due to the lack of a functioning private sector and/or security constraints.

- The initiation of the voucher schemes within the partner projects was considerably delayed, as a result of a combination of factors including the need for additional approvals (for example to modify existing awards to include the voucher scheme/research activities); and the technical capacity of the partners to design the scheme.
- In addition, in Test 1 there was no time for a post project assessment as implementation of the project was delayed. In Test 2 Cyclone Idai meant that all project activities stopped for two months to assist in humanitarian efforts. And in Test 3 due process from the bank for supporting the e-voucher scheme meant the project implementation period was also delayed.

5. RESEARCH FINDINGS

The project sites in the three countries are prone to frequent cyclic droughts that result in humanitarian crises warranting constant interventions. This Operational Research project was thus nested in on-going emergency interventions being implemented by the partners in the three project sites. As noted above, the research aimed to test a model animal health treatment voucher scheme comprising a CAHW voucher scheme implemented in Test 1 and Test 2, and an e-voucher scheme for AHSPs implemented in Test 3, based on six key elements. The findings are presented here according to these elements and criteria. A global survey was also undertaken to identify the wider extent of the challenges in implementing LEGS veterinary support and feed supplementation standards, and the root causes of these challenges, in order to provide a broader context for the Operational Research (see Annex E for the results of the global survey report).

5.1 FUNCTIONING COMMUNITY ANIMAL HEALTH SYSTEM

Prior to the Operational Research, there was on-going presence and provision of animal health services in all three countries. However, as highlighted in section 2, these rural services are characterised by a chronic lack of staff, limited veterinary supplies and poor logistical support. It was observed in all three countries that clinical veterinary services are considered a private good that is supposedly provided by private AHSPs, who include various cadres of animal health graduates in Kenya, plus agriculture and livestock extension officers in Zimbabwe, and CAHWs in Ethiopia. The governments mostly provide disease control support to herders through vaccination of important trans-boundary diseases. In some instances, governments and development agencies intervene to provide free veterinary supplies to farmers and herders.

PRE-PROJECT, TEST 1

In **Test 1**, the veterinary service system legitimately incorporates CAHWs as the frontline service providers to pastoral herders. CAHWs are part of the animal health referral system that also incorporates other cadres of animal health service providers with certificates, diplomas and degrees in veterinary sciences working in private or public sectors. The CAHWs undergo training of 21 days based on a standard national CAHW curriculum set by government, with frequent refresher training particularly during mass vaccinations sponsored by government or development agencies. The CAHWs, on graduation, are provided with a standard field veterinary kit with basic animal health equipment. Government veterinary officers are responsible for training and monitoring, and offer referral support to the CAHWs. CAHW trainers have to be accredited and most work for the government. Most private veterinarians are engaged in pharmacy businesses however and do not routinely engage in CAHW supervision unless they are involved with an NGO CBAH project. There is a very limited private veterinary sector other than CAHWs. Government veterinary staff deliver curative services, however their numbers are very scarce, they are mainly at animal health posts, and they have few supplies. The government veterinary staff's capacity to attend to herders' animal health needs is therefore quite limited.

PVPs are needed to complement the CAHWs' work in the field, and there is a network of 18 established PVPs in 5 of the 6 woredas in Jarar Zone. The PVPs are the main suppliers of veterinary medicines to the CAHWs and pastoral herders. The government supplies drugs in times of drought, but in normal times the government only procures drugs twice a year. This means that the main source of drugs for herders are the PVPs and illegal cross border trade drugs.

In the baseline study for the Operational Research in Test 1 the community recognised four types of AHSPs prevalent in their area: government animal health technicians, PVPs, CAHWs and unskilled herders. The term unskilled herders is used to define herders who treat their own animals or are called upon by their neighbours to carry out livestock treatments on their herds since they may have more experience than other herders. The different service providers were assessed for the quality of the services they offer, see Table 2 below. (The full set of data analysis tables is provided in the separate appendix). The criteria of assessment for AHSPs included their availability, accessibility, affordability, acceptability and overall service quality[28]. These were first weighted, as shown in Table 1:

Table 1: Pre-project Test 1 weighting of criteria

	Weight per criteria
Availability	20.56
Accessibility	15.74
Affordability	16.92
Acceptability	13.89
Quality	33.82

Respondents considered the quality of the animal health service provided to be the most important (33.8%), followed by availability, affordability, accessibility and acceptability. The criterion of quality was given more weight by women and men. Women consider the second most important criterion to be acceptability followed by availability accessibility and affordability equally weighted. Men indicated the second most important criterion to be availability followed by affordability, accessibility and acceptability.

Table 2: Pre-project assessment of veterinary health service providers by women and men groups Test 1 (Mean score n=9)

	PVP	Government Vet	CAHW	Unskilled Herder
Availability (W=0.246)	3.22	3.78	6.56	7.00
Accessibility (W=0.357)	1.63	2.78	4.22	7.11
Affordability (W=0.750***)	1.25	8.56	2.89	4.22
Acceptability (W=0.417*)	1.00	7.11	3.78	2.00
Quality (W=0.856***)	3.38	19.44	7.44	3.56
Score per provider	**10.47**	**41.67**	**24.89**	**23.89**

n=sample size: W=Kendall's Coefficient of Concordance (*P<0.05; **P<0.01; ***P<0.001). The numbers are the mean scores for each animal health service provider against service assessment criteria as scored by informants during the proportion piling.

The respondents indicated that government animal health technicians provided the best service rated at 41.7% followed by the CAHW and unskilled herders. The PVPs were ranked lowest. The respondents were significantly in agreement in scoring affordability (W=0.75, p<0.001) and quality (W=0.856, p<0.001), however there was low agreement on the other three criteria. The main challenge to the CAHWs' work was the limited veterinary drug supply that was mainly dependent on government drug supplies to the woreda animal health posts. Whilst the PVPs are well supplied with drugs, the government supply system is inconsistent for CAHWs, or they administer drugs dumped as a relief commodity. It is probably for this

[28] These are commonly used indicators for animal health services. Definitions can be found in FAO 2016. *Livestock related interventions during emergencies – The how-to-do-it manual,* eds Ankers, Bishop, Mack and Dietze, page 166-167.

reason that CAHWs argue veterinary drugs sourced from PVPs are expensive: they compare them with cheap unsupervised drugs delivered by development agencies which also leads to herders refusing to pay for their services offered based on true market prices. The PVPs are considered by herders to be traders, and thus are not well trusted on account of their profiteering. The community scored government AHSP services very highly on quality and affordability overall, even though the drugs are only available once or twice a year. The government drugs, and those provided by PVPs, were viewed by herders to be of good quality. When development agencies provide free drugs they undermine the PVPs' business and create a 'hand-out' culture among herders. Unskilled herder services are second most popular according to the men because of their easy access and availability, otherwise their service was deemed of poor quality, expensive and not very acceptable. However, women preferred CAHWs as the second most important service provider on account of their availability, accessibility, quality and acceptability. The women also value government AHSPs for acceptability, while men value their availability and affordability. The PVP scored low on these factors because they specialise in drug selling without attending or giving advice to herders.

POST-PROJECT TEST 1

During the project thirty-six new CAHWs were trained[29] and equipped with field kits[30] and canvas bags, to join a pool of 50 existing CAHWs who were also given refresher training and participated in vaccination campaigns. The CAHWs were sensitised on the treatment voucher scheme and were introduced to PVPs that would be their veterinary drug suppliers. As part of the regular system of institutional support, a CAHWs platform was set up for CAHWs, PVPs and relevant government officials to meet on a regular basis. Unfortunately, further data could be not collected from Test 1 because implementation of the project was delayed until after the Operational Research collection period had ended.

PRE-PROJECT TEST 2

In Test Area 2, government and private veterinary services are the most commonly accessed AHSPs by the farmers, however the numbers of government veterinary personnel who manage the animal health management centres are very few in this extensive district. In the three wards (4, 5 and 10) where the Operational Research was implemented there was only one ward veterinary extension officer, who had no training in animal health. FGDs with farmers indicated that most had not had contact with the local officer and for those that had been attended to, service was only offered once or twice a year. The main government staff offering animal health services are therefore the few general agricultural extension workers (known as Agritex officers) who have limited training in animal health, and in most cases they make their diagnosis over the phone or prepare prescriptions that farmers use to purchase drugs from PVPs. The Agritex officers are in contact with farmers almost on a weekly basis. The poultry vaccinators who undergo a one-day training in vaccination are limited in their capacity to attend to any other animal health issues, but since the poultry vaccinators are called on by farmers to attend other livestock cases, they are often referred to as CAHWs. Baseline FGDs indicated that the poultry vaccinators were not evenly distributed, and in most instances farmers had not had contact with them, while a few indicated

[29] The training was based on the government certified training curriculum (although the quality of the training was not assessed by the research team): Community Animal Health Workers Training Manual in Ethiopia, Facilitation guide; Ministry of Agriculture and Rural development, Federal Democratic Republic of Ethiopia (2009).

[30] The kit contents were: syringes, needles, vaccination syringes and needles, spares, thermometer, hoof trimmer, scissors, forceps, sterilising dish, measuring cylinder, cotton wool, Savlon, iodine, alcohol.

they were their neighbours. Due to the limited number and sparse distribution of veterinary technical staff, the animal health referral system was found to be weak.

Based on information gathered during the baseline key informant interview with the District Veterinary Officer (DVO), Chiredzi District has 25 animal health trained staff working in the entire district: six are veterinary medicine degree holders and are called animal health inspectors, and are based at the DVO office in Chiredzi town; the rest are diploma holders and are referred to as Veterinary Extension Workers (VEWs). The VEWs staff are not distributed evenly in the district, for example the LEGS partner project sites in wards 4, 5 and 10 had no trained animal health personnel at ward level.

The baseline community assessment of AHSPs revealed four types: government, VEWs, Crop and Livestock extension workers (Agritex), poultry vaccinators and farmers, as shown in Table 4, with the weighting of the criteria shown in Table 3.

Table 3: Pre-project Test 2 weighting of criteria

	Weight per criteria
Availability	19.2
Accessibility	22.0
Affordability	9.3
Acceptability	22.0
Quality	27.5

During the pre-project assessment of service providers, the respondents indicated the most important criterion of service to be quality (27.5%), followed by acceptability, accessibility, availability and affordability. Women considered quality to be most important followed by acceptability, accessibility, availability and affordability. In contrast, men considered availability to be most important followed by accessibility, quality, acceptability and affordability.

Table 4: Pre-project assessment of veterinary health service providers by women and men Test 2 (Mean score n=6)

	Govt Agritex	Govt VEW	Poultry vaccinators	Farmers
Availability (W=0.623*)	9.33	1.67	0.17	8.00
Accessibility (W=0.714**)	12.83	2.17	0.50	6.50
Affordability (W=0.676**}	5.67	0.67	0.33	2.67
Acceptability (W=0.648**)	11.33	0.83	0.50	9.33
Quality (W=0.477*)	16.83	6.17	0.50	4.00
Score per provider	**56.0**	**11.5**	**2.0**	**30.5**

n=sample size: W=Kendall's Coefficient of Concordance (*P<0.05; **P<0.01; ***P<0.001). The numbers are the mean scores for each animal health service provider against service assessment criteria as scored by informants during the proportion piling.

Respondents consider the Agritex officers to be the most important AHSPs (56.0%) followed by farmers and government veterinarians. The Agritex officers were the most available, accessible and their service was considered of good quality compared to others. The second most important group of service

providers were the farmers themselves: Some farmers with interest and skills in modern or traditional ethno-veterinary medicine provide their services to the community; however it was clear that community dependence on this group was based on their availability, accessibility and acceptance, as the quality of their work is poor. The third group of service providers, VEWs, scored low on all criteria except by the women who scored them high on quality. The low score for government extension workers is probably because there are very few contacts with farmers on which they could be assessed. The fourth group, poultry vaccinators, were not even mentioned by the men, with the women finding them to be the least important of all service providers. (This group of poultry vaccinators were probably working with the women poultry group farmers and due to their short training of one day did not have knowledge in managing other livestock diseases.) Except for on quality, the community respondents were significantly in agreement on their scoring of the other criteria.

Post-project Test 2

A replica of the Test 1 CAHW treatment voucher scheme was to be implemented in Test 2. However, in the initial stages of the Operational Research project the baseline data in Test 2 established that the CAHWs, as envisaged, were not available in the project site except for the one-day trained poultry vaccinators. A decision was made to recruit and train 50 CAHWs using a 5-day course[31] that was prepared by a consultant. The CAHW trainees were selected by the ward Agritex officers, whose selection criteria was based on individuals who were literate and had undergone feed lot management training. During the baseline survey the local community prioritised the qualities of CAHWs to include literacy, respected, trustworthy, owns livestock, friendly, youthful, selected from both men and women, well trained in animal husbandry, disease identification and drug administration.

The 5-day CAHW training was shorter than recommended by most implementing agencies, and limited their technical competence, but the CAHWs who underwent the training were motivated and excited by the skills they had acquired and were ready to start practising. The CAHWs were provided with the skills for handling the common livestock diseases occurring in the area, and their veterinary drugs and equipment were provided by the voucher scheme project. The course also included entrepreneurship training. The Test 2 partner suggested that for any future CAHW trainings the course should be six weeks long, recognising that the CAHWs needed considerable further training. The partner was however of the opinion that these CAHWs should be legally recognised by government as official frontline animal health service providers.

A total of 29 men and 21 women CAHWs were trained and provided with a small vet bag that contained a weigh band and thermometer. They were also provided with a hard cover counter book for recording cases and voucher redemption forms that were stored in a file. The CAHWs were not issued with protective clothing. The new CAHWs were also trained on the voucher scheme operation and introduced to the only PVP recruited to get their supply of drugs.

Based on spot check observations, it was found that CAHWs collaborated with each other and often used existing community structures, such as holding pens or crush at the communal feedlot, where they would meet and request farmers bring their animals for treatment. CAHWs were observed advising farmers on drug withdrawal periods and this was also verified through looking at the treatment books and farmers' confirmation during the endline FGDs. Their skills in handling livestock, treatment, record-keeping

[31] Technical guideline for community animal health workers, complied by James Machingura, 2019. See Annex D for a summary of the curriculum. (Note that the quality of the training was not assessed by the research team).

advisory messages on how to manage sick animals, as well as how to observe the withdrawal period, commended them to the livestock keepers. They also formed CAHW committees that enabled them to engage with government and NGO partners. The project was also able to equip each ward with one burdizzo, one dehorning iron rod and a halter.

The government veterinary extension workers and Agritex officers were very supportive of the new CAHWs and provided the necessary support including referral of difficult cases. Whilst the community viewed the government veterinarians as very knowledgeable, they are few and inaccessible compared to the CAHWs who responded to cases swiftly and had most of the drugs needed by the community. A post-project assessment showed that the CAHWs had become the key AHSP because of their availability and accessibility according to the men, while women scored them highly on acceptability and affordability, see Table 6.

Table 5: Post-project Test 2 weighting of criteria

	Weight per criteria
Availability	13.5
Accessibility	20.0
Affordability	13.8
Acceptability	18.3
Quality	34.3

In comparison with the pre-project assessment, the respondents' quality score increased to 34.3% (from 27.5%). Access had the second highest score, followed by acceptability, affordability and availability.

Table 6: Post-project assessment of veterinary health service providers by women and men in Test 2 (Mean score n=6)

	Govt Agritex	Govt Vet	CAHW	NGO
Availability (W=0.827**)	2.83	1.67	8.67	0.33
Accessibility (W=0.833**)	3.83	2.50	13.17	0.50
Affordability (W=0.745**)	1.50	2.83	9.33	0.17
Acceptability (W=0.798**)	3.83	2.67	10.17	1.67
Quality (W=0.5*)	7.33	16.83	7.83	2.33
Score per provider	**19.3**	**26.5**	**49.2**	**5.0**

n=sample size: W=Kendall's Coefficient of Concordance (*P<0.05; **P<0.01; ***P<0.001). The numbers are the mean scores for each animal health service provider against service assessment criteria as scored by informants during the proportion piling.

The introduction of CAHWs changed the service provision environment, making the CAHWs (at 49.2%) the most important service provider in the post-project assessment. The data from the endline KAP survey summarises the results of the FGD with separate women and men's groups (see appendix for full details of sample numbers).

Endline women KAP:

- 3/3 respondent groups said that CAHWs always examined animals
- 3/3 respondent groups said that CAHWs need more training
- 3/3 respondent groups said all drugs were administered by CAHWs

- 1/3 respondent groups said that the training was too short
- 1/3 respondent groups said that CAHWs were not selected by community
- 3/3 respondent groups appreciated the CAHW service, in particular access to the service, reduced livestock mortality, and improved body condition

Endline men KAP:

- 3/3 respondent groups said that CAHWs always examined animals
- 2/3 respondent groups that CAHWs need more training
- 3/3 respondent groups that all drugs were administered by CAHWs
- 2/3 respondent groups said that the training was too short
- 1/3 respondent groups said that the CAHWs were too old
- 1/3 respondent groups said that the CAHWs were not selected by community
- 3/3 respondent groups appreciated the CAHW service, in particular access to the service, reduced livestock mortality, and improved body condition

The government efforts to support the CAHWs in their work, in particular offering referral advice, was noticed by the farmers who scored them second as a result of quality services. However, some CAHWs (4 out of 12) mentioned that there was no extension worker to whom they could report or ask for advice. The Test 2 partner NGO held many meetings with the community in facilitation and preparation of the voucher scheme, therefore they were included in the service providers' scoring as shown in Table 8, although in any real sense they did not offer any clinical animal health services. The Agritex officers who, pre-project, were the main service providers were relegated to third place. The respondents were significantly in agreement in scoring for all criteria with W values ranging from 0.5 to 0.833. The women maintained that they needed service providers who are acceptable to them and provided quality services, while the men were more concerned with availability and accessibility than quality service.

Some of the key challenges encountered include the CAHW selection process: The community felt they were not involved in the selection and the criteria were not clear, although some of the selected CAHW were formerly involved in community livestock work as feedlot workers or poultry vaccinators. The community noted that the CAHW age and gender profile could be improved to get more women and younger CAHWs despite the cultural gender constraints. (KIIs with CAHWs revealed some male livestock keepers believe that if a woman of childbearing age enters the cattle kraal the pregnant cows will abort). An additional challenge was that animal health coverage was still low due to the wide geographic distribution of the population. The provision of bicycles for CAHW would greatly increase the reach to farmers.

PRE-PROJECT TEST 3

In Test Area 3 veterinary services are supposed to be provided by private veterinary service providers, as by law clinical services are privatised, but in reality they are limited in number and sparsely distributed within the few urban markets. Due to the remote location of Test 3 there are no private AHSPs. This presents an opportunity for public AHSPs to set themselves up as PVPs, but CAHWs are not allowed to treat animals as stipulated by law. At times national and county governments distribute free veterinary drugs during drought emergencies, through the public veterinary services, thus undermining private veterinary sector development.

In almost all the major market centres in Marsabit County there are veterinary drug sellers, some of which are legally established PVPs run by qualified staff, while others are just normal merchandise shops stocking veterinary drugs due to demand and run by unqualified personnel. Most of the well-established PVPs are operated by government veterinary staff largely dispensing over-the-counter veterinary drugs. There are very few private veterinary technical personnel carrying out private veterinary clinical work in the county; only three were encountered during the Operational Research.

The limited number of government and private sector AHSPs in the extensive county of Marsabit means that most herders buy medicines directly and treat their own animals. Community Disease Reporters (CDR), that previously worked as CAHWs before they were outlawed, currently work as frontline disease surveillance personnel and are the main links between the community and the government AHSPs. In most cases the CDRs also assist the community in treating their livestock although this action is illegal. The herders have contact with CDRs at least two times a month since they are located in the same villages and livestock kraals, while contacts with government veterinarians may be only once or twice a year. CDRs are still being trained by the county government and NGOs on disease surveillance and reporting, and hence are still visible to the community. Some NGOs support them with mobile phone airtime or a small fee incentive to ensure continued reporting of disease incidences.

The baseline community assessment of service providers in Test 3 established there are three groups, namely the government veterinary officers (AHSP), CDRs and traditional healers - see Table 8 - with the weighting of the criteria shown in Table 7.

Table 7: Pre-project Test 3 weighting of criteria

	Weight per criteria
Availability	32.0
Accessibility	10.3
Affordability	9.5
Acceptability	14.9
Quality	33.9

In Test 3 the pre-project assessment by the respondents indicated quality (33.9%) as the most important criteria, closely followed by availability, with acceptability, accessibility and affordability all scoring much lower.

Table 8: Pre-project assessment of veterinary health service providers by women and men Test 3 (Mean score n=10)

	Others (Traditional healer)	CDR	Government AHSP
Availability (W=0.121)	11.30	18.20	2.50
Accessibility (W=0.226)	2.70	6.10	1.50
Affordability (W=0.285)	2.90	2.00	4.60
Acceptability W=0.146)	3.30	8.00	3.60
Quality (0.49**)	5.40	7.20	21.30
Score per provider	26	42	34

n=sample size: W=Kendall's Coefficient of Concordance (*P<0.05; **P<0.01; ***P<0.001).

The numbers show the mean scores for each AHSP against the service assessment criteria, as scored by informants during the proportion piling. The CDRs (42%) were the most preferred service providers by

the community due to their availability, acceptability and quality of their service; this is despite their services being outlawed. The government AHSPs are rarely available or accessible though they are considered second on account of their quality service, although men ranked traditional healers second due to their availability. It was observed that the respondents were not in agreement on all the criteria for assessing service providers since all W values were tending toward zero. Overall, community criteria for an ideal AHSP is one who is well trained, always available (preferably staying with the community), hardworking, and should have drugs and working equipment. As communities are left with the options of a weak private sector and limited public sector, they tend to rank CDRs and traditional healers highly, though most herders may in fact treat their own livestock with counterfeit and substandard drugs sourced from illegal drug sellers in local markets. During KII and spot checks with the partner, PVPs, AHSPs and government vets, the absence of a functioning animal health private sector was repeatedly highlighted.

For Test 3, as there were almost no experienced private AHSPs practising in Marsabit County who could be recruited to participate in the voucher scheme (only one private AHSP from Laisamis was recruited to participate), the initial plan to use government AHSPs had to be adjusted. It was realised that almost all the government AHSPs were the owners of the PVPs that had been selected to supply veterinary medicines, which would have led to a conflict of interest since government officers are not supposed to provide clinical services in their official capacity. LEGS was able to assist by providing a list of private newly graduated residents in the county who could be used as AHSPs in the project. In addition one government AHSP who did not own a PVP was able to participate in the scheme. The decision was made to recruit some new AHSP graduates who had just finalised their internship. Six new private graduate AHSPs (3 women and 3 men) agreed to participate in the voucher scheme. The total of eight selected AHSPs (3 women and 5 men) were all registered by the statutory bodies and legally allowed to practice. Two AHSPs were allocated to each PVP and were available throughout the project period.

Post-project Test 3

The AHSPs were trained on treatment protocols to ensure the USAID/OFDA list of drugs was appropriately handled and used. They were also given a large drug box to store their drugs, as well as thermometers, stethoscopes, weigh bands, needles and syringes. According to community feedback, when they attended a sick animal the AHSPs took a case history, undertook a clinical examination followed by a diagnosis, and then prescribed and administered treatment. The herders were provided with post-treatment advice on how to take care of the sick livestock and were also advised on the withdrawal period, as evidenced in the AHSP's records. The AHSPs recorded all this information on the herder's case prescription card, with this process repeated every time the AHSPs received and responded to clinical case calls. The AHSPs were methodical when attending sick livestock and the herders were impressed with the AHSPs' professional services. However due to the short time frame available for implementing the voucher scheme, the AHSPs had a very limited time period in which to deliver treatment to the number of herds that was agreed with the implementing organisation.

The post-project assessment by the community of service providers in Test 3 shows that the community incorporated the new private AHSPs into their assessment ranking but did not drop any of the earlier service providers, see Table 10.

Table 9: Post-project Test 3 weighting of criteria

	Weight per criteria
Availability	31.1
Accessibility	21.7
Affordability	10.4
Acceptability	14.6
Quality	22.3

In the post project assessment availability became the most important criterion (31.1%) followed by quality, accessibility, acceptability and affordability.

Table 10: Post-project assessment of veterinary health service providers by women and men Test 3 (Mean score n=12)

	Traditional healer	CDR	Govt AHSP	Private AHSP
Availability (W=0.026)	6.58	9.83	6.17	8.50
Accessibility (W=0.04)	5.67	5.42	4.58	6.00
Affordability (W=0.046)	2.75	1.50	2.42	3.75
Acceptability (W=0.097)	4.17	2.25	2.67	5.50
Quality (W=0.421**)	3.17	2.25	8.67	8.17
Score per provider	22	21	25	32

n=sample size: W=Kendall's Coefficient of Concordance (*P<0.05; **P<0.01; ***P<0.001). The numbers are the mean scores for each animal health service provider against service assessment criteria as scored by informants during the proportion piling.

The private AHSPs (32%) became the preferred service provider, followed by government AHSPs who were also the PVPs. There is a link between the first three service providers whereby the community usually uses the CDR to report cases to the PVP, then the PVP directs the private AHSPs to herds where cases have been reported. The respondents' level of agreement was low with W values being very close to zero. The prevalent use of traditional healers points to the uncertainty in service provision from private and government AHSPs, hence the community will always look for a fall-back when this group of service providers is not available. It is for these reasons these four service providers were scored high by the herders.

The data from the endline KAP survey summarises the results of the FGD with separate women and men's groups.

Endline women KAP survey:

6/6 respondent groups said that AHSPs always examined animals
4/6 respondent groups said that the AHSPs had been available for three weeks
2/6 respondent groups said that the project was period too short
4/6 respondent groups were buying their drugs in the market as they were cheaper
6/6 respondent groups knew about drug expiry dates
6/6 respondent groups said the animal's response to treatment was evidence of drug quality

Endline men KAP survey:

3/6 respondent groups said that the AHSPs always examined animals
3/6 respondent groups said that the project period was too short
6/6 respondent groups said that they used the ASHP services during the project
2/4 respondent groups said that the AHSPs provided a good service but needed more training to handle livestock and treat diseases
6/6 respondent groups knew about drug expiry dates
6/6 respondent groups said the animal's response to treatment was evidence of drug quality

It was also established that the eight recruited AHSPs were too few to cover the two sub-counties where the Operational Research project was implemented. The coverage and access to livestock were also complicated by a drought which caused the livestock to be moved further away from the project sites, and as the AHSPs were not part of the local pastoral community they did not move with the herds. Due to the limited project time, and distances covered to access the animals, most herders had only one contact with the project AHSPs, despite the partner using vehicles to transport the AHSPs to the herders. In order to support the AHSPs to reach more animals they were contracted as staff by the partner and earned a night out allowance if they attended to animals outside their area of operations as well as earning income for treating 120 animals a day. These AHSPs were therefore not able to grasp the entrepreneurship opportunity to start their own private business to offer clinical services. In addition, as there were no set pricing mechanisms, AHSPs did not charge non-beneficiaries for services offered. During the spot checks, the partner, the AHSPs, PVPs and the government vets noted that the private sector in the county was not really working (n=9).

5.2 Veterinary Pharmaceutical Supply Chain and Quality

Pre-project - The general structure of the official veterinary drug supply chain in the three countries, Ethiopia, Zimbabwe and Kenya, is similar to the extent that the main actors at the national level are importers, manufacturers and wholesalers.

Pre-project Test 1

In Test 1, at the national level, wholesaler drugs are sampled by the VDFACA but the results are not made publically available by the importer. In cases of potential quality issues, the VDFACA will visit the wholesaler, count the drugs in stock and order a hold on further distribution. When the investigation is concluded the VDFACA will notify if continued use is approved. Once the products in question have been sold however there is no further tracing possible beyond the wholesaler. A complex system is in place for ordering and importing drugs, which involves verification through the banks as foreign currency is required to complete transactions. National level wholesalers are managed by qualified staff, have good store management, use an electronic and paper based system, but product transport is by trucks that are not designated for pharmaceutical products only.

In Somali National Regional State it was difficult to recruit a wholesaler in Jijiga who could meet the required pharmaceutical standards due to poor documentation and storage management. The wholesaler used lacked a good documentation trail – invoices and receipts were the only documents available and did not include batch numbers, and all inventory management was done in a notebook. The

shop was small with shelving for storage covered with glass doors. A larger storage area nearby for additional stock was minimally organised, with many cartons in stock, no temperature monitoring, no stock cards noted and no pest control. (The Test 1 partner also lacked familiarity with the USAID/OFDA approval process, and therefore as the wholesaler chosen lacked many of the procedures and documents necessary for approval by USAID/OFDA much time was spent by the partner and the wholesaler getting properly prepared documents together.)

In the Test 1 Area the PVPs operate with varying levels of management depending on their location in urban or rural centres. The rural PVPs have poor shop arrangement in terms of shelving and display of products compared to urban PVPs. Store management is a challenge, particularly the regulation of temperatures as ambient temperatures are generally higher than the requirements for most drug storage. The PVPs and the wholesaler have poor records in terms of their stores and transactions, but they had good disposal and expiry date management. (See Annex C for the criteria and process for PVPs selection.)

The final level in the private drug supply chain is the CAHW who buys the drugs from the PVPs for use on herders' animals. However very few CAHWs have the finance to buy the drugs, so herders buy medicines themselves from the rural PVP and then request the CAHWs, presumably for free or at small service charge, to treat their livestock. In rural areas the herders' purchasing power was noted to be low, thus they only buy medicines when in dire need—i.e. when no free drugs are available, alternative treatments are not responsive, or for their milking or prize animals. A general complaint from herders was that the drugs supplied by the PVPs were expensive despite their good quality.

Alongside the private supply chain, the government supplies veterinary medicines once or twice a year, delivering them to woreda animal health posts and then supplied to herders at lower prices than the market. Development agents also supply herders with free veterinary medicines under humanitarian assistance programmes. The drugs supplied by government and development agencies are largely viewed by the community to be of good quality and are very much preferred, as Tables 11 and 12 below show. Though herders were aware of common drugs used on livestock, availability and access to these veterinary drugs was poor therefore most herders were least concerned about veterinary drug quality. The other parallel drug supply chain involves illicit flows of veterinary medicines through the porous international borders that bring in counterfeit and substandard veterinary medicines mainly sold by general traders.

Table 11: Pre-project scoring of access and quality of marketed veterinary drugs/vaccines by women and men Test 1 (mean score n=12)

	Anthelmintics	Antibiotics	Antiprotozoals	Vaccines	Acaricides	Immune boosters
Available	2.3	2.3	0.6	1.8	2.1	2.1
Affordable	2.2	2.1	0.7	2.8	2.1	2.1
Quality	2.3	2.9	0.9	2.8	2.9	2.9

Three-point scale: 1=poor, 2=average, 3=good

The community assessment of both marketed (Table 11) and humanitarian relief (Table 12) drugs shows that for both sources antiprotozoal drugs were found to be of poor quality, unaffordable and were not available, but antibiotics and anthelmintics were of good quality and availability. Vaccines, acaricides and immune boosters were moderately available, though they were of good quality and affordable. Thus it

was concluded that the common drugs in authorised market channels are of good quality except for antiprotozoals.

Table 12: Pre-project scoring of access and quality of humanitarian relief veterinary drugs/vaccines by women and men Test 1 (mean score n=12)

	Anthelmintics	Antibiotics	Antiprotozoals	Vaccines	Acaricides	Immune boosters
Available	2.08	2.08	0.33	2.17	1.75	2.00
Affordable	3.00	3.00	1.00	3.00	2.33	3.00
Quality	2.42	2.67	0.83	3.00	2.92	3.00

Three-point scale: 1=poor, 2=average, 3=good

There are several challenges experienced by importers and wholesalers in Ethiopia, the key one being foreign exchange shortages since fiscal management is tightly controlled by the government. The challenges experienced by the PVPs at the regional level are mainly record-keeping and storage space management, particularly temperature regulation as high temperatures are a common feature in Jarar Zone affecting some of the pharmaceutical products. Low purchasing power was cited by the community as a major challenge that precludes them from buying quality veterinary medicines. In the process of project design and implementation it was recognised that the Test 1 partner did not meet the model requirements in terms of fully understanding the supply chain and related regulations in order to be able to meet USAID/OFDA requirements for ensuring safe quality pharmaceuticals.

POST-PROJECT TEST 1

An agreement was made with the pharmaceutical wholesaler in Jijiga to act as the supplier of veterinary drugs. This wholesaler is supplied by two wholesalers in Addis Ababa. A memorandum of understanding was signed between the implementing partner, the selected PVPs and the woreda livestock office. Six PVPs were identified following the criteria and process of PVP selection, and were trained for three days in basic pharmacology, veterinary pharmaceutical management and business skills, as well as the modalities of the voucher scheme. The market actors (wholesaler, PVP, and CAHWs) were helped to link up through a community dialogue platform in an effort to create familiarity and explain the terms of interactions in the voucher scheme. PVPs and wholesalers were facilitated by the partner to establish an MOU for the voucher scheme drug supply. The veterinary pharmaceuticals as approved by USAID/OFDA for Test 1 were:

1 Ivermectin 1%
2 Oxytetracycline L.A 20%
3 Isomethamedium chloride 1%

The national wholesalers in Test 1 were registered with the relevant authorities and employed technical managers to run their wholesale outlets. Transactions were accompanied with fiscal receipts and some had electronic invoice systems. The wholesalers used a stock card system for inventory management and provided delivery services for pharmaceutical products. The wholesalers keep a dossier of products they sell and are in regular contact with the VDFACA, but regional wholesalers have poorly kept documentation of their transactions and their stores lack temperature regulation, an inventory system or pest control. The lack of competitiveness among pharmaceutical suppliers and the lack of regulatory enforcement at all levels leads to poor handling, recording, transportation and storage of veterinary drugs, as well as entry of counterfeit and substandard products in the markets.

PRE-PROJECT TEST 2

In Test 2 the veterinary drug supply chain incorporates importers, wholesalers at different levels and retailers/PVPs. The importers and wholesalers are highly organised with good biotechnology laboratory capacity. The two wholesalers selected for the supply of project drugs had drug packaging lines, good storage with well-aerated stores, and modern cold room stores. The PVPs, particularly in Chiredzi District, were very few (only two in Chiredzi Town) but their shops were well managed with good infrastructure, storage and record keeping. Drug management by PVPs, based on expiry date and disposal management, was also found to be good. Drug deliveries to the PVPs were carried out in company vehicles thus providing good packaging, ventilation and temperature management. Once or twice a year the government also delivers veterinary medicines to animal health management centres at the ward level.

The two available PVPs (also known as VMGDs) in Chiredzi town, one of which has a branch in Chikombezi, dispense over-the-counter medication sometimes directly to farmers or to farmers who have prescriptions from government veterinary and agricultural extension officers, however prohibitive transport costs make it difficult for farmers to visit PVPs. According to the community assessment on drugs prior to the project, most drugs were poorly available and unaffordable, though were of good quality, see Table 13. The most commonly available drugs were antibiotics and acaricides. To determine drug quality communities used the effectiveness of a treatment as an indicator, i.e. if the animal recovers well they consider the drug to be of good quality (6/6 focus group discussions).

Table 13: Pre-project scoring of access and quality of marketed veterinary drugs/vaccines by women and men Test 2 (mean score n=6)

	Anthelmintics	Antibiotics	Vaccines	Acaricides
Available	0.8	2.0	1.8	2.0
Affordable	1.0	1.2	1.8	1.0
Quality	2.0	2.0	2.8	3.0

Three-point scale: 1=poor, 2=average, 3=good

The key challenges in the veterinary drug supply chain were given as: lack of frontline animal health workers that could deliver quality animal health service to farmers; few agro-dealer stores stocking veterinary products; and poor transportation in the rural areas making it difficult to reach farmers. A major challenge affecting all actors in the value chain and particularly the importers is the unstable monetary policy context, prompting inflation and poor access to foreign exchange.

POST-PROJECT TEST 2

In Test 2, two wholesalers were approved by USAID/OFDA who were also licensed by MCAZ. The list of veterinary pharmaceuticals approved by USAID/OFDA for Test 2 were:

1 Oxytetracycline (10% and 20% concentration)
2 Imidocarb Dipropionate (Imizol)
3 Oxytetracycline 10 Hitet 120
4 Albendazole 10%
5 Sulphonamides/Furazolidone 15g
6 Piperazine powder 100g

Spot check visits revealed that one of the wholesalers had a quality control manager who had extensive knowledge of policies and procedures. The wholesaler used an electronic stock management system with

capacity to test the quality of VMPs. The facility also had a master file with Standard Operating Procedures, inspection reports and licenses. The establishment had sufficient staff and office space, and conducted regular personnel training though no records were provided. The storage areas were kept clean and organised with no products stored on the floor. There was a cold room monitored with multiple thermometers and log tags in which many products were stored. Based on the quality manager information, MCAZ recommends that VMP imports should withstand temperatures of 30°C (+ or - 2°C). The inventory of stock was performed daily on different product lines resulting in a full inventory completed once per month. The establishment uses the First Expired, First Out system for stock inventory management. There was an active pest control measure though the receiving/dispatch area was crowded and disorganised. It was not clear if the facility had an Environmental Management Agency certificate. A visit to the second wholesaler found that the facility largely lacked records to verify their procedures.

One PVP was selected for Test 2 to ensure a smooth supply of drugs. The PVP had two branches but due to distance and transport challenges for farmers only the Chiredzi store was used. The CAHWs were linked with the PVPs to replenish their drugs. According to the community assessment the CAHWs were appreciated by the farmers since they were close by and responded to clinical cases promptly. The supply of veterinary drugs through the chain was also smooth with no shortages of any approved drugs. The PVP was also happy to deal with the CAHWs and offered discounts of up to 15% on veterinary drug products to enable them to go on with the work and charge a mark-up that would help them to remain in business. The government veterinary extension workers offered good support to the CAHWs on difficult cases with advice where necessary, including preparing prescriptions. The wholesaler and PVP recruited for the project maintained good capacity (technical, financial and logistical) in the supply of project veterinary drugs, based on the spot checks and observations carried out.

Follow-up on drug management through spot-checks and drug sampling revealed that the PVP had very good records of drugs issued to the CAHWs, including the redemption of CAHW vouchers. Laboratory results carried out by the DVS laboratories confirmed that all the drugs sold were the same drugs used throughout the supply chain from the wholesalers to the CAHWs. The quality of drugs with regard to the quantity of active pharmaceutical ingredient, as indicated on the label, remained stable throughout the supply chain and microbial load testing was negative showing that product sterility was maintained.

Results from the PVP spot checks showed that:

- 2/2 PVPs had clean and dust free store shelves and with vet drugs arranged neatly so drugs could be identified [both spot checks]
- 2/2 PVPs had off-the ground shelves to ensure vet products were dry and kept away from direct sunlight. The stores had good ventilation to maintain ambient temperatures below 25°C [both spot checks]
- 1/2 PVPs kept very good records, had a file with a divider for each CAHW (50) and had attached the cadex forms and purchase receipts
- 1/2 PVPs had an envelope where all drug fronting vouchers from CAHWs were stored
- 1/2 PVPs the vouchers from farmers has no record form, instead the store manager was noting them on the cadex form. The PVP was advised to photocopy the CAHWs redemption form and keep the copy in the file with the cadex and purchase receipt
- 2/2 PVP store managers attended the one week training for CAHWs. PVP stores provided sample drugs and equipment for use during the CAHWs training

- 1/2 PVPs had an MOU with Test 2 partner to pay the PVP once all vouchers from CAHWs and farmers were redeemed at the end of the project (the second PVP was a branch of the first PVP and therefore did not need an MoU).

Follow-up on drug management with the CAHWs through spot-checks and drug sampling established that the CAHWs maintained drug quality, and their storage bags were tidy and well kept. Of the 50 CAHWs trained in Zimbabwe, researchers were able to conduct spot check visits for 24 (12 per spot check) and conduct random checks of the kits of 36 CAHWs in order to assess drug storage and equipment maintenance practices. The drug bags were noted to be small and in the future may not be large enough to carry the different types of veterinary equipment that may be required. The women CAHWs maintained good treatment and voucher redemption records, with the men's recording of a poorer standard. Of the 24 CAHWs inspected, all were found to be implementing good storage practices.

Spot check summary details (per spot check) on CAHW record keeping showed that:

- 12/12 CAHWs had drugs with long expiry dates
- 9/12 CAHWs had drug purchase receipts
- 9/12 CAHWs for the first spot check and 12/12 CAHWs for the second spot check had good treatment and procurement records
- 12/12 CAHWs had good drug storage – cool and dry away from direct sunlight or high temperatures (both spot check visits)
- 5/6 women CAHWs had good treatment records but 5/6 men had poor records and missing case diagnosis

The community post-project assessment rated all drugs available, affordable and of good quality, see Table 14. This assessment shows a significant increase in scores compared to the pre-project period (see Table 13).

Table 14: Post-project scoring of access and quality of marketed veterinary drugs/vaccines by women and men Test 2 (mean score n=6)

	Anthelmintics	Antibiotics
Available	3	3
Affordable	3	3
Quality	3	3

Three-point scale: 1=poor, 2=average, 3=good

The partner KII revealed that the partner staff were very positive about the voucher scheme which gave them an opportunity to learn and engage the private sector in relief programming.

PRE-PROJECT TEST 3

The wholesaler selected for the supply of veterinary medicines in Test 3 operates at the national and regional level, with a network of wholesale distribution stores across the arid and semi-arid counties. The PVPs selected were located in rural remote market centres, were previously a franchise of the wholesaler, and are now owned by government AHSPs. Branded in the wholesaler's colours, the PVPs are meant to sell only its products, but many sourced their products from multiple suppliers including other agrovet wholesaler stores in the region. The PVPs are the only licenced suppliers of livestock drugs in their

locations, and are also the only government AHSPs, however they rarely attend cases unless it is brought to the PVP premises. The few private AHSPs also have limited capacity to physically attend to cases in the field. Most diagnosis is done over the PVP counters, often after CDRs or herders present a case history of their sick animals, with herders then buying dispensed medicine to treat the animals themselves. Herders demand the drugs of their choice from the PVPs, with cost the main driving factor of drug purchase. Short-acting antibiotics, low concentration anthelmintics, and acaricides, all in small or single-dose packages, are popular due to their cheap prices. These drugs tend to be misused since their repeat regime is rarely followed. FGD with herders revealed that they buy short acting preparations of drugs such as 5 or 10% oxytetracycline, and they do not repeat the treatment for the recommended 3 to 5 days.

Driven by the fear of prevalent and devastating diseases such as trypanosomiasis and camel sudden death syndrome, community knowledge is limited and fixated on drugs to treat these diseases. The herders' fear, the uncertainty of obtaining professional animal health services, and previous experiences are the major drivers in the purchase and stocking of drugs such as trypanocidal (Triquin®) and long-acting antibiotics (Penstrep®) for prophylaxis use in camels, while long-acting oxytetracycline, acaricides and anthelmintics are popular for use in cattle and small stock. The demand for these drugs fuels a parallel illicit supply chain that delivers cheap veterinary drugs of questionable quality across the porous borders into the local pastoral markets. These illicit products unfairly compete with the PVPs, forcing them to also provide cheap substandard products. The community and PVPs, though well versed in quality standards (such as checking expiry dates, keeping away from high temperatures and light, and disposal of veterinary medicines), as shown by the KAP studies and KIIs, tend to ignore the standards due to various reasons including economic (availability, access and affordability of drugs), or the non-availability of disposal systems for migrating herders.

Community assessment of the drugs (see Table 15) showed that all drugs are viewed as available and of good quality. However, acaricides, antiprotozoals, and anthelmintics are expensive while antibiotics are moderately affordable.

Table 15: Pre-project scoring of access and quality of marketed veterinary drugs/vaccines by women and men Test 3 (mean score n=10)

	Anthelmintics	Antibiotics	Antiprotozoals	Topical acaricides
Availability	3.00	3.00	3.00	3.00
Affordability	1.80	2.00	1.60	1.00
Acceptability	3.00	3.00	3.00	3.00

Three-point scale: 1=poor, 2=average, 3=good

The key challenges experienced by PVPs were the lack of transport for their merchandise since they are located remotely, deteriorating business relations between PVPs and the regional wholesaler, lack of cold chain infrastructure, and poor storage and record management.

POST-PROJECT TEST 3

Although the selection of the four PVPs was straightforward, implementation of the project was delayed by 12 weeks because of the required due diligence by the bank in the provision of point of sale (POS) machines. To ensure good service delivery to the herders, the project strengthened field service provision by engaging eight AHSPs, of which two were previously working in the county.

There was no formal agreement between the wholesaler and PVPs which initially resulted in PVPs refusing to purchase the project drugs from the wholesaler as the profit mark-up negotiated by the wholesaler did not take into account PVP expenses, such as transport of drugs to their stores. A meeting between all parties moderated by the LEGS Research Team Leader was able to resolve these issues and give the PVPs confidence to participate in the project. The Marsabit wholesaler then provided all drugs required by for the voucher scheme. The list of veterinary pharmaceuticals approved by USAID/OFDA for Test 3 was:

1 Penstrep
2 Multivitamin injection
3 Albendazole 10%
4 Triquin without water (Quinapiramine sulfate1.5g+Quinapiramine Chloride 1g)
5 Ivermectin 1% injection
6 Oxytetracycline 20%
7 Tylosin 20%
8 Diseptoprim (Sulphadiazine 1g/Trimethoprim 200mg)
9 Dexamethasone 2mg

The wholesaler ran out of stock of anthelmintics (Albendazole), and was providing Levamisole which was not one of the approved drugs as a result of the wholesaler's internal communication breakdown between the head office in Nairobi and its outlet store in Marsabit town on the pricing and types of veterinary drugs that were to be used in the project.

The Nairobi based manufacturer had a well laid out factory which was clean, efficient, with ample space, and with temperature and humidity monitored manually. The Nairobi wholesaler however was found to have poor door security in their overstock room, no ventilation, humidity and temperature monitoring was set up but very few SOPs were in place. The wholesaler also lacked knowledge management systems. The wholesaler store in Marsabit was found to be clean with well maintained records and a digital inventory. Supplies to the wholesaler from Nairobi are sent either in a company car or through courier services. Some cartons were stored on the floor and there was no temperature monitoring for room temperature and cold-chain storage.

The PVPs faced a number of challenges: The drug store management tools did not clearly track drug inflows and outflows by batch and expiry dates of drugs. Spot-check assessment of PVPs established that they maintained delivery notes and invoices as evidence of sourcing. All drugs were maintained in ambient temperatures, but some were in Styrofoam packing blocks in cartons as the only insulation. Other drugs were well arranged on the shelves. The stock documentation was poor with old store ledgers not updated. The stores were well kept and dry with no signs of vermin. Two of the PVPs had non-functioning refrigerators and one PVP had a functioning fridge/freezer in his house. Drug quality was well maintained with documentation from the wholesaler matching the products distributed to the AHSPs.

Results from two spot checks of three PVPs showed that:

- 3/3 PVPs lacked proper procurement records from wholesaler (the evidence of purchase was a delivery note/invoice that had no sale receipt). Records did not have records of batch number or expiry date of procured drugs

- 3/3 PVPs cross checked drugs sold to AHSP with order form copy matching wholesaler records.
- 3/3 PVPs lacked log book/ledger to track vet drug sales
- 3/3 PVPs had records of AHSP purchases from PVP (copy of order form with POS receipt attached)
- 3/3 PVPs project drugs had long expiry dates of between 2020 and 2023
- 3/3 PVP stores had shelves with drugs kept tidy, dry and away from direct sunlight
- 3/3 PVPs had stores with ambient temperatures above 25°C due to a lack of adequate ventilation
- 3/3 PVPs did not stock veterinary drugs that required cold chain storage
- 3/3 PVPs had drugs well packed with no damage
- 3/3 PVPs had no used drug packs, bottles or vials from AHSPs
- 3/3 PVPs [2nd spot check] had POS machine receipts now attached to order forms and order form copies with the name and signatures of AHSPs.

Samples of drugs collected from the AHSPs and PVPs, and tested by a commercial laboratory, confirmed the quality and integrity of the active molecules in the same drugs from wholesaler sources to AHSPs. The quality of drugs with regard to the active pharmaceutical ingredient remained stable throughout the supply chain.

The AHSPs maintained good transaction records; although initially they lacked details on drug batch numbers and post-treatment advisory messages, this was improved as work progressed. The AHSPs stored their drugs in large wooden trunks and, though difficult to transport, these were protective and secured the medicines well. Due to the limited time for project implementation, the partner provided the AHSPs with vehicles to access the herders at watering points. The quality of drugs provided was good. Community assessment of veterinary drugs did not change significantly between pre and post-project – see Table 16 below (compared to Table 15 above). The project period of three weeks with limited contacts with AHSPs did not allow for discernible changes. Affordability of drugs remained the main obstacle for drug access particularly affecting acaricides, anthelmintics, and antiprotozoals.

Table 16: Post-project scoring of access and quality of marketed veterinary drugs/vaccines by women and men Test 3 (mean score n=12)

	Anthelmintics	Antibiotics	Antiprotozoals	Topical acaricides
Available	3.0	3.0	3.0	3.0
Affordable	1.0	2.0	1.2	1.0
Quality	2.9	3.0	3.0	2.9

Three-point scale: 1=poor, 2=average , 3=good

5.3 COMMUNITY AWARENESS AND BEHAVIOUR

PRE-PROJECT TEST 1

During the initial stages of Test 1 it was observed that the pastoral community had low general awareness of the planned voucher scheme, partly because the partner did not want to raise expectations before the approval process was complete. Project consultations with the local community to select CAHWs and train them, as well as implement project activities, were carried out through local authorities.

POST-PROJECT TEST 1

Although the community in Test 1 was involved in the selection of CAHWs early on in the project, they had not been made aware of the beneficiary selection process and voucher scheme implementation process by the time the Operational Research period had to be closed in Test 1. It was observed that there was no community animal health committee that could have liaised with local government to strengthen community involvement. Once the voucher scheme did begin (after the closing of the Operational Research project), awareness creation was reportedly carried out for the target communities to explain the project and the number and type of drugs to be delivered, however this was unable to be verified by the research project.

PRE-PROJECT TEST 2

In Test 2 prior to the project, the community had little awareness of the forthcoming animal health project and their level of involvement. They were previously involved in community livestock projects – mainly livestock dip tank operations, feedlot schemes for fattening goats, and poultry production projects. The community had poor knowledge of animal health treatments with little awareness of the different types of veterinary medicines. Community engagement consultations were carried out through local government structures and considerable effort was made by the partner to raise awareness of the voucher scheme.

POST -PROJECT TEST 2

Project meetings held with the farmers in the presence of the local authority were used to share information and create community awareness of project decisions and activities, such as the selection and training of the CAHWs. However, the community was not involved in the CAHW selection process, a fact that was raised during the FGDs by community members who highlighted that some of the people selected as CAHWs were too old to do the job. It was also observed that formation of community animal health committees could have been instrumental in setting community criteria for the desired qualities of a CAHW, as well as liaising with local government to strengthen community involvement. Although community feedlot management committees existed, they were never tasked with the animal health work of the project. Despite this, there was good participatory involvement of the community in Test 2, particularly in the selection of beneficiaries. Through the operation of the project, the community's knowledge of veterinary drugs and treatment was enhanced, while the newly trained CAHWs felt empowered with new animal health knowledge and the responsibility of carrying out treatments.

PRE-PROJECT TEST 3

Awareness of the veterinary project in Test 3 was enhanced by the presence of an existing community dialogue platform, created by the partner organisation and managed by community facilitators to mobilise the community on various development issues. The partner displayed a good working relationship with the local authority. The use of local community FM radio stations enhanced awareness of the project during the preparation stage. Frequent community interactions with CDRs helped herders become familiar with some common livestock medicines, particularly those available at the local PVPs. Some community members had previous experience with e-vouchers implemented by the partner in 2017 for the provision of animal feeds and veterinary drugs.

POST-PROJECT TEST 3

In Test 3 continuous dialogue through the community forum improved awareness of the animal health service that was to be provided by the project. Though there was no animal health committee formed to

spearhead community involvement, there was a successful participatory beneficiary selection process led by the community. The community expressed the importance of the CDRs to them, particularly in disease reporting and advice on animal diseases and treatment, irrespective of the fact that they are not legally supposed to treat community animals. The CDR interaction has improved the community awareness of veterinary drugs and respective diseases. The community expressed satisfaction with the AHSPs and their visits to the local watering points and kraals to offer animal health services. Although the community recognised that some of the AHSPs were not experienced, they were cognizant that they did offer a quality service with advice that was appreciated; with some herders nostalgically remembering years ago when they last saw veterinary officers visiting herders to provide animal health treatments other than vaccinations. During the endline FGDs it was observed that private AHSPs could have a future role in providing animal health services and that the community is willing to pay for a reliable quality service. A key drawback was that some of the selected beneficiaries under-reported the number of their livestock in order to meet the selection criteria. Consequently, the number of animals treated per household corresponding to the voucher numbers were few, and this led to some complaints when these additional animal were not attended to.

5.4 VOUCHER SCHEME

PRE-PROJECT TEST 1

Voucher schemes are a common humanitarian intervention in the Test 1 area, with the most common voucher type being commodity vouchers, as well as conditional and unconditional cash transfers. About 50% of the community have had experience of voucher schemes, mainly through single commodity treatment vouchers combining anthelmintic and antibiotics as one treatment, as well as vouchers for humanitarian non-food or food items.

POST-PROJECT TEST 1

The wholesaler distributed the drugs to the PVPs, and the PVPs gave each CAHW their fronting voucher determined allocation. An agreement was signed between the PVPs and the CAHWs, with the approval of the local administration and animal health department, regarding the drug allocations. The Test 1 paper value vouchers and the partners' internal SOPs were designed with the support of the LEGS team. The paper value vouchers were of two types – a fronting voucher for the CAHWs' start-up drug supply and the community voucher to be distributed to the target beneficiaries. Fronting vouchers with a value of 675 ETB (US$22) were provided to 86 CAHWs. The community vouchers had a value of 20 ETB, 30 ETB and 50 ETB. A total of 200 ETB (US$ 6.25) i.e. two x 20 ETB, two x 30 ETB and two x 50 ETB, were provided to each beneficiary. A total of 39,900 community vouchers with a total value of 1,330,000 ETB (US$ 41,802) were distributed to 6,650 beneficiaries.

It was envisaged that the CAHWs would retain 20% of the drug value as mark-up and professional fee while the PVP was to retain a 15% mark-up as a profit. The scheme began in October 2019 with drugs being distributed to the CAHWs by the PVPs based on signed agreements. The PVPs would collect the empty bottles from the CAHWs to allow for cross checking that the drugs supplied from the PVP were utilised. The vouchers collected from beneficiaries by the CAHWs were submitted to the PVPs who in turn claimed their costs from the partner.

Pre-project Test 2

In Test 2 the community had previous experience with seed vouchers. The selected PVP also had previous experience as a supplier of veterinary products for an animal health treatment voucher scheme. In March 2019, as project activities were about to start, the country experienced devastating flooding due to unusual rainfall brought about by Cyclone Idai, and all project activities stopped for two months to assist in humanitarian efforts. In June 2019 the government abolished the multi-currency regime and re-introduced the Zimbabwean dollar as the sole legal tender. This brought significant challenges for the project as government clearance had to be sought to continue using US$ to use the vouchers that were already printed in US$ to pay the PVP. The end date of the project was also brought forward by 6 weeks.

Post-project Test 2

The CAHW voucher scheme was implemented in Test 2 in the three wards over a period of three months. The total voucher value per household was pegged at US$9 divided into two types: treatment vouchers valued at US$7 broken into seven US$1 voucher bills; and non-treatment/service vouchers valued at US$2, again broken into two US$1 voucher bills, provided to 2,444 target beneficiaries. The split of vouchers into treatment and non-treatment was requested by the community in response to the demand for non-treatment services such as dehorning and castrations. A drug fronting voucher worth US$10 was also developed and issued to each of the 50 CAHWs which enabled them to acquire their first consignment of drugs, syringes and needles with which they could initiate their first voucher-based treatments.

The MOU signed between the PVP and Test 2 partner was well executed, with clear roles and responsibilities in the operation of the voucher scheme. The wholesaler was not part of the MoU so as to allow market forces to operate and not tie the wholesaler to specific drug prices. The herders paid the CAHWs 40% of the value of the service provided by the CAHWs in local currency. The PVP and wholesaler worked on an agreed drug mark-up, based on market prices and previous engagements. This enabled the PVP to provide the CAHWs with veterinary medicines at lower prices, which in turn allowed the CAHWs to make a 15% profit and still provide the drugs to the community at a competitive price. This worked very effectively as all 50 CAHWs redeemed their treatment vouchers directly for more drugs at the PVP store in Chiredzi town.

The CAHWs were given a breakdown of the cost per ml of each drug, enabling them to inform each farmer of the total cost of drugs covered by the vouchers. This helped farmers to appreciate that CAHWs services were cheaper and had better outcomes (drug treatments were based on the animal's weight) than when they treated their own livestock. The community was therefore willing to pay for CAHWs services and have indicated that they will continue to do so after completion of the project.

The CAHWs took the history of the sick animal, examined it, made a diagnosis and then prescribed, dispensed and administered treatments. The process was recorded on a treatment form by the CAHW. The CAHW then charged for his/her services and was paid with a voucher equivalent to the service value. Where service costs were not equal to a full dollar, the positive or negative balance was recorded in the farmer's record and carried forward for future case calls. The CAHWs accumulated vouchers from cases attended and then delivered them to the PVP where they were redeemed to replenish depleted drugs, or the mark-up extra cash collected where needed. The PVP accumulated redeemed CAHW vouchers and delivered them to the wholesaler to redeem them with more veterinary drug supplies. Finally, the wholesaler redeemed all the vouchers collected from the PVP with the partner for cash in US$, a process that was greatly affected by unstable monitory policies in Zimbabwe at the time.

The relationships between the various stakeholders (wholesaler, PVP, CAHWs, partner organisation and government agencies) exemplified very high levels of trust, which created good linkages and a positive enabling environment for the project's success. However, a key complaint from farmers with large herds was that the voucher value was small. It was also noted that the CAHWs, though a key element for the success of the treatment voucher scheme, are only informally recognised by government and thus their future service provision is uncertain.

A total of 64 drugs were sampled from CAHWs and PVP and analysed at the DLVS laboratories. The results indicated that all samples passed the quality analysis, indicating that the active molecule remained unchanged.

The voucher scheme was well executed within three months, achieving a 96% treatment voucher redemption and 100% service voucher redemption. A total of 2,444 beneficiaries (94%) were able to access CAHWs services with 40,041 livestock treated. During the endline KAP study, in all five FGDs, participants indicated there was a drop in the winter season mortality of goat kids (due to heartwater disease) and poultry when compared to previous years, which they attributed to the services provided by the CAHWs.

Pre-project Test 3

Various humanitarian voucher schemes were reported in Test 3 area, but the only animal health voucher scheme was an e-voucher ('e-wallet') project implemented in 2017. Community members selected as beneficiaries, and some PVPs who were previously involved, could remember the previous e-wallet scheme well. They noted that the herders were the holders of the debit e-wallet card and could withdraw money from the bank or make unlimited purchases of livestock inputs or any other household goods as the voucher was unrestricted. However most of the community and the AHSPs had limited or no previous experience with voucher schemes.

Post-project Test 3

In Test 3 a second type of treatment voucher scheme was used that incorporated AHSPs rather than CAHWs, and it was an electronic rather than paper voucher. The partner organisation made an agreement with the bank to provide financial services and infrastructure for the operation of the e-voucher scheme. The bank provided the POS equipment to the four PVPs, who underwent a rigorous process of due diligence since they would essentially become bank agents and could provide other financial services as well as the e-voucher scheme. The bank also issued the eight AHSPs with e-voucher debit cards that were locked to a specific POS machine, which meant that AHSPs could only purchase drugs from one specific PVP outlet and the cards could not be used in any ATM to withdraw cash. The PVP owners were trained on the POS machine operation by the bank and were also trained by a consultant on drug store management and treatment protocols.

The partner organisation deposited project funds for medicine purchases with the bank, with an allocation list for each of the AHSPs. The bank then loaded the e-voucher debit cards through their system. The AHSPs' ATM cards were loaded with a total amount of 2.3 million Ksh (US$ 22,660), with on average each ATM card loaded with KSh 292,600 (US$ 2883) - the actual amount loaded being dependent on the target number of beneficiaries the AHSP would serve. The amount only included the actual cost of drugs with no mark up to cover time, transport or equipment repair, meaning that the AHSPs lacked a market-based incentive for the services they provided.

The provision of the ATM cards and POS machines was significantly delayed due to several factors, including PVP owners not providing adequate documentation as well as fund payment delay to the bank. After the financial processes were set up, the wholesaler who had pre-positioned the first consignment of drugs at the Marsabit wholesale store requested the PVPs to collect their share of veterinary medicines. Once the PVPs had their consignment of drugs delivered to their store, the AHSPs were then requested to purchase the drugs using the e-voucher debit card. Each AHSP could purchase drugs worth up to a maximum of KSh 40,000 (US$394) every time they visited the PVP. The approved veterinary medicine wholesale supplier committed to procure and sell to their franchise PVPs the approved list of veterinary medicinal products at a fixed wholesale price, which ensured their stores would realise a profit from the sales. The profit margin realised by PVPs ranged from between KSh 3 and 150 depending on the product.

Following community dialogue, 3000 beneficiaries were identified in the target wards and issued with an identification card to be presented to the private AHSPs for clinical services. The card contained information on the number and species of livestock owned by the beneficiaries. Beneficiary herders could request animal health services from the AHSP either through phone calls, messages left at the PVP stores by CDRs, or by physical meetings with herders. The AHSPs verified the beneficiary through their serialised identification card and then travelled with the herder to the location of their livestock either at livestock kraals or watering points.

LEGS offered technical support throughout the model design and implementation phases as well as monitoring support through two spot check visits. The first spot check highlighted the need to ensure that only the pre-approved list of drugs was being distributed to PVPs and AHSPs. The second was conducted after the voucher redemption activity ended prematurely and it was found that six out of the eight AHSPs and three out of the four PVPs had returned all unused drugs to the partner. A total of 14 drug samples were collected during the two spot checks and submitted to an independent private laboratory for quality analysis. All samples passed the quality analysis, indicating that the active molecule quality and quantity remained unchanged. This was a key indicator of good veterinary medicine distribution and storage practices.

Implementation of the Test 3 voucher scheme was extensively delayed by the administrative demands for organising the AHSP voucher programme, including procedures for wholesaler engagement, and time and procedures for establishing PVPs and bank POS representatives. The redemption period was reduced to a very short period of about three weeks. By the end of the project, AHSPs had offered services to 1,680 beneficiaries (56% of the planned total) as well as 298 non-beneficiaries – who received the service for free - and treated 58,550 livestock. Due to the short duration of activities the PVPs and AHSPs returned drugs worth KSh 552,515 (US$5443), but a total of 1.25 million KSh (US$12,315) was paid out to the AHSPs. On average the AHSPs earned Ksh 157,400 (US$ 1550) from the project partner for the one month worked, with a range of between KSh 208,000 (US$ 2049) and 109,000 (US$ 1073). The quantity of veterinary drugs used was 71% of the consignment.

5.5 Monitoring system

Pre-Project

The research model proposed that the voucher schemes include a monitoring system to record implementation and allow for course correction. This monitoring would cover drug use, management,

storage and distribution by CAHWs/AHSPs, PVPs and wholesalers, as well as community satisfaction, based on the following:

- Checking the packaging and the source of drugs held by CAHWs/AHSPs
- Random CAHW/AHSP kit content monitoring
- Random laboratory drug quality testing where possible
- Random monitoring of CAHWs/AHSPs, PVPs and suppliers including their SOPs, GSPs and GDPs
- Endline studies of beneficiaries, CAHWs/AHSPs, PVPs and suppliers

POST PROJECT

In **Tests 2 and 3** the research team carried out:

- Baseline and endline studies with community members
- Spot checks on CAHWs/AHSPs and PVPs[32]
- Laboratory tests on sample drugs

In Test 2, the partner also carried out both baseline and endline studies. This partner also organised a learning event on the conclusion of their project in an effort to inform and share project outcomes with other partners and stakeholders in the livestock sector.

In **Test 1**, a baseline study was carried out by the research team. However, since the voucher scheme was not implemented in Test 1 in time, no further data (including spot checks or laboratory tests) was collected.

The donor USAID/OFDA carried out monitoring visits in all the three projects. The three test partners may also have carried out their own internal monitoring but reports were not shared with the research team.

5.6 POLICY CONTEXT

The Operational Research model calls for appropriate policies to be in place to support privatised community-based animal health systems. The key national policies include:

- Regulations on who can provide frontline services
- Regulation and licensing of private veterinary pharmacies
- Wholesaler licensing and regulation
- Importer licensing and regulation
- Drug quality standards
- Definition of the roles of the private and public animal health service sectors

The policy environment in the three test countries as regards animal health service provision varies considerably, as detailed in Section 2 above, with specific issues highlighted here.

TEST 1

In Test 1 CAHW are recognised by law and national guidelines exist for their training, certified by the Ministry of Agriculture. The *Veterinary Drug and Feed Administration and Control Proclamation No. 728/2011* regulates veterinary drugs, feed and veterinary drug professionals. The national drug certification process is rigorous and well designed but does not address the challenges of high ambient

[32] In Test 3 the planned second spot-check data collection was not fully completed since the partner closed the project ahead of schedule.

temperatures in many pastoral areas. Licensing and annual inspection of wholesalers and PVPs is required by law, however inspections are not always carried out each year, particularly in remote areas, and feedback is rarely given. PVPs carry only nationally certified veterinary pharmaceuticals although non-certified (including counterfeit) products are locally available. There is poor knowledge of laws, legislation and bodies involved in drugs and animal health control at all levels, including the regional level. Poor knowledge of the policy environment has also contributed to poor knowledge of quality control procedures and regulations at project and regional levels. On the other hand, the fact that CAHWs are a recognised cadre in animal health service provision in Ethiopia, with a standardised and accredited training curriculum, is an important policy achievement for animal health provision.

TEST 2

In Test 2, *the Veterinary Surgeons Act Chapter 27:15* regulates animal health professionals and defines animal health service provision in the country. The *Medicines and Allied Substances Control Act of 1991, (Chapter 15:03 and its Regulations, SI 150)* mandates the Medicines Control Authority of Zimbabwe to control the manufacture, importation and sale of veterinary medicines to ensure they are safe, efficacious and of good quality. The national drug certification process is rigorous, with licensing and inspection of wholesalers and PVPs.

As for Test 1, PVPs carry only nationally certified pharmaceuticals but others are available. The key stakeholders in the animal health sector up to the level of PVPs are knowledgeable about laws, legislations, regulations and government agencies responsible for drugs and animal health control; and therefore there is good knowledge of quality control procedures of veterinary drugs at PVP level and above. However, out of 12 CAHWs consulted during the spot checks, none were aware of the institution responsible for drug regulation.

There is no formal recognition of CAHWs therefore there is a need for animal health stakeholders to discuss their utility and possibly find a way to recognise them formally (and provide a standardised training curriculum), to ensure future continuity of community-based animal health projects. Monetary policy changes in Zimbabwe requiring all transactions to be in Zim RTGS dollars during the implementation of the voucher scheme greatly affected the running of the scheme due to the uncertainty it created. The voucher scheme was developed and pegged to US$ at time when the country was free to use multi-currencies. The introduction of the new policy caused a rush to conclude the project within the window provided for the changeover of policies and still ensure all market actors were paid in US$ as per their contracts.

TEST 3

In Test 3, of the many laws touching on animal disease and welfare, the most significant is the *Veterinary Surgeons and Veterinary Para-Professionals Act, Cap 366,* which forms the basis for animal health service regulation as well as the control of veterinary medicines through the Veterinary Medicine Directorate. Licensing and annual inspection of wholesalers and PVPs is required, although again the inspections do not always take place and feedback is not provided. The PVPs carry only certified drugs but non-certified products are locally available.

In Test 3 the PVPs and AHSPs lacked knowledge on the laws and institutions governing veterinary drug regulation and control, as well as animal health laws and legislation governing animal health service delivery, although PVPs do not adhere to the standards regarding their premises and personnel (based on

spot check results from four PVPs, seven AHSPs and one government vet). The county government tends to overlook some existing policies regarding the role of public and private services, which contributes to confusion and uncertainty for the PVPs and dependency for herders. However, PVPs and AHSPs understood well the animal health personnel regulatory body – the Kenya Veterinary Board (KVB) – due to annual interactions when renewing their status. Future training of AHSPs in such a project should include training on the relevant policy environment. A key policy position in Kenya is that CAHWs are outlawed by an act of parliament.

6 ANALYSIS AND CONCLUSIONS

6.1 REVIEW OF TESTS AGAINST THE RESEARCH MODEL ELEMENTS AND CRITERIA

Table 17 presents a review of the three Tests against the six elements of the model and their corresponding criteria, using a simple scoring of 0 (not met) to 5 (fully met), followed by a discussion of the detail.

Table 17 Review of Research Tests against the Model

Model elements	Criteria	Test 1 score	Test 1: comments	Test 2 score	Test 2: comments	Test 3 score	Test 3: comments
1 Functioning Community Based Animal Health system	Appropriate training curriculum for the local disease context, including cost recovery and business skills	5	Standardised government-certified national training curriculum, includes a session on cost recovery and finance management	3	Training commissioned for project so not nationally accredited; short training period; focus on theory rather than practical, and limited to project drugs only; but did include business training	4	Selected AHSPs were trained Animal Health Interns, but this did not include business training
	CAHWs/AHSPs with skills to provide quality service appropriate to the local context based on a valid animal health provider-owner-animal relationship, that includes taking a history, physical examination, diagnosis and treatment choice	n/a	CAHWs recruited but operations could not be observed.	4	All CAHWs examined animals before diagnosis and maintained good treatment records and follow up (based on spot check visits and according to endline KAP survey). Skills limited by short training period	3	AHSPs had strong clinical skills but beneficiaries felt they did not have sufficient knowledge of local diseases, particularly camel diseases. Of the 8 AHSPs, 6 were observed during spot check visit to be establishing a relationship but 2 were conducting mass treatment due to high service demand and hence were not able to establish a relationship
	CAHWs/AHSPs trained in drug protocols and maintaining quality of veterinary pharmaceuticals including dosage, withdrawal periods, storage and disposal	n/a		4	Covered in the short 5 day training; verified by spot check visits, KIIs, and observation of treatment record books	4	AHSPs were trained in and well aware of drug protocols, withdrawal periods and maintaining of quality veterinary pharmaceuticals

	Appropriate CAHW/AHSP equipment	n/a	Not observed	3	The thermometer and weigh band were appropriate. But selection of disposable needles and syringes without indication of disposal times resulted in reuse until gradation markings were erased and sterility not ensured. Vet bags were small and CAHWs were not provided with protective clothing	3	Basic kit provided in large boxes good for safe storage but too big to transport easily without access to vehicle, therefore all drugs were transported by vehicle in the box leading to high ambient temperatures
	Effective links with public/private sector veterinary professionals for monitoring, referrals and support	2	Local government veterinary staff allocated to supervise the CAHWs as part of the project agreement with government. The CAHW, PVP and wholesaler are also linked in a community discussion forum involving government veterinary staff at woreda level	4	Effective link with the ward level veterinary and agriculture extension government workers. CAHWs called them to refer difficult cases. Government vet and agriculture extension workers monitored castration and dehorning services	4	7 out of 8 AHSPs were interns based in the county veterinary department and therefore had existing and effective links with public services. The Test 3 partner also set up a WhatsApp group so that the AHSPs could request support from the county staff for difficult cases, but there was no monitoring support
	Market-based system for service provision which includes service fee for providers	n/a		5	The wholesaler, PVP and CAHWs relationship was based on a working market-based system. Farmers paid the CAHWs' service fee	0	AHSPs were under contract to the implementing partner and therefore not operating as private providers
2 Veterinary Pharmaceutical Supply Chain and Quality	USAID/OFDA approved veterinary pharmaceuticals supplied by USAID/OFDA approved wholesalers, and procured by nationally registered/licensed PVPs identified by partners using selection criteria approved by USAID/OFDA	n/a		5	The PVP had in drugs stock and supplied to CAHWs all the approved USAID/OFDA drugs	4	1 non-approved drug was distributed
	Approved wholesalers and registered/licensed PVPs able to able to procure, store and supply approved pharmaceuticals to project CAWHs/AHSPs	3	Wholesaler was not up to standard and required significant support from partner	4	The wholesalers met country, and most of USAID/OFDA, quality standards and licensing requirements: one had no temperature mapping and a poorly organised receiving area; the other had no quality manual, lack of cold storage, and no pest control. The PVP met all the spot check list quality requirements;	4	The wholesaler ran out of approved anthelmintics and issued some wrong products to PVPs. The PVPs had storage and temperature control challenges as noted by the spot checks.

					however temperature regulation and recording were noted to be inadequate.		
	Memoranda of understanding between key actors in the supply chain (where possible allowing market forces to drive the supply chain)	4	MOU between wholesaler and PVPs	5	MOU between PVP and implementing partner to lock prices (because of hyperinflation affecting the market); this allowed market forces to work between the wholesaler and PVP, and the PVP and CAHWs	2	No MOU and subsequent lack of clarity on roles and responsibilities of the PVP and wholesaler
	PVPs trained in drug protocols and maintaining quality (as defined above)	n/a		5	PVP staff had prior training from manufacturers, and also participated in the CAHW 5-day training as trainers on drug protocols and quality maintenance. Spot check visits confirmed PVPs had this knowledge and were applying it to maintain quality	3	PVPs were trained on drug protocols and strategies to maintain drug quality. However spot check visits revealed that although they had the knowledge they were not able to implement it
	Quality supply chain not compromised, based on: quality pharmaceutical products, storage, distribution, dosage, and disposal, according to USAID/OFDA requirements	2	Wholesaler: very poor storage, distribution, documentation practices (poor shelving, storage on the floor, no temperature monitoring, no pest control, poor documentation) PVPs had good to poor procurement and storage, poor documentation, but adequate shelving with basic accommodation for high temperatures, and good management of expiry periods. Quick stock turnover likely to prevent degradation due to high ambient temperatures.	4	Wholesaler: met almost all of the USAID/OFDA quality standards for approved product storage, distribution and dosage, with minor temperature regulation issues. PVPs: drug quality maintained; storage good. CAHWs maintained records well however relatively short project period limits conclusive findings of quality of entire supply and distribution chain	3	Wholesaler: met some requirements but there were temperature regulation and monitoring issues. The warehouse from which the approved drugs were sourced also had storage, temperature control and monitoring issues as well as lack of SOPs and pest control plan. The PVP stores had significant temperature and dust storage challenges; batch numbers and expiry dates were not always recorded by wholesaler, PVPs and AHSPs. Short project period limits conclusive findings
	Random selection of pharmaceuticals tested and confirm active ingredients and purity/safety	n/a		5	Two rounds of sampling were carried out from 2 PVP stores and CAHWs, with a total of 57 drug samples (18 from PVPs and 39 from CAHWs). Laboratory tests confirmed stable active ingredients and no microbial growth in injectable bottles that	5	Two rounds of sampling with a total of 18 samples (3 from PVPs and 8 from all AHSPs). Laboratory tests confirmed stable active ingredients

					had had a damaged rubber seal		
3 Community awareness and behaviour	Community engagement in planning activities including prioritisation of diseases	3	Limited community awareness prior to the project start to avoid raising expectations	4	Disease priorities were set by the district and ward level government veterinary/ agricultural officers. Community were not part of the process	4	Built on existing community-based participatory disease surveillance information to select the priority diseases and vet pharmaceuticals
	Community involvement in selection of CAHWs/AHSPs	5	Selection criteria and community dialogue meeting employed to facilitate selection	0	Due to project short timeline and low literacy rates the CAHWs were selected by government extension workers at ward level based on their local knowledge regarding which farmers could best serve the community	n/a	Small number of AHSPs based on availability
	Community involvement in selection of target beneficiaries	n/a		5	Test 2 partner had an existing relationship with the community and local authority: this formed basis of community engagement to set beneficiary selection criteria and identification of vulnerable beneficiaries	5	Partner had an existing relationship with community and conducted monthly community conversation platforms, which included representation from local government and community elders, and used this to engage community to set beneficiaries selection criteria and identification of vulnerable beneficiaries
	Community awareness of quality of drugs, value of services provided and how cost recovery is calculated.	n/a		5	Baseline and endline KAP study revealed good understanding of drug quality issues. Farmers paid CAHW service fee.	4	Baseline and endline KAP study demonstrated good understanding of drug quality, however low literacy rate meant livestock keepers could not read expiry dates. No cost recovery mechanism demonstrated.
	Creation of community animal health committees or use of existing community structures to support the process	n/a		2	Community and local authority meetings but no structures established	5	Use of existing community dialogue structures and local radio
4 Voucher scheme	Elements 1-3 above incorporated into a voucher scheme that ensures good coverage and targets vulnerable community members	n/a		4	Coverage was good but some areas remote and inaccessible due to flooding	3	Brief implementation period limited coverage; failure to run privatised scheme
	Vouchers designed based on consultation with the private sector to determine the	5		5	Addition of service voucher in addition to the treatment voucher in response to project partner	3	Short implementation period resulted in effectively a mass treatment mechanism rather than

	redemption period, and appropriate values for delivery of animal health services, including drug fronting vouchers and service vouchers where appropriate				realisation that treatment voucher amounts were too little for both services		beneficiary-based voucher scheme
	All key stakeholders including government understand and are engaged in the scheme based on MOUs	n/a		4	MOUs clarified roles, responsibilities and operation of scheme but no SOPs developed. Engagement with government and MoU with PVP allowed a good understanding and ownership of designated roles. However no SOPs were developed	3	Absence of MOUs resulted in some price confusion and no SOPs developed
	Voucher redemption system established and working	n/a		5	Scheme ran for three months as planned	3	Scheme ran for very short time period (one month, with only one day's contact with AHSPs in some areas)
	Beneficiary satisfaction with scheme and positive impact on livestock	n/a		4	Endline survey confirmed community satisfaction with scheme, significant winter season reduction in livestock mortality especially for poultry and goat kids compared to previous years. There was also significant improvement of body condition as well as the realisation that seeking CAHW services was more cost effective than travelling to PVP stores to purchase drugs	3	Endline survey confirmed that more than half of the FGDs were satisfied with the scheme and cited improvements in body condition and recovery from disease; others noted that the short implementation period limited the impact of the scheme
5 Monitoring system	Checking batch numbers, packaging and source of drugs from CAHWs/AHSPs and PVPs	n/a		5	Two spot checks carried out as planned with CAHWs and PVP	3	First spot check completed; second spot check not carried out due to early closure of project
	Random inspection of CAHW/AHSP kit contents and storage	n/a		5	Two spot checks carried out as planned	3	First spot check completed; second spot check not carried out due to early closure of project
	Random laboratory drug quality testing where possible at both PVP and CAHW/AHSP levels	n/a		5	Lab tests completed successfully	5	Lab tests completed successfully
	Random inspection of CAHWs, PVPs and suppliers including:	n/a		5	Two spot checks carried out as planned	3	Second monitoring visit not carried out due to early closure of project

	drug management, storage and distribution preferably based on SOPs, GSPs and GDPs						
	Collection and tracing of used vouchers (or monitoring of electronic system) to ensure inclusion of only targeted beneficiaries, and use of vouchers only for approved services	n/a		3	Partner monitored, not verified	3	Partner monitored, not verified
	Baseline and endline studies of beneficiaries, CAHWs/AHSPs, PVPs and suppliers	2	Baseline study completed	5	Baseline and endline studies completed, supplemented by partner baseline study	4	Baselines and endline studies completed but within short timeframe
6 Policy context	Appropriate policies in place in support of privatised community-based animal health system	4	Two draft regulations and proclamations for para-professionals exist which are expected to support CAHWs. National minimum guidelines for establishing CBAH services, guidelines on CAHW training and a standardised curriculum exist.	4	There are no laws recognising CAHWs although the government supports their training at district level (from local learning event with government staff in attendance). Other regulations on drug service provision are good	2	CAHWs are outlawed but there is no service provider to fill the gap; former CAHWs are now CDRs and are still relied upon by livestock keepers for services in spite of illegality due to the shortage of public and private AHSPs, in addition to their role as disease reporters and community mobilisers

	Veterinary pharmaceutical regulatory policies, including licensing and inspection procedures for wholesalers and PVPs, ensure that quality pharmaceuticals are available for privatised community-based animal health services	3	National drug certification process rigorous and well designed, but does not address the environmental context of regions where pastoral production predominates including ambient temperatures. Wholesalers and PVPs are required to be licensed and inspected annually. Participating PVPs reported that inspection is not carried out annually, especially in remote areas. Wholesalers and PVPs do not receive feedback from inspection process. Randomised drug testing is called for, and some participating PVPs reported having had products taken for inspection. PVPs carry only nationally certified pharmaceuticals. Non-certified pharmaceuticals, including counterfeit products, are available in local markets and some non-project PVPs.	4	National drug certification process rigorous and well designed. Wholesalers and PVPs are required to be licensed and are inspected annually, including randomised drug testing. PVPs carry only nationally certified pharmaceuticals. Non-certified pharmaceuticals are reported to be available in the market. Weak regulation due to staff shortages	3	National drug certification process rigorous and well designed, but does not address he environmental context of regions where pastoral production predominates including ambient temperatures. Wholesalers and PVPs are required to be licensed by national medicine directorate and county government, and if carrying acaricides by VMD, and inspected annually. Participating PVPs reported that inspection is not carried out annually, especially in remote areas. Wholesalers and PVPs do not receive feedback from inspection process. PVPs carry only nationally certified pharmaceuticals. Non-certified pharmaceuticals, including counterfeit products, are available in local markets and some non-project PVPs. PVPs had no information about VMD and hence were not licensed by them. Wholesaler did not have a separate licence from VMD.
	Key actors, including wholesalers, PVPs, CAHWs/AHSPs and implementing partners are aware of and adhere to relevant regulations	n/a		4	The wholesalers and PVP had good knowledge of the regulatory bodies and licensing requirements, and adhered to them by ensuring premises and staff complied to set standards and guidelines. The CAHWs (and government extension agents) did not have similar knowledge of the regulations themselves but performed services as they were trained (which was in line with the set regulations).	3	The wholesaler, PVP and AHSP had good knowledge of the regulatory bodies for animal health services but no knowledge of VMD (the regulatory body for veterinary pharmaceuticals). The PVP did not adhere to set standards with regard to the premises and personnel running the shop. All the PVPs had a PVP licence from KVB but not from VMD.

Scoring: 0 = not met; 5 = fully met; n/a = data not available. NB: given that the criteria were not weighted within the original model, no total scores have been calculated

ELEMENT 1 ANALYSIS: FUNCTIONING CBAH SYSTEM

The design of the animal health treatment voucher model emphasised the need for a competent functioning community based animal health service as the first key element on which the voucher system would depend during its implementation, with a set of six criteria identified. It is well recognised that a robust rural animal health system is necessary for improved rural livelihoods in livestock dependent communities. The requirements for the system include adequate staffing, provision of resources, and sufficient mobility to reach as many livestock owners as possible. Prior to the Operational Research project in all three Test contexts, animal health services were present and on-going. However, these rural services were characterised a by chronic lack of staff, veterinary supplies or logistical support, and therefore all three Tests included some strengthening of the existing animal health services.

In Test 1, the recruited CAHWs met the criterion of standardised training[33] and the linkages with veterinary professionals and the market-based system were anticipated to be positive due to the history of CAHW operation in the area, although this was not verified in the field. (Further data on the remaining CBAH system criteria are not available for Test 1.)

In Test 2, all six criteria for the CBAH system element were largely met. There was no standardised curriculum for CAHWs so a short training course of five days was commissioned, although this was considered too short and inadequate by both community members and the CAHWs themselves. The course did include business training and drug protocols and management, but focused more on theory rather than practical skills and was limited to the project drugs. However, during the community endline assessment all the participants (in all six focus groups) confirmed that the accessibility of the CAHWs was greatly appreciated and had had an impact on the health of their livestock, compared to the higher skilled (but significantly less available) professional veterinary staff. Communities appreciated the inclusion of women as CAHWs, as this provided better and more culturally acceptable opportunities for female-headed households to access services. The service provider-owner-animal relationship was established with all CAHWs examining animals before diagnosis. The provision of disposable needles was not accompanied by appropriate training to avoid overuse.

In Test 3, the recruited AHSPs were trained animal health interns and so met the criteria for recruitment and training, and their observed clinical skills were noted to be strong. Community feedback however highlighted that their training was not tailored to locally prevalent diseases (especially camel diseases), and the AHSPs were considered to be inexperienced in handling and treating livestock. Accessibility by women-headed households was facilitated by the inclusion of women as well as men AHSPs. In terms of the equipment criteria, the kit boxes provided safe storage but were too large to be transported without access to vehicles. During spot check visits, six of the eight AHSPs were observed to establish the provider-owner-animal relationship but two were seen to be conducting mass treatment because of the high demand for their services and the short time period. Significantly, Test 3 did not meet the criterion of a market-based system, which significantly affected the implementation of this first element of the model effectively in Test 3. This reflects the challenge of ensuring sustainability of services in a context where CAHWs are not legalised. (In pastoral areas where herds move long distances often to inaccessible areas to find grazing and water, CAHWs present the best opportunity for these herds to receive animal health care. Other higher cadres of AHSPs are likely to be less mobile as they are not part of the local pastoral community and therefore will have more limited opportunities to access the herds.)

[33] An assessment of the quality of the training was not part of the Operational Research remit.

The global online survey revealed the continued prevalence of free distribution of veterinary drugs, which undermines the market-based system promoted by the research model (and by the LEGS standards). Details of the results of the online survey are given in Annex E.

Element 2 analysis: Veterinary pharmaceutical supply chain and quality

The second element of the model related to veterinary drug delivery systems for disease prevention and control, and entailed mapping of the available drug supply chain and the quality of the products, in line with six criteria.

Test 1 met the criterion for approved veterinary pharmaceuticals and to a certain degree the criterion for MOUs between key actors (the MOU was only between the wholesaler and the PVPs). However the selected wholesaler and PVPs were not up to standard in terms of documentation and storage facilities, although they had good disposal and expiry date management, and required significant support from the partner. The PVPs' storage was observed to be adequate in the context of high ambient temperatures but anticipated high turnover of drugs within the store. Further data regarding quality of the supply chain, including laboratory testing, is not available for Test 1.

In Test 2, all the criteria were met and achieved high scores, with the exception of the quality of the supply chain. One of the wholesalers had no temperature mapping and a poorly organised dispatch and receiving area. The other had more non-compliance issues including no quality manual, lack of cold storage hence no temperature mapping, no pest control contract and no EMA licence. Drug quality was well maintained by the PVP and CAHWs, with good storage and record keeping for the duration of the project confirmed by the laboratory analysis. But the short implementation period limits the conclusiveness of these findings, which would need to be tested over a longer period of time. The baseline and endline studies revealed that both the availability and quality of veterinary drugs improved during the project according to community members. In addition, the community appreciated that it was cost effective to seek CAHWs services instead of travelling to source veterinary medicine themselves. The main sustainability challenge relates to the macro-economic environment that will see a lowering of the CAHWs' purchasing power post-project. The PVP has however committed to maintain the 15% discount for CAHWs.

In Test 3, some of the criteria were partially met: approved drugs were distributed with the exception of one non-approved product, and the supply chain was subject to some shortages and incorrect products. Identifying fully private sector PVPs in Test 3 was challenging since – as is commonly the case where government veterinary staff incomes are low – government staff also operate PVPs to supplement their income. In these circumstances, it is challenging to find PVPs who are entirely independent of the public sector. In Test 3 the community baseline and endline studies revealed that they considered the quality and availability of veterinary services, including drugs, to have improved during project implementation. Shortcomings were that MOUs for key actors were not developed and, most crucially, the quality of the supply chain could not be confirmed in spite of the positive laboratory tests, because storage conditions at the PVPs did not meet good storage practice—including addressing high ambient temperatures and poor record keeping. The wholesaler met some of the requirements but there were issues regarding temperature regulation and monitoring. The warehouse where the USAID/OFDA approved drugs were sourced also had storage, temperature control and monitoring issues, as well as lack of SOPs or a pest control plan. The PVP stores had significant temperature and dust storage challenges. Batch numbers and expiry dates were not always recorded by the wholesaler, PVPs or AHSPs. As with Test 2, the short implementation period for Test 3 also limits the conclusiveness of the findings.

For all three Tests, although the Operational Research results suggest that the integrity of the quality supply chain was compromised to a certain extent in each area, the research did provide an opportunity for the implementing partners to learn more about the steps involved in maintaining the quality of the drug supply chain and build their understanding and future capacity in this area, with support from the research team.

Challenges of storage and the presence of easily available counterfeit drugs in the market, both of which can threaten the quality of the supply chain, were also noted by respondents to the global survey.

ELEMENT 3 ANALYSIS: COMMUNITY AWARENESS AND ENGAGEMENT

Community awareness campaigns targeting enhanced knowledge, attitudes and practices for the uptake of animal health services were envisaged to be an integral part of the implementation of animal health treatment voucher schemes. Community conversations were to be an essential part of the process to inform and involve the community in decision making on how they were to participate and access community animal health services. Access to veterinary treatments through a voucher system was intended to be discussed thoroughly, with community agreements regarding the beneficiary selection process. Finally, the essence of the campaign was also to educate the community on how to identify certified veterinary medicines and their expiration dates.

Prior to the project the community in Test 1 was poorly informed about the forthcoming project mainly because the partner did not want to raise expectations within the community before the partner was ready to implement the voucher scheme. However, the partner was able to work through the local authority to select and train CAHWs with the involvement of community members. Data is not available for the remaining criteria for Test 1.

For Test 2, there was some community consultation regarding the initiation of the project, although community priorities on diseases did not inform the planning process. Communities were also not involved in the selection of the CAHWs, which they claimed affected the quality and appropriateness of the CAHWs, particularly with regard to age and gender. However, the criterion of community involvement in the selection of beneficiaries was fully met, and community awareness on the quality and pricing of veterinary drugs was increased. No livestock committees were established nor were existing community structures used to create a platform for information and planning, but rather, meetings with community and local authorities formed the basis for creating awareness.

To improve community awareness of the voucher model in all countries, this element of the model recommended the creation of community livestock committees (or the use of existing community structures) to motivate the community to participate in the project, as well as to represent them in the official processes of voucher implementation. In Test 3 the on-going community dialogue forum and FM radio station were maintained as tools for grassroots awareness creation about the project to the community. This did enhance community awareness of the project, although again local disease priorities were not part of this process. The selection of the AHSPs did not involve the community since the project struggled to identify any appropriate service providers who could take on this role. As for Test 2, the criterion of community involvement in the selection of beneficiaries was fully met for Test 3 and community awareness on the quality and pricing of veterinary drugs was increased.

Element 4 analysis: Voucher scheme

There were two types of voucher schemes developed for implementation in the Operational Research project: the CAHW animal health treatment voucher implemented in Test 1 and Test 2, and the AHSP e-voucher implemented in Test 3. The Test 1 scheme started one month after the data collection period ended, and therefore no data was collected on its performance, although the research team did provide support for the development of appropriately valued vouchers for the scheme.

The Test 2 scheme ran for three months and was based on all the model elements and criteria. An MOU between the partner and PVP was developed (but not SOPs), and a service voucher was added to the scheme to complement the treatment voucher in response to community requests to cover activities such as castration and dehorning. The voucher redemption system worked well and nearly all vouchers were redeemed (96% of treatment vouchers and 100% non-treatment vouchers). However, the PVP had prior experience in using treatment vouchers and could have been consulted in the design of the voucher and to provide advice in the implementation process. The scheme reached 2,444 beneficiaries (98% of the intended beneficiaries) and the endline survey confirmed community satisfaction with the scheme, noting reduced livestock mortality and improved livestock body condition as a result.

In Test 3 the AHSP e-voucher was implemented for a brief period of three weeks, which restricted the scheme's coverage. Two other criteria were also affected by the limited time available in which to implement the project: the AHSPs were not engaged as business partners but as contractors to the partner; and the partner provided hired transport for the AHSPs to access herders. These two changes were expensive and created a potential issue for future AHSPs recruited for similar e-voucher schemes in that they would be likely to demand contractual arrangements for service provision rather than participating as private entities similar to CAHWs. However, given the absence of a legal basis for CAHWs in Kenya and the shortage of private AHSPs in these remote locations, these challenges may well be on-going, in spite of the beneficiary feedback which confirmed the need for private AHSPs to provide services and their willingness to pay for such services.

The absence of MOUs in Test 3 between the key actors initially hampered the flow of veterinary drugs from the wholesaler to the AHSPs, as well as the movement of voucher cash from AHSPs to the wholesaler facilitated by the bank. This led to a misunderstanding early in the voucher scheme where the PVPs complained that the wholesaler had fixed drug prices without consultation, while the wholesaler did not trust the PVPs to pay for their deliveries. However, in spite of the short timeframe and probably aided by the contractual and transport incentives described above, the AHSPs reached 56% of the 3,000 planned beneficiaries (60% in North Horr and 47% in Laisamis) as well as 298 non-beneficiaries (who received the service for free); and 71% of the drug consignment was used. The endline survey results found that more than half of the FGD participants were satisfied with the scheme, citing improvements in livestock body condition and recovery from disease, although others noted that the short implementation period reduced the potential impact of the scheme.

Element 5 analysis: Monitoring system

The research model proposed a monitoring system to record implementation and allow for course correction on veterinary drug use, management, storage, and distribution by wholesalers, PVPs and CAHWs, as well as community satisfaction. The key aspects included random spot-checks and kit monitoring, drug sample collections, checks on used packages and vials, KAP surveys, random checks on drug chain suppliers, and baseline and end-line studies carried out by partners and the research team.

For Test 1, only the baseline data were collected by the research team.

For Test 2, the research team was able to collect data to meet all the criteria in this element, which was supplemented by the partner's own baseline and end-line surveys. The partner also hosted a learning event with local stakeholders after project activities ended.

In Test 3 the research collected most of the planned data, although the second spot-check was incomplete due to the close of the project.

The data collected by the research team proved sufficient to support the implementation of the voucher schemes (as well as generating the research data), and at the same time provided capacity building for partner staff. Partners confirmed that they plan to develop similar monitoring systems for their future animal health and other programmes. This is particularly important as although most of the data collection during the research was carried out by the research team, rather than the implementing partners, this element forms an integral part of the operation of the voucher scheme model (rather than being simply a research exercise).

Based on the research experience, the minimum monitoring required for a successful voucher scheme is as follows:

- Baseline and end-line studies with communities
- Spot checks to PVPs and CAHWs/AHSPs:
    - checking kit
    - approved drugs stocked
    - drug storage and transport
    - drug batch number and expiry dates
    - record keeping
    - observations of storage and documentation
    - interviews with PVPs and CAHWs/AHSPs

Given the time and funds required, random laboratory tests for sample drugs are a recommended but not essential part of the recommended monitoring scheme.

Element 6 analysis: Policy context

The last element in the research model considers the policy environment regarding animal health service provision and drug control, and how these policies and institutions are known by and impact on the stakeholders.

In Test 1 CAHW are recognised by law and national guidelines exist for their training. The national drug certification process is rigorous and well-designed but fails to address the challenges of high ambient temperatures in many pastoral areas. Although licensing of and annual inspection of wholesalers and PVPs is required by law, this is not always implemented particularly in remote areas. Although PVPs carry only nationally certified veterinary pharmaceuticals non-certified (including counterfeit) products are locally available.

In Test 2, the national drug certification process is rigorous, with licensing and inspection of wholesalers and PVPs. As for Test 1, PVPs carry only nationally certified pharmaceuticals but others are available. There are no laws recognising CAHWs although the government is informally supportive. The country national regulation body only certifies products that can withstand temperatures of up to 30°C. Key stakeholders are well versed with legislation and regulatory bodies, a fact that is reflected in generally

good adherence to quality control procedures by PVPs and wholesalers. The CAHWs had very limited knowledge of the regulatory environment but performed services based on their training, which was in line with the regulations.

In Test 3 the national certification process is rigorous but again does not take into account the environmental context of most pastoral areas. Licensing and annual inspection of wholesalers and PVPs is required, although again the inspections do not always take place and feedback is not provided. The PVPs carry only certified drugs but non-certified products are locally available. Key stakeholders, particularly the AHSPs, have poor knowledge of the legislative context, even including legislative bodies such as the VMD, but have a good understanding of regulatory bodies such as the KVB and licensing requirements, although the PVPs do not adhere to the set standards with regard to their premises and personnel. The key policy issue for Test 3 is the fact that CAHWs are not permitted by national law and there is no effective service provider to fill the gap.

In all three Tests, policies are largely in place regarding animal health services and veterinary pharmaceuticals but the implementation of these policies, including inspection and monitoring feedback, is not consistent.

6.2 Conclusions regarding proof of concept for the model

The conclusions of the research findings regarding the proof of concept for the model are that the six elements, and all the related criteria, are essential for the effective implementation of a quality emergency veterinary voucher scheme, which can be summarised as follows:

- Emergency voucher schemes require a veterinary-supervised privatised community-based delivery system
- Emergency voucher schemes require a legal and capable market-led veterinary drug delivery system to be engaged
- Community engagement contributes to effective implementation and uptake of the service and is a key part of the emergency voucher scheme
- SOPs, MOUs and detailed planning are essential for effective emergency voucher schemes
- Quality monitoring systems by implementers are key to help support pharmaceutical quality, ensure community satisfaction and steer emergency voucher scheme implementation
- Appropriate policies need to be in place and implemented, and stakeholders need to be well-versed in them, in order to support drug supply chain quality in emergency voucher schemes.

Although none of the Tests fully met all the criteria for each element, the overall conclusion of the research is that despite time constraints and some variations in the design, veterinary structures, and enabling environment, the model effectively proved the concept regarding market-based approaches to the inclusion of veterinary pharmaceuticals in emergency animal health programmes.

7. RECOMMENDATIONS

These recommendations are divided into two sections: voucher models and CBAH systems. There are several excellent publications and many references available on community based animal health services. The recommendations here should be read as key experiences from the Operational Research rather than a comprehensive overview of such services.

7.1 RECOMMENDATIONS FOR VOUCHER MODELS

The overarching recommendation is that the elements and criteria of the model are the key requirements for the successful implementation of voucher schemes, and in particular that the key elements need to be in place prior to the emergency, including the capacity of implementing organisations[34]. What follows below are some specific recommendations, presented according to the model elements.

ELEMENT 1. FUNCTIONING COMMUNITY-BASED ANIMAL HEALTH SERVICE SYSTEM

Based on the research findings, the following recommendations are proposed to support voucher-based animal health service schemes:

Veterinary voucher schemes offer a means to support market actors during an emergency response, whilst providing direct assistance to vulnerable beneficiaries. They depend however, on an available cadre of existing or newly recruited CAHWs or other AHSPs who should be fully trained in service provision and business management so that by the end of the project they can continue to provide services in the target community in a sustainable manner.

In line with LEGS, partners should always seek to work through the local market-based system of service provision and avoid contracting CAHWs/AHSPs to deliver services as this can create a precedent and disincentive for future service providers in a voucher scheme or front-line community based service delivery. The PVPs should be involved from the beginning in voucher design and the redemption process. Vouchers should be set at an amount of to allow vulnerable livestock owners to meet AHSPs' operating costs such as income/fees, transport, pharmaceutical resupply and equipment repair.

Training should be provided to new CAHWs/AHSPs so that they understand the costs of running a business, can calculate service fees accordingly, and understand whether and how voucher values contribute these fees. Communities should be adequately informed as to what costs the voucher covers, and therefore what beneficiaries and non-beneficiaries need to pay in order to receive services.

CAHWs should ideally be under the supervision of a private veterinarian, with both under national veterinary legislation enforced and monitored by public services. However, where private vets are few or absent, as is often the case in remote and harsh areas, public veterinary services may have to take on this role with the support of implementing agencies, or implementing agencies may have to lead this process themselves.

[34] In line with LEGS core standards on preparedness and technical capacity.

Element 2. Veterinary Pharmaceutical Supply Chain and Quality

Capacity building is required at all levels of the supply chain in many countries, to improve drug storage, distribution and management, and implementing partners have a key role to play in this, through for example the development of guidelines on quality standards and related training.

There is also a need to work closely with government agencies responsible for setting quality standards to ensure that they are appropriate for the end-use environment, for example ensuring that drug import standards regarding temperature and stability are appropriate for the environment where the drugs will be used.

Key areas where the supply chain comes under pressure are often linked to the distribution of drugs from the wholesaler to the PVPs, and then to the front-line service provider, including temperature and relative humidity monitoring, packaging, storage and record keeping.

Working with a small number of wholesalers rather than just one can help to broaden the access to drugs and improve distribution, although this can be more time-consuming for implementing partners as additional paperwork will be required to obtain USAID/OFDA approval of each.

Element 3. Community Awareness and Behaviour

Where existing community platforms are not already in place, the model proposes setting up Livestock Committees to act as a means for the partner to engage with the target communities It is therefore recommended that mapping of community platforms and committees is undertaken prior to developing a voucher scheme.

Communities must always be engaged from the start of the scheme and throughout the project period, including in the selection of CAHWs, selection of beneficiaries, identifying of priority diseases to ensure that the correct drugs are supplied, and for discussions about any service fee to be paid.

Element 4. Voucher scheme development and implementation

Preparedness, including engagement with all key stakeholders, is important to ensure that the appropriate modalities are put in place, e.g. technical input from wholesalers, and that all are agreed on respective roles and responsibilities. This could also include working closely with the target beneficiary communities to increase their knowledge of quality drugs.

The research found that community contributions to the cost of the service were an important factor in the future sustainability of the delivery system, for example in Test 2 beneficiaries were willing to pay at least part of the full cost of service provision. In the same Test, the addition of a service voucher to provide dehorning and castration proved to be popular with livestock owners and may be a way of developing a strong relationship between the frontline service providers and the community. It also shows that voucher schemes can be adapted to a local context depending on the needs of a community.

The development of standard operating procedures by one partner proved to be very effective in identifying the key steps, roles and responsibilities of the various actors in the chain, and the appropriate voucher redemption period. This can facilitate a more rapid response from implementing agencies in the

event of any future emergencies, and serve as an entry point for discussing voucher delivery modalities with stakeholders.

The need for livestock feed and water vouchers should also be assessed particularly in drought emergencies, as animals are generally more likely to die of hunger and dehydration than disease. Feed and water vouchers are also more common and easier to manage as they require fewer quality control measures.

Further areas for voucher model research could include use of new and developing technologies such as the use of e-vouchers and mobile phone banking, which could reduce the need for paperwork and allow for a simpler voucher delivery system. Appropriate technology for drug storage and transport in hot climates, for example the use of concrete shelving for drugs to help limit high temperatures, would also be of value.

Element 5 Monitoring

The research shows that there is a minimum level of monitoring required for a successful voucher scheme that maintains a non-compromised quality supply chain, based on: baseline and end-line studies with communities; spot checks to PVPs and CAHWs/AHSPs that include checking kit, approved drugs stocked, drug storage and transport, drug batch number and expiry dates, record keeping, observations of storage and documentation; and interviews with PVPs and CAHWs/AHSPs. Random laboratory testing, which formed part of the original model, is desirable but not essential.

Implementing partners will often have to develop a record keeping system specific for the project, that allows traceability of batch numbers based on wholesaler invoices to PVPs and onward to CAHWs. There already exist handbooks and good practice guidance for voucher programming that can be used.[35] As referenced above, the use of e-vouchers and other technologies may further streamline voucher monitoring and reporting.

Given the time and funds required, random laboratory tests for sample drugs are a recommended but not essential part of the recommended monitoring scheme.

It is important that a detailed monitoring plan is drawn up before the project begins, and that sufficient time, resources and staff are allocated to the implementation of the plan.

Element 6 Policy Context

Appropriate licensing and regulations are frequently present at national level but the implementation at lower levels is often poor, with very limited oversight by the relevant government bodies. This is likely to have an effect on the quality of both the drug supply chain and the service provided to the livestock owners. In these contexts implementing partners need to understand the need for oversight, have the required technical capacity, and be prepared to take an active role in monitoring the various stages of the chain to ensure quality is not compromised.

[35] For example, existing voucher best practices from other sectors can be adapted, such as from the Cash Learning Partnership's Programme Quality Toolbox at pqtoolbox.cashlearning.org

7.2 Recommendations for Community Based Animal Health Projects

1. Technical support

Governments, agencies and NGOs have been involved in CBAH programmes for a considerable number of years since structural adjustment in the 1990s. A few specialist livestock and animal health NGOs exist, however, multi-sectoral organisations frequently take on animal health activities, sometimes as an add-on to wider programmes. In these circumstances in-house experience and technical skill of both developing and implementing community-based animal health projects is essential from the concept note stage through to the end of the project. Where agencies implement community-based animal health projects without the necessary experience and knowledge, problems can arise, with one example being a lack of understanding of the need to avoid free treatment leading to existing or future privatised services being undermined.

2. CAHWs

If animal health services are to provide an effective service to communities in the long term, CBAH projects need to work closely with government at all levels to improve the quality standards of the whole supply chain, and in the acceptance and legalisation of private CAHWs as a key part of the animal health delivery system. The experience of Kenya is interesting, where CAHWs are now illegal and have become CDRs, but are still recognised by livestock owners for their ability to diagnose and treat livestock. There is a need for continuing advocacy at government level and with professional veterinary organisations to promote the benefits of CBAH systems, particularly for agro-pastoral and pastoral areas with very limited veterinary service cover.

The countries where the model was implemented had very different legal and structural environments regarding the delivery of animal health services to rural and often isolated communities. Giving CAHWs legal status helps to anchor them in a veterinary service structure, alongside establishing national standards for roles and training, which should include guidelines on training and a standardised training course. These standards should aim to provide the necessary quality assurances for drug management and use, and clinical services.

Where CAHWs are legally allowed to operate, women CAHWs have been shown to be an integral part of acceptable and accessible services. Communities recognised the benefits of women CAHWs, citing the need to have both men and women trained as CAHWs as female headed households find it easier to access services from a woman CAHW. It also became clear during the Operational Research that, overall, the women CAHWs had better management of their case, treatment and drug records, which in the long term may result in more successful service provision and case management.

3. Competencies and training of AHSPs

Competencies of AHSPs will depend on their level of training, for example, competencies of a CAHW would not be as high as those of an animal health technician. Standardised national guidelines for competencies of the different cadres of front-line service providers allow for appropriate training course contents and time frames to be developed, with recommendations for refresher training. Training course content should be flexible to allow for priority local diseases to be targeted. These guidelines can be used by implementing agencies to monitor the competencies of the AHSPs if monitoring is not be undertaken by any regulatory body.

Implementing agencies need to understand the legal context and the national standards on the roles and responsibilities of the various cadres of AHSPs so that they can provide the necessary support to training, equipment and service delivery as needed.

4. Sustainability of CBAH services

The Operational Research project aimed to find avenues for engaging PVPs and private CAHWs/AHSPs in a system that had long term opportunity and potential, in line with the LEGS approach of helping people to secure their livestock assets through preparedness and links to long term development. To support this, a good understanding of the market chain and demand and supply are required by an implementing organisation to help both PVPs and CAHWs orientate themselves as business people, with appropriate pricing and recording of cases, treatments and drug details. As previously mentioned, business training and supporting AHSPs to develop their business skills is integral to establishing lasting private services.

In some countries, government veterinary services have taken on the role of providing curative services as well as their usual public roles. This can be due to a historic lack of private AHSPs who are able to provide these services. However, when privatised CBAH services are set up, provision of curative services often at subsidised rates by government veterinary services will undermine the emerging private sector. Implementing agencies must advocate to convince public services to stop providing these services and move fully to a private system.

5. Community participation

Community involvement is essential in all stages of a CBAH project from awareness raising, CAHW selection, payment for services, and feedback sessions to the authorities and implementing bodies. Without this contribution, community acceptance and willingness to engage can be affected. It may be necessary to form an animal health committee to act as the main interface between the community and other stakeholders, though working through existing structures can be preferable in terms of the sustainability of the group and being accepted by the wider community.

6. Monitoring and Evaluation

The research model proposed a monitoring system to record implementation and allow for course correction on veterinary drug use, management, storage, and distribution by wholesalers, PVPs and CAHWs, as well as community satisfaction. Ideally, these activities should be part of government regulatory functions, however, in many cases this is either weak or absent, and in these circumstances, implementing agencies will need to provide capacity building to help governments fulfil their role in the longer term. In the face of poor government regulation, agencies should also take responsibility to ensure that safe, quality pharmaceuticals are used in their projects, and must support good supply, distribution, and documentation practices by the market actors including participating wholesalers, PVPs, and AHSPs.

Annexes

Annex A: Original research protocol and model

Annex B: Details on research methodology

Annex C: Criteria for PVP selection

Annex D: Test 2 CAHW Training Outline

Annex E: Global online survey report

ANNEX A: ORIGINAL RESEARCH PROTOCOL AND MODEL

BACKGROUND AND SIGNIFICANCE

Millions of people worldwide depend on livestock as a source of livelihood offering multiple benefits that include income, food, skin, hide, wool, draught power, social and economic security[1]. In the event of a disaster, the loss of livestock culminates in destroyed livelihoods and enhanced food insecurity of livestock dependent communities. At times, the situation is compounded by humanitarian actions that do not take into account the livelihoods of livestock owning communities consequently undermining their already precarious situation[2]. It is for this reason that the Livestock Emergency Guidelines and Standards (LEGS) were developed. Livestock Emergency Guidelines and Standards are thus grounded on a livelihood based approach offering a valuable set of guiding principles to the implementation of short-term emergency relief and long-term resilience programming. LEGS, therefore is a set of international standards and guidelines for the assessment, design, implementation and evaluation of livestock interventions[3]. Specific LEGS interventions are grouped into six categories: destocking, veterinary support, ensuring feed supplies, provision of water, livestock shelter and settlement, and provision of livestock. Key information for each intervention comprises Standards, Key actions and Guidance notes[3]. The ultimate aim of LEGS is to improve the quality and livelihoods impact of livestock-related projects in humanitarian situations.

LEGS has proved to be an effective and useful tool in livestock emergency response thus its uptake has grown over time and it has been embraced globally by various agencies[4] [5] [6] governments, humanitarian donors, UN agencies and NGO supporting development and emergency livestock programming. The governments of Kenya and Ethiopia have institutionalized the use of LEGS while international and local NGOs as well as UN agencies (FAO and OCHA) use LEGS as a framework for emergency livestock programming. LEGS is now used as a reference for assessing/screening and evaluating livestock projects by various donors, specifically USAID/Office for Foreign Disaster Assistance (OFDA), EU/ECHO, and DFID[7]. Donors such as the USAID/OFDA have also been supportive of the LEGS Project through funding. OFDA has further institutionalized the LEGS framework in its livestock programming[8].

Whereas OFDA supports veterinary clinical services in its livestock programming, OFDA procurement regulations and requirements places veterinary pharmaceuticals as restricted goods whose supplier and the goods need prior OFDA approval[9]. The veterinary medical supplier has to be approved by OFDA ascertaining that they can supply quality, safe and cost effective pharmaceuticals that are optimally stored. The non-prequalified suppliers have to undergo a rigorous process to seek approval.[10] NGOs receiving funds from OFDA have frequently taken up the burden of procuring veterinary pharmaceuticals from qualified suppliers to ensure donor regulations are met. In most cases where NGOs procure the veterinary medicines, the possibility is that these veterinary pharmaceutical supplies and accompanying services are provided free to the community through community animal health workers since the NGOs are unable to ensure the quality of supplies provided by private veterinary pharmacies. The provision of livestock health humanitarian handouts has undermined the private sector and created a legacy of dependence. LEGS recognizes the importance of the local private sector both during and after emergencies and recommends support to local veterinary pharmacies and the use of community-based animal health workers where available, including the use of voucher schemes. The use of voucher systems in emergency response has been hailed as an effective and efficient method in areas where markets are working in that the system ensures targeting of vulnerable beneficiaries and supports the existing private primary animal health service delivery system[11]. In Ethiopia, the concept of voucher

based veterinary service interventions during emergencies and in normal development programming has been extensively used with diverse models being implemented in different pastoral areas [12] [13]

However anecdotal reports indicate that some OFDA-funded NGO face difficult management decisions around how to provide beneficiaries with animal health service vouchers, while also being fully compliant with OFDA regulations regarding the procurement, storage and distribution of veterinary pharmaceuticals. It has also been noted that various recipients of OFDA livestock programming who are aware of procurement restriction on pharmaceuticals, have been avoiding seeking funds for veterinary pharmaceuticals and opt to seek complementary funding from other donors to support these activities through a voucher system, which means that drugs of unverified quality may be used within OFDA funded programs. Whereas animal health remains a key sector in livestock interventions funded by OFDA, OFDA does not generally consider voucher systems in procurement of veterinary pharmaceuticals due to concerns regarding safety, efficacy, and quality of the products however their use is not all together precluded so long as certain quality standards are met for the procurement, distribution and ensuring an acceptable cost[8]. The successful use of veterinary treatment and livestock feed vouchers in USAID funded programs has however been reported in Ethiopia [14] [15] [16].

STUDY AIMS

As stated in the research proposal, the overall goal of the program is to ensure LEGS guidelines are used more effectively through the identification and testing of models that allow LEGS guidelines to be applied while complying with key donor regulations, in order to benefit livestock keepers affected by crisis. The program entails operational research to identify and test alternative program models for the application of LEGS standards while complying with key donor regulations, specifically in the area of animal health.

The research question for the operational research is

"What are the potential models that will allow the application of the LEGS standards on the use of the local veterinary private sector and within the quality assurance requirements of OFDA?"

The models will seek to unravel the operational gaps that preclude the effective use of LEGS in emergency livestock programming funded by OFDA. The question that then needs to be answered is:

"What are the operational gaps which, if solved, could enhance the use of LEGS in OFDA funded veterinary support in livestock programming?"

A study of OFDA procurement documents[9] and proposal preparation guidelines[8] indicates that veterinary pharmaceuticals, pesticide and acaricide for use on animals are classified as restricted goods which need prior approval at several levels for them to be acceptable for use in project activities..

Given these facts, the key operational factors required in animal health and veterinary pharmaceutical programming are:

- Compliant veterinary clinical service (compliance relates to the whole value chain, from importer to wholesaler to retailer/PVP to CAHWs) that ensures market provision and availability of veterinary medicines, in terms of quality, safety, accessibility, affordability, with optimal storage and distribution by skilled and capacitated animal health workers.
- Skilled community animal health workers able to provide quality animal health services and who have the ability to discern the quality of veterinary medicine from what is offered by the market.

- Positive community animal health service seeking behavior– knowledge, attitudes, behaviors and practices.
- Policy guidance that is cognizant of local context
- Monitoring system that ensures compliance with the set standards

Therefore the proposed operational research aims to examine the operational barriers facing the implementing organizations in the application of LEGS standards, while meeting their own and OFDA regulatory standards, with a specific focus on veterinary pharmaceuticals and animal health service delivery.

STUDY DESIGN

Design

The operational research will involve a range of data collection methods, described in detail in a separate Data Collection Framework document, including a pre- and post- Knowledge, Attitudes and Practice (KAP) survey; key informant interviews with CAHWs, PVPs, government veterinarians and partner staff; focus group discussions using participatory approaches; and observational site visits; together with a global survey that will be applied to humanitarian actors worldwide. Samples of veterinary medicines will be collected from CAHWs and PVPs for laboratory quality analysis. Secondary data from partner project documents as well as monitoring reports will be analysed to assess project progress and accomplishment.

Setting

The LEGS Project has identified the three countries (Ethiopia, Kenya and Zimbabwe) and project partners who will participate in the operational research. Test 1 will be implemented in Jarar Zone: Aware, Bil'ilbur, Daror, Dhagahbur, Gashamo, Gunagado areas. Test 2 project sites in Zimbabwe are proposed to be in Chiredzi and Chipinge Districts, while Test 3 is proposed to be Marsabit County, Kenya.

Study participants and sampling

The study participants will be project beneficiaries (livestock keepers), key stakeholders and the market actors involved in the supply of veterinary inputs including CAHWs and PVPs. Further details on the participants and proposed sampling process are provided in the Data Collection Framework.

STUDY PROCEDURE

An operational model (see annexed Operational Research models) will be developed *a priori* then adapted to each country context based on partners' advice. Partners of LEGS Project, implementing the models will certainly have or expect funding for their livestock projects from USAID/OFDA. The partners should have made a strategic decision to include provision of veterinary medical inputs in their OFDA funded livestock project. However in situations where the partner is envisaging to implement a veterinary emergency project but has never implemented provision of veterinary medical inputs with OFDA funds, the LEGS Project will offer guided support and capacity building in the project design, proposal development, project implementation and in monitoring and evaluation. This will ensure that all components outlined in the model protocol are included and requisite activities fund are requested accordingly.

Specifically the partners will need to be guided in the initial activities leading to procurement of veterinary inputs including: market assessments, selection and OFDA approval of wholesaler(s), and determination of the process to identify PVP(s) and build their capacity to ensure good practice in the procurement (from the approved wholesaler), storage and distribution of quality OFDA-approved drugs. Support and guidance will be offered in subsequent activities that involve distribution of livestock inputs to the farmers/herders. The partners will be taken through the voucher scheme process so as to ensure targeting of vulnerable beneficiaries as well as helping to strengthen the veterinary input market in emergency situations. Community awareness creation and training of animal health service providers as well as putting in place monitoring structures will be emphasised during the support to ensure efficient and effective emergency livestock input delivery to the beneficiaries.

On securing funding from OFDA, the partners will implement their specific Operation Research model starting with procurement process, training the CAHWs and PVPs; community awareness and putting in place and operationalizing the voucher scheme. Monitoring and evaluation and data collection will be initiated on commencement of the project.

Data collection, management and analysis

The separate Data Collection Framework document contains detailed information on the proposed topics, methods, checklists, participants, and sampling processes. It also outlines how the data will be managed and analysed, and the roles of the implementing partners and research team in communication and coordination.

Discussion

The described operational research protocol is intended to obtain data that will provide a proof of concept for alternative program models relating specifically to veterinary pharmaceuticals programming within OFDA's requirements.

The models in the annexes below describe veterinary treatment voucher schemes in the three contexts of the partner projects. These models are informed by the various types of voucher schemes that have been implemented and used in the provision of veterinary services in pastoral areas. Though not indicated in the model illustration, the donor, in this case OFDA, will be a very crucial node in the approval of the wholesalers and lists of essential veterinary pharmaceuticals to be used by the project. Data collection will essentially focus on the challenges encountered in model implementation so that a revised model incorporates solutions to these previous challenges.

However one assumption made in the models is that during the envisaged humanitarian situation where the model will be implemented, the markets will be active and have the capacity to deliver humanitarian supplies.

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Appendix 1: Community Based animal health voucher model to be implemented in Ethiopia (Test 1)

a) The first step is to ensure there is a competent functioning CAHW system. The CAHWs should have the skills to provide quality animal health services and have the ability to discern the quality of veterinary medicines from what is offered by the market. This will be achieved through refresher and new trainings of CAHWs. The CAHW training curriculum should be updated with topics on certified veterinary medicine recognition, expiry dates, cost recovery, financial management and use of treatment vouchers. Depending on the financial market environment, the implementing agency could consider connecting CAHWs with some type of financial service provider, if desired, that can help them save and make payments for drugs.

b) The proposed model is cognizant of the fact that OFDA's requirements for the procurement of veterinary pharmaceuticals ensure the consistent application of quality assurance standards regarding their manufacturing, storage, and distribution.

In the second step, the model requires the identification of veterinary pharmaceutical wholesalers that are registered and licensed with relevant national authorities. Wholesalers should have the ability to stock and provide quality and safe veterinary medicine in optimal storage and backed with an appropriate distribution support. The identification process starts with a rapid market assessment of the veterinary input sector within the project area. At this point the implementing partner will create a provisional list of wholesalers. The implementing partner will then request these wholesalers to express their interest (EOI) to supply veterinary pharmaceuticals, with required documentation listed in the USAID-OFDA Pharmaceutical & Medical Commodity Guidance of June 2018 (or the most up to date version). Although ideally one wholesaler is chosen for a project, the number of wholesalers may be dictated by the list of veterinary drugs required by the project. The partner will submit a list of drugs to be included in the project in the USAID-OFDA pharmaceutical template of February 2018 (or the most up to date version). Analysis of the EOI and pharmaceutical documents will provide a list of wholesalers whose approval will be requested from OFDA prior to award at the proposal submission period. In case of Test 1, a waiver was granted so that the pharmaceutical wholesaler documents can be submitted post award, with the rider that no project activity is to commence before approval is granted for use of the proposed pharmaceutical wholesaler(s) to supply the proposed veterinary pharmaceuticals.

Private veterinary pharmacies (PVP) wishing to participate in the project will be reviewed against the 'selection criteria for PVPs'. PVPs that pass the evaluation will be candidates for entering into a memorandum of understanding (MOU) with the implementing partner to source veterinary pharmaceuticals from the approved project wholesaler(s) for onward distribution to community animal health workers (CAHWs).

c) The third step is for the implementing partner to carry out community awareness campaigns targeting enhanced knowledge, attitudes and practices for uptake of animal health services. Community dialogue is an essential process to inform and involve a community in decision making on how they are to access community animal health services. Access to veterinary treatments through a voucher system should be thoroughly discussed and agreed particularly around beneficiary selection criteria. Finally the essence of the campaign is also to educate the community on how to identify certified veterinary medicines and their expiration dates.

d) The fourth step is to tie up the first three elements into a veterinary input delivery system that ensures good coverage and targeting of vulnerable community members. This operational model proposes a veterinary treatment voucher scheme. Vouchers come in two main forms, 'value vouchers' which can be exchanged for a range of veterinary services up to the cash value printed on the voucher, and 'commodity vouchers' that must be exchanged for a fixed quantity of named veterinary services. Vouchers are given by the implementing partner to the beneficiaries; the beneficiaries pay CAHWs for their services using the vouchers; the CAHWs redeem their vouchers at project PVPs for drugs and/or money. The PVPs are bound by a MOU to only purchase certified and approved veterinary inputs from OFDA approved wholesalers. The MOU agreement will also highlight the need for PVP to participate in the inspection visits to their premises by project partners and donor. The CAHWs are similarly bound only to source drugs from the approved PVPs. The key processes to initiate the voucher scheme process are:

i. The system is initially planned in cooperation with government officials and people from the beneficiary communities. On this basis, the wards/administrative areas for intervention are chosen. It is during this meeting that the PVPs identified in the initial market assessment are shared with the community to help in identifying reliable PVPs. The selected PVPs should meet a set criteria outlined in Annex 4.

ii. The selected PVP will be trained on best practices in storage and distribution processes, prior to their receiving OFDA-funded pharmaceuticals from the approved wholesaler(s). A focus on stock management system based on expiration dates First Expiry, First Out (FEFO) will be emphasized. The project PVPs will participate in a workshop during which the veterinary voucher scheme is presented in detail, and they will be introduced to the approved wholesalers. A memorandum of understanding is agreed between implementing partner and PVP, spelling out the quantity, quality and type of drugs they should stock from the approved vendors. The list of the medicines made available to CAHWs will be comprehensive enough to reflect basic treatments for the prevalent livestock health conditions in the project area.

iii. The value of the vouchers will be determined based on the medicines to be used by the CAHW to provide animal health services to the herders. The value will calculated based on the retail market value of the drug used plus an agreed mark up being compensation for CAHW time and service provision to herders. The implementing partner and CAHWs may negotiate the percentage markup for CAHW to compensate for his/her service prior to printing vouchers. The implementing partner then decides the total value of vouchers to be issued per household selected. The partner makes a decision whether the value of voucher covers 100% value of animal health services and markup, or less of which the balance has to be paid by the beneficiary as cost recovery.

iv. At the start of the project, CAHWs will be issued with an initial "CAHW voucher" when they are commissioned to start the project treatments. This initial voucher would be different from the "Herder voucher" issued to herders, in that it allows the CAHWs to access their first consignment of drugs from the PVP without having done any treatment. The initial voucher acts as a drug 'fronting' instrument while also safeguarding the PVP business who will be reimbursed based on this voucher.

v. CAHWs that will participate in the project and have been trained according to the national guideline and standards are invited to a training session offered by the implementing partner. The CAHWs are trained on identification of certified medicines to be used by the project, good storage practices, and recognizing expiration dates, entrepreneurship and financial management and are informed in detail about the voucher system. The implementing agency may seek appropriate mechanisms to integrate CAHWs with financial service providers to enable them to save and seek credit.

vi. At the ward/administrative areas where the project is implemented, an animal health committee in collaboration with the relevant local authorities is established. This committee is facilitated by the partner to select beneficiaries in a participatory process based on agreed selection criteria that include ownership of animals, financial vulnerability, households headed by women or elderly or that have members who are sick or with disabilities. This committee will take part as well in the monitoring and evaluation of the project representing the communities.

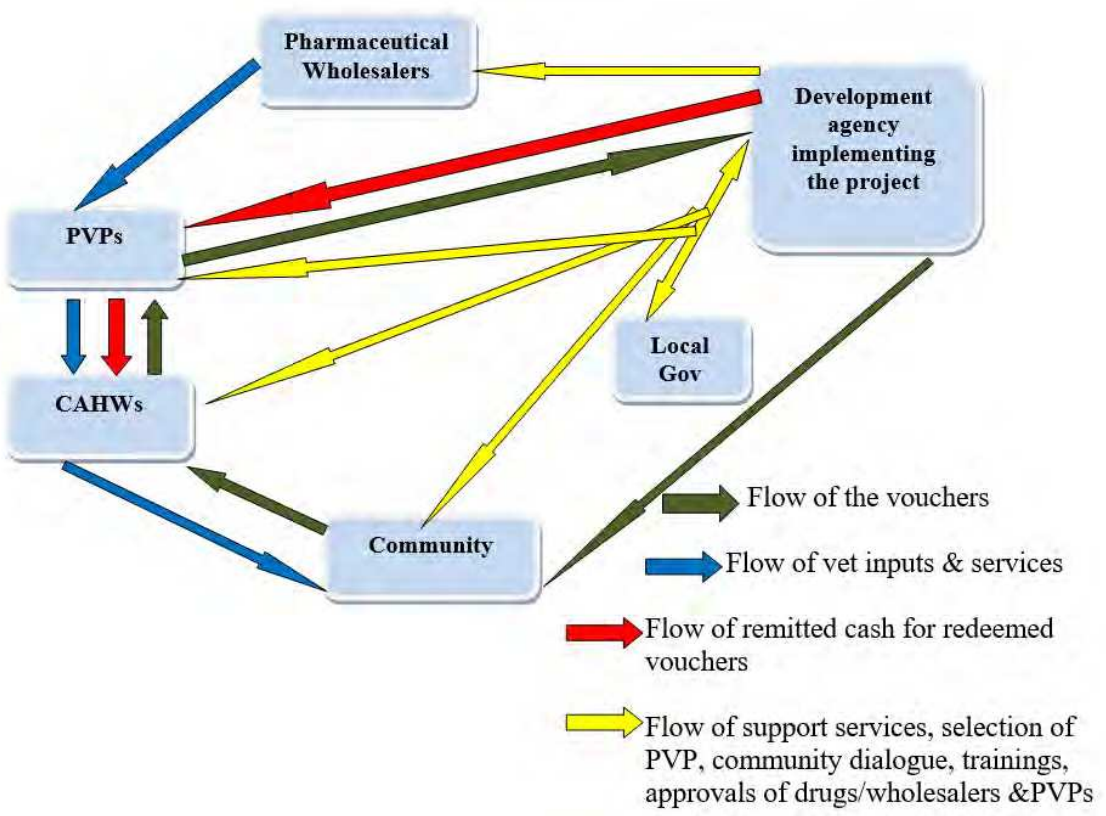


Figure 1: Treatment voucher scheme

vii. The selected households are made aware of animal health services and their relevance through partner project awareness campaigns and targeted beneficiaries meetings. The households are then issued with vouchers to pay for services they require.

viii. Once everything is in place, the community beneficiaries are in a position to seek veterinary services of their choice (from the vaccinations/clinical services covered by the program) from animal health service providers(community animal health workers, animal health technician or veterinarian) using the vouchers. The livestock owners will consult their local animal health service providers who will examine the sick animals, make a diagnosis and carry out treatments for cases based on vouchers the herder has.

ix. Where the CAHWs redeem the vouchers at PVP premises, he/she is reimbursed money equivalent to the voucher value. The CAHW can then use that money to buy more OFDA approved drugs. The vouchers need to be accompanied by the empty packaging and a voucher redemption form (completed and signed by the CAHW) for verification by the PVP that the proper drug was used. Thereafter the PVP will redeem the vouchers with the implementing partner. When the PVP redeems the vouchers with the partner, they need to be accompanied by the filled and signed voucher redemption forms, voucher reconciliation form, the packaging and a copy of the invoice demonstrating the drug was purchased from the approved wholesaler. The partner will remit the money of redeemed vouchers to PVP bank accounts.

e) The fifth step is to implement a working monitoring system supported by all stakeholders. Key players in the monitoring will be the LEGS operational research project, implementing partner, CAHW, PVP, wholesalers, local veterinarian, community, local government and donors. This would entail monitoring the CAHWs, PVP and wholesaler drug use, management, storage and distribution. The community satisfaction will be monitored as well.

f) The potential tools for monitoring medicines used by CAHWs and those dispensed by PVP as well as other supply chain operations will include:

    a. Random laboratory drug quality testing for drugs sampled from CAHWs and PVPs will be undertaken at national analytic laboratories. In each partner country an analysis laboratory has been identified and further consultations are ongoing,

    b. Checking packaging and source of drugs from CAHW and PVPs,

    c. Random CAHW kit content monitoring,

    d. Random monitoring of CAHWs, PVPs and suppliers including elements that led to their selection such as Standard operating procedures (SOPs), Good Supply Practices (GSPs) and Good Distribution Practices (GDPs),

    e. Outcome surveys of beneficiaries, CAHWs, PVPs and suppliers.

g) Finally the implementing partners and research team are well briefed and make changes to the project based on any new evidence from the field operation activities.

h) Vetwork/LEGS project will provide support as needed. Such support will include facilitation for development of a detailed implementation plan, advice on developing internal capacity to implement the plan and have a clear responsibility matrix prepared, which comprises all the project activities in detailed manner.

Appendix 2: Community-based animal health voucher scheme model to be implemented in Zimbabwe (Test 2)

The model for Test 2 is the same as the one for Test 1 (see Appendix 1).

Appendix 3: E-voucher scheme implemented in Kenya (Test 3)

The model for Kenya is the same as the one for Test 1 (see Appendix 1), with the following key differences:

1. The model does not rely on CAHWs to offer clinical services to the community. In this case, the model envisages the use of a network of private and public animal health technicians and veterinarians operating in Marsabit County to provide the clinical services to the community.
2. The selected private veterinary pharmacies should have capacity to run a point of sale (POS) machine i.e. be accessible to GSM network for connectivity with the bank offering financial services (Equity Bank runs the Hunger Safety Net Program (HSNP), the platform on which this e-voucher will be operated). The partner will assist the PVP to set up the system. The POS may be mobile to watering points and markets as long as connectivity is ensured.
3. The e-voucher debit card will be issued to the herders with specific training on its value and specific areas it should be used to access services from the PVP, where an animal health provider will take a history, examine the animal, and administer the drug/vaccine.
4. The partner will deposit all e-voucher money with the bank in e-voucher consolidated account.
5. The bank will be a major stakeholder since it will allocate to each e- voucher specific amounts and manage how e-money circulates between the community, PVP and itself and provide necessary reports.
6. The PVP will access the money from their account in the same bank since the POS is connected to it.

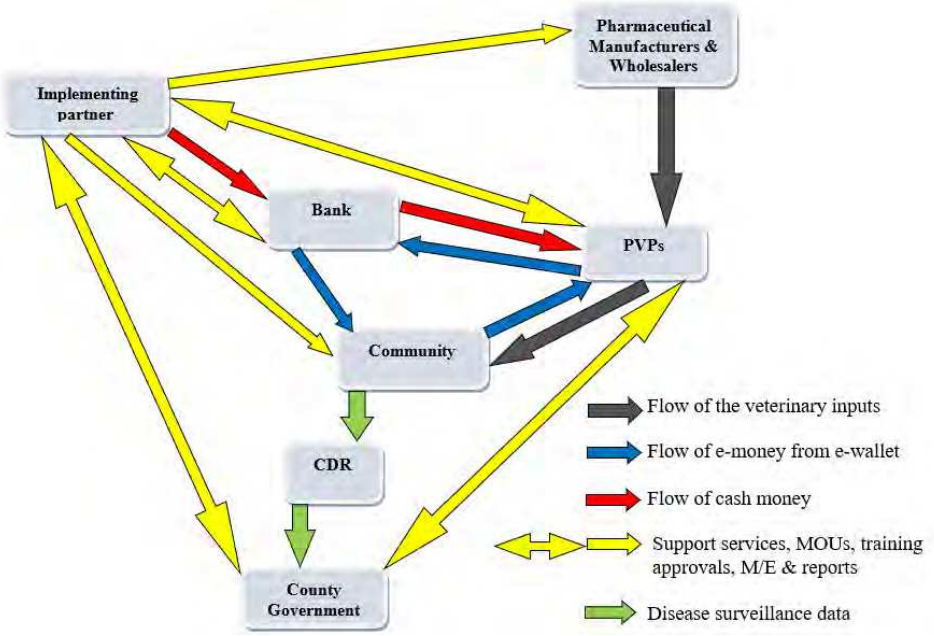


Figure 2: Veterinary medicine provision e- voucher model flow chart

ANNEX B: DETAILS ON RESEARCH METHODOLOGY

The research methodology was based on a multi-method research approach using both quantitative and qualitative data collection methods and associated tools, as shown in Table 1 below, with tools and checklists developed for each method.

Table 1: Data Collection Methods and Tools

Topic	Questions/issues	Respondents	Methods	Tools
Knowledge, Attitudes, Practice (KAP)	Knowledge of available services; uptake of services; community use of pharmaceuticals; the extent of clinical diagnosis before prescription; appropriateness of veterinary pharmaceuticals; challenges arising from voucher scheme implementation	Livestock keepers (gender and age disaggregated) in sample target communities	Focus Group Discussion (FGD)	Tool 1: semi-structured question lists supported by ranking and scoring
	As above, noting changes since pre-survey	Livestock keepers (gender and age disaggregated) in sample target communities	FGD	Tool 1: semi-structured question lists supported by ranking and scoring
Animal health service delivery	Challenges and opportunities regarding the delivery of animal health services: access, storage, distribution, quality control, extent of clinical diagnosis before prescription	CAHWs, PVPs, government vets	Key Informant Interviews	Tool 2: Checklist for semi-structured interviews
	Project progress, challenges, issues arising	Partner staff	Key Informant Interviews	Tool 6: Checklist for semi-structured interviews
	Project progress	Partner staff	Project reports and monitoring data Final project evaluation	Secondary data
Vet pharmaceuticals	Procurement/sourcing from the wholesaler; storage; distribution; quality	PVPs	Site visits	Tool 4: Checklist for spot checks
	Source, quality, storage	CAHWs	Site visits	Tool 3: checklist for spot checks
	Quality	PVPs and CAHWs	Laboratory authentication	Tool 5: Samples sent to the laboratory
Project operation	Running of the voucher system: redemption, cash availability, CAHW payment etc.	Communities, CAHWs, PVPs	Monitoring by partner project staff	Partner project monitoring system
Research project overview	Cross-checking research findings	a. Beneficiaries b. PVP c. CAHW d. Partner staff e. Wholesalers	USAID/OFDA - Site visit by two USAID/OFDA technical staff using a checklist	a. FGD in each village b. KII plus observation, c. Individual/group, observation of treatment d. Individual/group, observation of voucher scheme implementation
Veterinary support in emergencies	Challenges to implementing LEGS vet support standards	Implementing organizations worldwide	Global stakeholder survey	Online questionnaire

The sample respondents were selected with the facilitation of the Test partner projects in each location. The total numbers of respondents for each method are listed below in Table 2:

Method		Test 1			Test 2			Test 3		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
KAP FGDs	Baseline	6	6	12	3	3	6	5	5	10
	Endline	-	-	-	3	3	6	6	6	12
CAHW/AHSP KIIs	Baseline	5	4	9	0[36]	0	0	2	0	2
	2nd	-	-	-	6	6	12	4	3	7
	Endline	-	-	-	6	6	12	4	3	7
PVP KIIIs	Baseline	5	0	5	2	0	2	4	0	4
	2nd	-	-	-	1	0	1	3	0	3
	Endline	-	-	-	-	-	-	4	0	4
Government staff KIIs	Baseline	3	0	3	4	0	4	1	0	1
	2nd	-	-	-	-	-	-	-	-	-
	Endline	-	-	-	-	-	-	-	-	-

[36] There were no pre-existing CAHWs in Test 2

Test partner staff KIIs	Baseline	3	0	3	1	1	2	1	1	2
	2nd	-	-	-	0	2	2	2	0	2
	3rd	-	-	-	2	0	2	-	-	-
	Endline	-	-	-	0	1	1	1	1	2
CAHW/AHSP spot check visits	1st	-	-	-	6	6	12	4	3	7
	2nd	-	-	-	6	6	12	2	0	2[37]
PVP spot check visits	1st	-	-	-	2	0	2	3	0	3
	2nd	-	-	-	1	0	1	3	0	3

[37] The 2nd spot check in Test 3 was limited because project implementation ceased ahead of schedule

For Test 1, the baseline KAP FGDs involved a total of 48 women and 49 men.

For Test 2 the baseline FGDs involved 21 women and 31 men, and the endline 27 women and 25 men.

For Test 3 the baseline FGDs involved 50 women and 49 men, while the endline involved 74 women and 56 men.

Altogether the FGDs consulted a total of 220 women and 210 men.

Data from each Test was transcribed into data collection sheets, which were then collated and summarized according to type. Qualitative data was grouped into themes and analyzed. The cleaned participatory epidemiology and other quantitative data was analyzed on Megastat® for MS Excel. Descriptive statistics, such as percentages and means were analyzed, and data visualization was carried out. The data on participatory epidemiology was tested for agreement on responses made by participants. The statistical test used was non-parametric test Kendall's Coefficient of Concordance.

The data summary sheets are presented in a separate Appendix to this report, while the global online survey report is presented in Annex E.

The tools and checklists are presented below.

DATA COLLECTION TOOLS AND CHECKLISTS

Tool 1: KAP Survey Checklist

#	Topic	Checklist Questions	Proposed tools	KAP level
1	Livestock & importance	What livestock species are kept in the area?	Semi structured interviews	Knowledge
2	Livestock diseases	Prioritize five diseases by their impact on livelihoods for the above most important species (and double check seasonality of occurrence) over the last two years	Simple ranking and simple question to check for seasonality of occurrence	Attitude
3	Disease management	a. How do you manage your sick livestock?	Semi structured interview	Practice
		b. Who initiates first treatment for the sick animal?		
		c. Before treatment is initiated in (b) what activities are done to inform decision to treat?		
		d. Who else provides animal health services to your sick animal?		
4	Animal health providers	Which of the animal health service providers mentioned are most useful to you? Rated by available, accessible, affordable, acceptable, quality (utilizable/equipped).	Impact matrix scoring	Attitude
5	Animal health service access frequency	How frequently do you get your animal health services from the various service providers mentioned in a year? [Quick follow up to no. 4]	Simple question	Practice
6	Veterinary drug access and quality assessment*	a. What types of veterinary drugs are used on your livestock?	Semi-structured interview	Knowledge
		b. Who are the providers of these veterinary drugs?		Knowledge
		c. Who administers them?		
		d. Prioritize most frequently used drugs among all drugs accessed? (By drug class)?	Simple question	Knowledge
		e. Rate the veterinary drugs on a scale of availability, affordability, acceptability and quality	Simple ranking	Practice
		f. How do you assess the quality of the veterinary drugs used on your livestock?	Semi-structured interview	Attitude
		g. What do you do when you notice quality of drug is not desirable?		Attitude
		h. How do you dispose expired/spoilt drugs?		Practice
7	Use of voucher system to access animal health services/drugs	a. What is a treatment voucher?	Semi structured interview	Knowledge
		b. Have you used one before?		Practice
		c. What are the benefits of the treatment voucher?		Attitude
		d. What are the challenges of treatment voucher?		Attitude
		e. How do you think the challenges can be resolved?		Practice

** Distinguish between the drugs they procure and use themselves, and those through the project – for all of question 6.*

Tool 2: CAHWs/AHSPs and PVPs KII Checklist

KII #: _____

Date of Interview: _____

Country: _____

District/County: _____

Ward: _____

Village: _____

Role: (CAHW/private vet/ PVP etc.): _____

GPS Coordinates: Latitude: Longitude:

Years in service/trade:

Diseases and other animal health problems

1. List of 5 main diseases/ for each of the livestock species in the area

Disease management by AHSP

2. a) Explain the process of managing a clinical case from the time a herder makes a report up to when treatment is done.
b) How often (frequency) is clinical examination & diagnosis carried out before prescription or treatment?
c) What is the frequency of CAHWs seeking advice from district veterinary officer before treatment? (*Question asked where CAHW are available*)

3. a) Do seeking of veterinary services depend on seasons?
b) Which seasons do livestock keepers seek your services?
c) How often do livestock keepers seek your services in the various seasons? (Frequency)

4. What constrains the herders from accessing veterinary service?

5. What is your experience with voucher-based animal treatment?

AHSP access to veterinary medical products

6. a) Where do you source your veterinary medicines?
b) How often do you get your supplies?

7. Briefly explain about veterinary drug supply chains. (*Record the different players involved in veterinary medical products until they get to the CAHW or AHSP*).

8. What are the common veterinary medicines products purchased/stocked or used to treat clinical cases presented you by herders?

- Antibiotic group:
- Anthelmintic group:
- Acaricide group:
- Antiprotozoal group:

- Others: metabolic boosters/support:

9. How do you rate the quality of veterinary medicines per each drug in every drug group? Using a scale of 1 to 3, where 1 stands for poor, 2 for good and 3 for very good.

10. How do you check the quality of vet med before use?

11. How do you dispose of expired/unused or contaminated drugs? (*Including used drug containers/packets/vaccine vials)*

12. What are the challenges you face accessing veterinary medical products from suppliers?

Storage and distribution of veterinary medicines

13. a) How do you store your different veterinary medicines?
b) What factors can affect drug quality while in storage?

14. What drug stock management system do you have in place?

15. a) What are the main challenges in veterinary drug storage and distribution?
b) What do you think needs to be done to address the storage and distribution challenges?

Regulatory environment for veterinary pharmaceutical and animal health service

16. a) In your country which institution is involved in veterinary drug quality control?
b) Which laws are used drug quality regulation?

17. a) Who regulates Animal Health service delivery?
b) Which laws are used to regulate Animal health service delivery?

18. What are the key challenges and recommendations in animal health service delivery?
a) Challenges:
b) Recommendations:

Tool 3: CAHW Spot Check List

Country:
Name of CAHW:
Location:
Date:
Recorder:

Criteria	Check list	Responses and comments
Sourcing	Receipts of drug purchases	
	Receipt of voucher redemption	
Training	Evidence of recent training including drug procurement and management	
Kit contents	Drugs:	
	✓ Type	
	✓ Expiry	
	✓ Condition	
Storage	FIFO system:	
	✓ Physical checks	
	✓ Records	
	Physical storage conditions:	

	✓ Clean, tidy, easy to identify drugs	
	✓ Light – away from direct sunlight	
	✓ Temperature – below 25C	
	✓ Dry environment (as appropriate for individual drug specifications)	
	No vermin	
Quality	Cross check drugs against receipts	
	Check expiry dates and packaging	
	Drugs/packaging not damaged	
	Used packs, sachets and vials returned by CAHWs	
Distribution	Treatment records:	
	✓ Name of owner	
	✓ Species	
	✓ Diagnosis	
	✓ Treatment.	
	Voucher record book – voucher number against name of owner	

CAHW feedback on the voucher system*	Their views on the operation, and what their customers say	
CAHW feedback on drug access and vet support*	Any comments or feedback from the CAHW on ease of drug access (pharmacy distance, hours of operation, drugs in stock, etc.), location and access to advice from a vet	
Any additional observations		

* To complement the Key Informant Interviews with AHSPs

Tool 4: PVP checklist for spot checks
– to be done during each field visit
Country:
PVP:
License number and date of expiry:
Location:
Date:
Recorder:

Criteria	Check list	Responses and Comments
Personnel	Are the staff manning the veterinary pharmacy qualified and registered by local professional regulatory body to dispense relevant drugs?	
Sourcing	Procurement details (all crossed checked for approved wholesaler):	
	✓ Order book/forms	
	✓ Invoices	
	✓ Receipts	
	✓ Delivery notes	
	Carriage system (where visit coincides with delivery):	
	✓ Distribution system	
	✓ Appropriate temperatures	

	✓ No exposure to sunlight	
Storage and drug management	FIFO system (store cards, physical check):	
	Expiry dates 6 months or more	
	Shelving	
	Physical storage conditions	
	✓ Clean, tidy, easy to identify drugs	
	✓ Light – away from sunlight	
	✓ Temperature – not above 25C	
	✓ Dry environment	
	✓ Cold chain if relevant – 2-8 C	
	✓ No vermin/pests (pest control system)	
	Disposal system for expired drugs	
Quality	Cross check drugs against receipts/delivery notes	
	Check expiry dates and packaging	
	Drugs/packaging not damaged	
	Used packs, sachets and vials returned by CAHWs	

Distribution	Individual CAHW records:	
	✓ Name	
	✓ Date	
	✓ Record of voucher redemption form	
	✓ Evidence of empty packaging	
	✓ Value and type of drugs purchased (cross checked against agreed list in the MOU with partner)	
	✓ Advice given	
	✓ Most recent training details.	
	Receipt book for supplied drugs – signed by CAHW	
	Voucher record book:	
	✓ Voucher redemption forms reference	
	✓ Date of redemption from NGO	
Any additional observations		

Tool 5: Drug testing

[To be used to provide standard results if labs' own formats are incompatible]
Country:
Name of company:
Location:
Date:
Drug being tested:
Origin of drug:

- Wholesaler:
- PVP:
- CAHW:

Criteria	Report and comments
Assay - Efficacy (active components)	
• Identity	
• Extractable volume	
• pH	
• Weight/ml	
Sterility	
Bacterial endotoxins	
Microbial limit test	

Tool 6: KII checklist for partner staff

1. What is the status of implementing the Operational Research model?
2. What is your take on blending an operation research in your programming?
3. What trainings did you carry out for the Animal health service providers?
4. What awareness raising sessions did you carry out with the target communities regarding vet drugs suppliers, and the voucher scheme?
5. What are the accomplishments and challenges of the voucher treatments so far?
6. What are the accomplishments and challenges of PVPs access to medicines from wholesalers?
7. What are the accomplishments and challenges of PVPs distribution of the medicines to CAHWs?
8. How have you addressed the challenges/constraints in the various stages of the operation research model implementation?
9. What lessons/ good practice did you learn in the course of implementation?
10. What are the key areas of challenge that requires due attention to be addressed accordingly?
11. In your opinion do you think the veterinary drug quality control mechanism is working? Give a brief explanation?

ANNEX C: PVP SELECTION CRITERIA AND PROCESS

C1: SELECTION CRITERIA

The research protocol included assessment criteria and a checklist for the selection of PVPs for the Test projects, as follows:

a) Assessment criteria, with inspection visits to the PVPs

i. The legality of PVP business

- The private veterinary pharmacy should be registered with necessary local/national authority as a business
- The business should be authorised by necessary professional (Veterinary/Pharmaceutical) authorities of the country.
- The staff running the veterinary pharmacy should be qualified and registered by local professional regulatory body

ii. Technical services and support

- The shop is only open when there is a qualified livestock/veterinary technical staff to sell pharmaceuticals
- The shop maintains a list of CAHWs that have received training from a recognised entity (e.g. government, NGOs etc)
- The shop keeps a log of drug sales to individual CAHW clients
- The shop has a system in place for providing assistance to CAHWs for difficult cases
- To be open to provide technical support to the CAHWs purchasing veterinary products from their outlets
- Enter in agreement with approved wholesalers for supply of approved products to be used for the project.

iii. Stock management

- Only carry nationally certified products
- Only carry products with temperature ranges appropriate to the location
- Do not sell products with less than 6 months until expiration
- Have a system for the management of expired products
- Have a stock management system based on expiry dates

iv. Adequate shop space that is well structured and appropriately located

- Shelving is installed, and no pharmaceuticals are stored on the floor
- Availability of cold chain storage for the appropriate drugs
- The shop has a pest control system
- The pharmacy premises is located within acceptable distance for access by community animal health workers

v. Acceptance

- The proprietor is amiable and accepted by CAHWs and other stakeholders
- The proprietor accepts to participate in the project

b) Checklist for gathering essential information on details of private veterinary pharmacies to be targeted for service provision covering the above criteria

S/N	Eligibility Criterion	Please tick (√) the relevant box		Action required/ requirements from the assessment team	Remarks
		Yes	No		
Community acceptance of PVP					
1	Is the PVP located in the project operational area?			Write location of the PVP in the project area in the space provided for remark	
2	Is the PVP accessible by community animal health workers and other stakeholders?				
3	Does the PVP accept to participate in the project?				
Legal and statutory compliance PVP business					
4	Does the Private Veterinary Pharmacy have the relevant licenses			Collect the copy of the license	
5	Are all licenses renewed in time			Need copy of updated document	
6	Is the PVP owner registered as a taxpayer				
7	Is the owner of the PVP certified as a livestock health professional?			Checked copy required	
8	Are the staff running the veterinary pharmacy qualified and registered by local professional regulatory body?				
Capacity of PVP to provide necessary technical information, services and support					
9	Is the PVP owner willing and able to present certification of origin for the drugs he/she has?			Checked copy required if the answer is yes	
10	Does the PVP have capacity to supply quality and recommended veterinary drugs to be used for voucher-based livestock treatment?				

11	Does the PVP have a link with legally registered wholesaler/ importers of veterinary drugs			Mention names of importers/company name	
12	Does she/he have any experience related to veterinary voucher systems				
13	Does the PVP maintain a list of CAHWs that have received training from a recognised entity (e.g. government, NGOs etc.)				
14	Does PVP keeps a log of drug sales to individual CAHW clients				
15	Does the PVP have a system in place for providing assistance to CAHWs for difficult cases				
16	Is the PVP open to provide technical support to the CAHWs purchasing veterinary products from their outlets?				
Stock management and well-structured storage					
17	Does the PVP carry only nationally certified products				
18	Does the PVP stock products with temperature ranges appropriate to the location				
19	Does the PVP have cold chain storage				
20	Does the PVP sell products with less than 6 months until expiration				
21	Does the PVP have a system for the management of expired products				
22	Does the PVP have a stock management system based on expiry dates				
23	Does the PVP premises have shelves installed, with no pharmaceuticals stored on the floor				

24	Does the shop have adequate space				
25	Is a thermometer appropriately installed and a temperature log maintained				
26	Does the PVP shop have a pest control system				

C2: SELECTION PROCESS

These criteria were used in the selection of the PVPs for the three Tests as follows:

In **Test 1**, two of the selected PVPs were in the urban area and met most of the above criteria. The remaining four, in the rural areas, were weaker but were the only available PVPs in the area and hence were selected.

In **Test 2**, there were only two licensed stores in the local town, and both were approached to participate in the research. One expressed low interest and did not provide the required documentation, so the other was selected. Both PVPs are legally registered with the relevant national licensing and regulatory institution as a Veterinary Medicines General Dealers store. This means that by law they do not require personnel running the store to have training in animal health or veterinary pharmacy as they only sell over the counter medication.

In **Test 3**, there were very few available PVPs in the area. The four selected were former franchises of the wholesaler and the only ones available in two of the three target areas. A fifth PVP, in the third target area, was rejected as it did not meet any of the required criteria. All four selected PVP owners had current registration with the animal health service regulatory body (KVB). However, none had a Veterinary Pharmacy licence from the new regulatory body VMD, that has since 2015 been mandated to regulate the veterinary pharmaceutical sector. However, the PVP owners are government staff who cover extensive areas which means that in reality they are not available for the day-to-day running of the PVP stores which is carried out by relatives who have no animal health or veterinary pharmacy training.

In all three Tests, although some of the criteria were not met, the selection process enabled weaknesses to be identified at the start and capacity building support to be provided during project implementation.

ANNEX D: TEST 2 CAHW TRAINING CURRICULUM

Day 1: General Primary Health Care

1) Signs of health and disease in livestock (cattle, sheep, goats and poultry) following a structured observation procedure that goes through all body systems (the Cooper livestock handlers manuals (cattle, sheep and goats (in English) and the poultry manual that is in vernacular will be valuable resources for this topic)
2) Animal restrain techniques (refer to the shared CAHWs manual for illustrations ideas)
3) Physical examination techniques - temperature taking, body system/part examination and post-mortem examination (especially so for poultry cases)
4) How to record observation and physical examination findings in the case record book that will be in the CAHWs kit (ensure a sample is available for use)

Afternoon: Practical sessions on observation, restrain and physical examination

Day 2

1. Recognition of clinical signs of priority diseases (use as many pictures as possible).
   The diseases are:
   - Cattle- Tick borne diseases (Babesia, Anaplasma, Heart water and Theileriosis), FMD, Black quarter, Anthrax and LSD
   - Sheep and goats- Tick borne diseases (Heart water and Anaplasma), Mange, helminthiasis, Caseous lymphadenitis, pulpy kidney and helminthiasis resulting in scours
   - Poultry- New castle disease, fowl pox, coccidiosis, Infectious coryza and helminthiasis (round worms)
2. Treatment and prevention options for the identified priority diseases
3. How to identify and use the list of OFDA approved vet medicine drugs to treat the priority diseases
4. How to record treatment given in the case record book
5. How to develop a vaccination and tick control schedule so as to mobilize community to prevent diseases that are preventable by vaccination or dipping.

Afternoon practical session:

- How to identify priority diseases using clinical signs live animal or can be a participatory approach where clinical signs are written or drawn on a card and CAHWs match them with the disease group
- How to select the correct OFDA approved treatment and how to use the weigh band to identify dosage as indicated in the drug regime protocol.

Day 3: CAHWs and Veterinary kit Components and their use

1. Types of vet equipment and consumables in the CAHWs and ward level vet kits and their use (we will share the list with James via email)

Afternoon practical session: how to use the equipment and consumables in the vet kits (remember to review restraint techniques as this is key as we have 18 female CAHWs).

Day 4: Drug storage and drug kit inventory management

1. Factors that affect drug quality
2. Proper storage to maintain vet drug quality
3. How to project stock of drugs needed to handle cases (forecasting) taking into consideration external factors that can result in delay or outbreak situation.
4. How to dispose consumables (syringes) and used drug containers and other biological waste generated

Afternoon practical sessions- recap on components of CAHWs and vet kit and how to maintain a vet kit inventory through stock cards system

Day 5: Voucher redemption process and recap practical sessions

Partner to introduce the PVP and together will train and discuss on how CAHWs will go about redeeming vouchers using lessons learned on stock forecasting and experience gained by PVPs and government vets (2 hours in the morning)

From 10 am to afternoon practical recap sessions of all topics learned

ANNEX E: REPORT FROM ONLINE SURVEY

INTRODUCTION

LEGS is conducting an operational research project, funded by OFDA, to identify and test alternative program models for the application of LEGS standards while complying with key donor regulations – specifically in the area of animal health and veterinary drug procurement/use. As part of this research an online survey was developed to consult practitioners and policy makers around the world to learn more about their experience of providing veterinary support in emergencies.

The survey was launched in late January 2019 and closed in early March 2019. It was advertised through the LEGS website and LEGS Mailing List, and through key contacts in the research countries and via OFDA.

The survey consisted of ten questions, as follows:

1. In which region are you engaged in emergency veterinary support?
    - Horn/East Africa
    - West Africa
    - Central/Southern Africa
    - North Africa/Middle East
    - South Asia
    - South-East Asia
    - East Asia
    - Central America/Caribbean
    - South America
    - Worldwide
2. What type of organisation do you work for?
    - Donor
    - Local NGO
    - National government agency
    - International NGO
    - International/multilateral agency
    - Other (please specify)
3. Do you provide or fund the provision of veterinary medicines and/or vaccines?
4. How are the veterinary medicines and vaccines distributed?
    - Directly to livestock keepers
    - Via private veterinary pharmacies
    - Via community animal health workers or other private para-professionals
    - Via private veterinarians
    - Via government veterinary services
    - Other or combination of the above (please specify)
5. How are the veterinary medicines and vaccines paid for by livestock owners?
    - Distributed to them free of charge
    - Through voucher schemes
    - For sale through government services
    - For sale via the private sector
    - Other (please specify)
6. What are the key challenges you face in providing emergency veterinary support?
    - Procuring/sourcing veterinary medicines
    - Ensuring quality of veterinary medicines
    - Storage and cold chains
    - Quality of diagnosis and treatment
    - Implementation of voucher or other schemes
    - Other (please specify)

7. What are the main causes of these challenges?
8. What activities and innovations have you developed to overcome these challenges?
9. Any other comments?
10. If you would be willing to be contacted for a brief follow up discussion, please give your email address

The draft questions were reviewed by OFDA before the survey was finalised and launched.

SURVEY RESULTS

A summary of the results is presented here. The full responses are available on request[38].

Questions 1 and 2: Location and organisation of respondents

A total of 85 people responded to the survey. The majority (53%) were from the Horn/East Africa region, followed by West Africa (18%) and Central/Southern Africa (16%). In total 87% of the respondents work in Africa, 5% in Latin America and the Caribbean, and 5% in Asia (South and South-East).

44% of the respondents work for an international NGO, 19% work for an international or multi-lateral agency (many of them for ICRC), followed by 17% for national or local government. Nine (10%) of the responses came from local NGO staff.

Questions 3 and 4: Provision/funding of veterinary medicines and vaccines

71 of the respondents (85%) are engaged in the provision or funding of veterinary medicines and/or vaccines. With regard to distribution, 26% distribute via community animal health workers or other private para-professionals; 19% via government veterinary services; 11% via private veterinary pharmacies and 11% directly to livestock keepers. The majority (31%) use a combination of distribution methods, including the following:

- Both community animal health workers and government services (7.5%)
- Private veterinary pharmacies and community animal health workers in combination (5%)
- Different methods depending on the location, for example via community animal health workers where they are officially recognised, and via government services in Kenya (1 response – 1%)
- Vaccines generally distributed through government services (6%)

Question 5: How are veterinary medicines and vaccines paid for?

The most common response (39%) was that medicines are distributed free of charge; 20% via the private sector (presumably private pharmacies); 10% through voucher schemes; and 5% though government services. The remainder (26%) noted other methods:

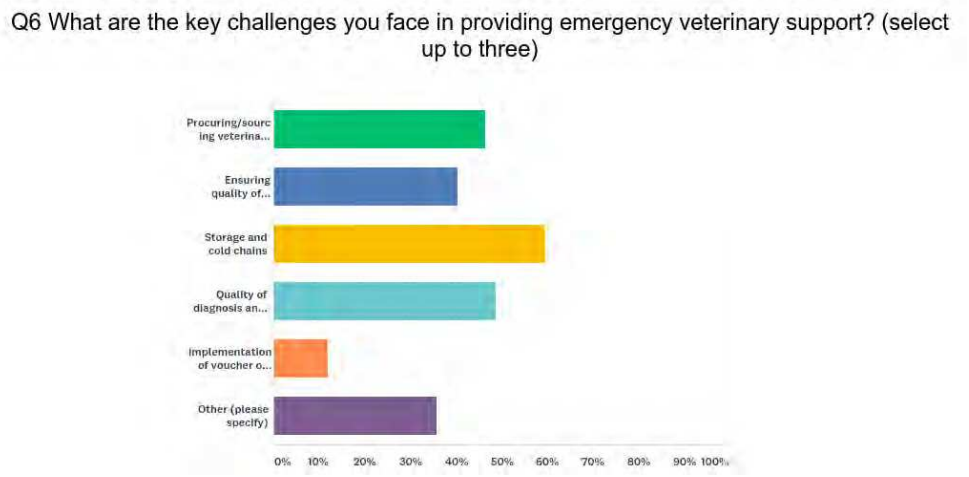
- Eleven respondents (14%) use cost-recovery methods, generally through community animal health workers who charge a fee (though it is not clear whether the CAHWs purchase the drugs or are given them free), and a further two respondents use some type of subsidy.
- Two respondents (3%) explained that they use vouchers or sell medicines during normal times, but distribute them free during emergencies.

38 NB: the figures presented in this report have been adjusted to incorporate individual responses given in the *'other – please specify'* sections and so in some cases differ from the totals in the Annex.

- Three (4%) use a variety of methods depending on the context.
- For vaccines, seven respondents (9%) distribute them free of charge (whilst generally charging in some way for medicines); only one noted that they use cost-recovery for vaccines. The remainder did not refer to vaccines.

Question 6: Challenges in provision of veterinary support

The majority of respondents (60%) listed 'storage and cold chains' as the main challenge; followed by 'quality of diagnosis and treatment' (49%), 'procuring/sourcing medicines' (46%) and 'ensuring quality of veterinary



medicines' (41%). 'Implementation of voucher schemes' was listed by 12% of respondents.

The other challenges listed included:

- Acceptance of cost recovery by communities (6%)
- Concerns about the quality of storage, diagnosis and treatment by CAHWs (6%)
- Poor treatment/misuse/mistrust of drugs or vaccines due to lack of understanding on the part of livestock owners (5%)
- Insecurity and complex emergencies (4%)
- Women's livestock overlooked by government vaccination services (1%)

Questions 7 & 8: What are the main causes of these challenges? What activities and innovations have you developed to overcome these challenges?

The following table groups the causes and activities/innovations in response to them according to the challenges listed above under Question 6:

Challenges	Causes of challenges	Activities and innovations
Storage and cold chains	Cost of electricity Unreliable electricity/power cuts Lack of electricity in remote areas Lack of cold chain facilities Poor storage in remote and hot areas	Solar powered fridges Car battery powered fridges Continuous ice supplies for field teams Engagement with human health services to share storage and cold chain Mobile cold chain Support to Ministry of Livestock decentralised services with cold chain
	Limited knowledge on handling, storage and management	Awareness raising and training
Procuring/sourcing veterinary medicines	Funding	Farmer contributions supported by feedlot
	Poor quality government services, lack of accountability/ cooperation	Support to local government services Training and support to government vets (and 'vet auxiliaries')
	Weak private sector	Involve drug companies in extension services Direct delivery through CAHWs Raise awareness on cost recovery Business skills in CAHW training
	Shortage of foreign exchange	Direct supply of vet medicines
	Government procurement regulations for international procurement	Signing waiver by drug regulation agency to allow procurement of foreign drugs International guidelines for procurement
	Internal organisational procurement systems	Plan to assess quality of local suppliers to avoid import procedures Forecasting Forward planning, ensuring buffer stock Allowing lead time for procurement
	Corruption in procurement	Promoting accountability and transparency using needs assessment data
	Lack of private vets	Service Vétérinaire Privé de Proximité ('Private Veterinarian Service in the Proximity') model[39]
	Insecurity	Monitoring security situation Training CAHWs
	Remoteness and poor infrastructure (including roads and	Mobile human and animal health services

[39] An integrated approach for animal health services in remote areas of Niger based on cost-recovery, adopted by VSF-Belgium, working with CAHWs, local authorities, communities and private veterinarians.

	communications) leading to lack of services	Coordination with local authorities with transport resources Coordination with other agencies for synergy Working with local vets Cash transfers for drug purchasing Increased communications and monitoring Focus on preparedness planning
	Poor availability of vaccines (especially FMD)	Contractual agreement with vaccine producers
	Poor support to CAHW from government	Increase skills and capacity of CAHWs (particularly business skills) Support to supply chain
	Limited community participation	
	Reaching vulnerable beneficiaries	Voucher scheme Support to PVPs and linkage with CAHWs
Quality of diagnosis and treatment	Absence of effective animal health service	Strengthen system via PVPs and government vets Training local health and disease reporting officers Improved record keeping Training
	Insufficient staff, shortage of licensed vets	Increased recruitment Lobbying government Training CAHWs
	Shortage of vet clinics and labs	Send samples to available labs
	Poor quality pharmacologists	Training Set up PVPs and distribution systems
	CAHW capacity and training inadequate	Improve selection, training and M&E of CAHWs Regular refresher training
	CAHWs low literacy rates	Using pictorials for training Training on diagnosis
	Poor support to CAHWs from government	Working with livestock professional associations which have access to remote areas who can monitor and supervise CAHWs
	Limited access by CAHWs to labs and quality drugs	Linking CAHWs and vets for access to drugs and guidance
	Lack of preparedness	More LEGS training (!!)
	Varying veterinary standards	Capacity building for local vet services
	Poor policy environment	Promotion of improved policies
Ensuring quality of veterinary medicines	High availability and low price of counterfeit/poor quality drugs: lack of control of drug entry points; provenance hard to guarantee; quality hard to confirm; limited quality control by authorities	Engaged CAHWs to sell subsidised quality drugs Voucher schemes/cost recovery drug distribution Encourage better regulation (and enforcement) of drug imports Strengthen local vet suppliers

		Linking local drug stores to reputable suppliers Local purchase of quality drugs Control visits to vaccine producers Provide vet pharmacies with quality specifications Capacity building for government vet services at grassroots level Require documentation from authorised suppliers Ban certain suppliers Purchase of products from official state approved suppliers/certified suppliers/central sources Community involvement in service delivery Develop relationship with regulatory bodies
	Reluctance of livestock owners to pay more for quality drugs	Raising awareness on importance of drug quality
Implementation of voucher/ other schemes	Shortage of medicines and staff	Voluntary participation by local people Training on voucher approach
	Inadequate private sector Lack of drug shops in remote pastoralist areas	Empowering community through CAHWs and PVPs Support to establishment of PVPs at community level, involve them in voucher scheme
	Undermining of PVPs by free distribution	
	Misuse of vouchers by CAHWs	Support and training for CAHWs on voucher scheme
	Low technical capacity of CAHWs for diagnosis, treatment and reporting	Careful selection of CAHWs, regular refresher training
	Tracking livestock owners	Involving community to help identify livestock owners
	Poor understanding of voucher schemes by government	Involvement of government in project implementation
	Lack of policy support for private sector engagement	Engagement of PVPs through shared risk approach
	Internal organisational bureaucracy	
Acceptance of cost recovery by communities	Limited local services leads to free distribution	Limit to one year free support then link to local service providers
	Failure to pay by communities leads to lack of CAHW stocks	Enforce cost-based services by CAHWs Farmers groups pool resources to aggregate demand Discussion with community leaders Involve local authorities/government in mobilisation and sensitisation
	Other organisations give free medicines and vaccines	Promote uniform agreed ways of working Community mobilisation and sensitisation
Concerns about the quality of storage, diagnosis and treatment by CAHWs	Difficult to follow up and monitor CAHWs in remote locations Reluctance of vets to work in remote locations	Increase frequency of CAHW refresher training Farmer Field Schools

Poor treatment/ misuse/ mistrust of drugs or vaccines due to lack of understanding on the part of livestock owners	Low literacy levels Lack of training/information Lack of knowledge of disease prevention/mistrust of vaccines Poor understanding of drugs (based on colour of vials etc.)	Farmer training Key messages for awareness raising Involve local authorities/government in mobilisation and sensitisation on importance of vaccines Workshops on drugs and usage Training and refresher for CAHWs
Insecurity and complex emergencies	Conflict Insecurity with cycles of drought	Mobile response teams Feed banks and fodder production Infrastructure development in secure areas Promote government support to remote areas, linking communities and private sector Air freight, solar powered cold chain, communities support ground transportation Training CAHWs and linking to PVPs
Women's livestock overlooked by government vaccination services and by other services	Marginalisation of women, lack of gender analysis and gender-balanced programming Lack of political will to address gender issues in provision of animal health services	As NGO, aim to work with the most vulnerable (but not sustainable response)

Question 9: Other comments

The following is a summary of selected additional comments given by the respondents:

- Challenge of poor quality drugs costing significantly less than high quality equivalents (particularly for government procurement with limited budget).
- Need for more government investment in animal health systems.
- Need for improvement in government regulation of drugs (reducing bureaucracy), more awareness raising/national guidelines.
- Government needs to raise more awareness about the importance of quality drugs, cost recovery, and sustainable systems using the private sector (CAHWs, PVPs)
- Need for greater coordination and linkages between key actors in the sector
- Community awareness raising on animal health alongside capacity building for government services can make a difference over time.
- Access to remote areas remains a challenge for animal health services, often further complicated by conflict
- Need for more LEGS training and application of LEGS approach.
- Need for more training and capacity building
- Need for improved coordination between stakeholders

DISCUSSION AND CONCLUSIONS

An overarching issue highlighted by the survey is the challenge of poor quality government animal health services, particularly in remote locations. Poor infrastructure, insecurity, inadequate funding, poor professional capacity and the absence of adequate laboratory services all combine to hinder the effective delivery of high quality animal health services.

This issue is further compounded by the availability of poor quality/counterfeit drugs at low cost, the absence of a thriving private sector (often undermined or not supported by government policy and procedures, or by the actions of development agencies), and the challenge of maintaining adequate storage and cold chains in remote and often hot environments with intermittent or insufficient electricity supplies. Community Animal Health Worker schemes also face problems of lack of support from local and national authorities, the absence of a thriving private sector, and inadequate training, together with a lack of understanding of cost recovery and appropriate and quality drug usage on the part of communities. The free distribution of some drugs and most vaccines can also undermine the cost recovery process and the development of the private sector.

In response to these challenges, the survey respondents are engaged in outlined a number of activities and innovations. The use of solar and car battery fridges and working with human health services help to address cold chain and storage challenges. Training and capacity building of government staff, communities and CAHWs form a key strategy, as does awareness raising with communities, drug companies and PVPs. Coordination with other stakeholders including government, other NGOs, and private sector actors also contributes to improved outcomes, as does planning ahead, in particular to avoid procurement bottlenecks. To address the issue of poor quality/counterfeit drugs, survey respondents are engaged in training and awareness raising, subsidising quality drugs, linking with quality drug suppliers and voucher and other cost recovery schemes.

Vouchers and other sustainable cost-recovery schemes and improving linkages with the private sector were considered important ways forward by many of the survey respondents. Improved (and simplified) systems to verify drug quality (national guidelines, improved importation procedures), complemented by awareness raising and training on the importance of drug quality at all levels (importers, government service providers, communities) are also needed to address this issue.

When viewed in the context of the LEGS standards, the following key points emerge from the survey results:

- 39% of respondents still distribute veterinary pharmaceuticals free of charge - whereas LEGS clinical veterinary services Standard 1 on service design encourages payment for services.
- Similarly 11% are distributing pharmaceuticals directly to livestock owners - whereas LEGS clinical veterinary services Standard 2 on examination and treatment encourages that treatment be provided based on an animal health service provider having examined the sick animal when providing curative services.
- 60% of respondents identified storage and cold chain as the main challenge in the provision of veterinary support. However, when identifying causes of this challenge, the focus of respondents seems to be on infrastructure (electricity, lack of facilities, etc.), with less focus on the impact of poor storage practices in the private sector on the quality of pharmaceuticals in the market chain. There is therefore awareness of the importance of investing in supply chain management (good storage, distribution, and documentation practices). However, LEGS promotes market-based

approaches to the provision of animal health services, which should include the responsibility to ensure that good storage, distribution and documentation practices are followed to ensure that safe, quality and effective pharmaceuticals are being used. Adherence to the LEGS Guidance Note 4 and related Key Action under clinical veterinary services Standard 1 would therefore require a shift in focus from direct distribution and public sector provision of services, to the private veterinary pharmaceutical market chain.

- 41% of respondents identified challenges in ensuring the quality of veterinary medicines. However the focus of respondents seems to be on the issue of counterfeit or non-approved drugs rather than the role of regulatory authorities and market chain actors in maintaining the integrity of pharmaceuticals through good storage, distribution and good documentation practices. There is a need for partners to work with private sector actors to build their capacity in these areas.

The survey results therefore highlight the fact that implementing organisations are aware of the need to support private animal health services delivery, including the pharmaceutical supply, but at the same time some still distribute free veterinary pharmaceuticals and are not investing sufficiently in building the capacity of private sector actors in the pharmaceutical market chain to provide local animal health service providers with safe, quality, effective pharmaceuticals for the provision of curative and preventative services to beneficiaries.