A LITERATURE REVIEW OF COMMUNITY-BASED ANIMAL HEALTH WORKERS IN AFRICA AND ASIA
WITH RECOMMENDATIONS FOR IMPROVED PRACTICES
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<th>Description</th>
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<tbody>
<tr>
<td>AMR</td>
<td>Antimicrobial resistance</td>
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<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<td>AU-IBAR</td>
<td>African Union – Interafferican Bureau for Animal Resources</td>
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<td>AVSF</td>
<td>Agronomes et Vétérinaires Sans Frontières</td>
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<tr>
<td>CAHW</td>
<td>Community-based animal health worker</td>
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<td>CAVE</td>
<td>Community agro-vet entrepreneur</td>
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<td>CIRAD</td>
<td>French Agricultural Research Centre for International Development</td>
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<td>DCA</td>
<td>Dutch Committee for Afghanistan</td>
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<td>DLS</td>
<td>Department of Livestock Services (Nepal)</td>
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<td>DVO</td>
<td>District Veterinary Officer</td>
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<td>ECCAS</td>
<td>Economic Community of Central African States</td>
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<td>ECOWAS</td>
<td>Economic Community of West African States</td>
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<tr>
<td>EMA</td>
<td>EMPRES-i Event Mobile Application</td>
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<td>EU</td>
<td>European Union</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>FCDO</td>
<td>Foreign, Commonwealth &amp; Development Office of the UK</td>
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<td>GHSA</td>
<td>Global Health Security Agenda</td>
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<td>GTZ</td>
<td>German Technical Cooperation</td>
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<tr>
<td>ICRC</td>
<td>International Committee of the Red Cross</td>
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<tr>
<td>IGAD</td>
<td>Intergovernmental Authority on Development (East Africa)</td>
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<tr>
<td>KZN GAP</td>
<td>KwaZulu-Natal Goat Agribusiness Project (South Africa)</td>
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<tr>
<td>LEGS</td>
<td>Livestock Emergency Guidelines and Standards</td>
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<tr>
<td>LIDISKI</td>
<td>Livestock Disease Surveillance Knowledge Integration project (Nigeria)</td>
</tr>
<tr>
<td>LLRP</td>
<td>Lifesaving &amp; Livelihoods Restoration in South Central Somalia</td>
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<tr>
<td>LUSAPEL</td>
<td>Lutte pour la Sécurité Alimentaire par le Petit Elevage (North Kivu, DRC)</td>
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<tr>
<td>MEL</td>
<td>Monitoring, evaluation, and learning</td>
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<tr>
<td>M&amp;S</td>
<td>Monitoring and surveillance</td>
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<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
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<tr>
<td>OFDA</td>
<td>Office of United States Foreign Disaster Assistance (now the Bureau for Humanitarian Assistance)</td>
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<tr>
<td>STI LEAP</td>
<td>Southern Tier Initiative Livelihood Enhancement for Agro-Pastoralists and Pastoralists (Ethiopia)</td>
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<tr>
<td>UEMAO</td>
<td>West African Economic and Monetary Union</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>VPP</td>
<td>Veterinary paraprofessional</td>
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<tr>
<td>VSF</td>
<td>Vétérinaires sans Frontières (Veterinarians Without Borders)</td>
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<tr>
<td>WASH</td>
<td>Water, sanitation, and hygiene</td>
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<td>WOAH</td>
<td>World Organisation for Animal Health (founded as OIE)</td>
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Introduction
The World Organisation for Animal Health (WOAH, founded as OIE) and VSF International are jointly implementing a two-year project entitled “Strengthening the enabling environment for community animal health workers through development of competency and curricula guidelines”, funded by USAID’s Bureau for Humanitarian Assistance (BHA). The project’s goal is to allow WOAH to develop community-based animal health worker (CAHW) competency and curricula guidelines and for VSF International to produce guidelines and recommendations for CAHW models. To contribute to this goal, this literature review consolidates learnings from CAHW programs in Africa and Asia to better understand the success factors and impediments for sustainable CAHW programs.

Background
The financial burden of providing animal health services, combined with pressure from donors to undertake structural adjustments, led many countries in the 1980s to hand over responsibility for animal health service delivery to the private sector. However, coverage in many rural and marginal areas was limited or absent. To fill this gap, NGOs in Asia and Africa soon began training small numbers of livestock keepers in basic animal health care and equipping them to provide these services to their respective communities. The aim was not to replace animal health services in rural areas but rather to complement them. In the early 1990s, UNICEF and AU-IBAR led an initiative to recruit and train thousands of CAHWs in East Africa to work for the Global Rinderpest Eradication Program, in which they proved crucial to the success of rinderpest eradication.

Previous assessments suggest that successful CAHW programs have certain characteristics in common: their services are widely accessible within the geographical area they are meant to serve, CAHWs have good basic technical knowledge, they have a dependable supply of veterinary inputs, they have regular supervision, and they are trusted by their communities. When these factors are present and sustainable, the positive impacts can be significant. At the same time, numerous problems persist, including lack of institutional memory, poor coordination of CAHW programs, confusion and mistrust over objectives and roles of CAHW programs, lack of standardization in CAHW training, and low financial sustainability of private CAHW service provision. The present literature review aims to analyze and discuss in detail these success and failure factors, to draw lessons learned, and make recommendations that promote successful CAHW programs.

Institutionalization of CAHWs
CAHWs are not formally recognized in many countries where they are active. Basing rural animal health services on CAHWs without a clear legal status is risky and confusing for stakeholders. There has been considerable hesitancy, in some cases outright opposition, to this recognition owing to concerns that CAHWs are not adequately trained or supervised to provide safe animal health services, will promote antimicrobial resistance through improper use of drugs, and will compete with veterinarians and veterinary paraprofessionals (VPPs).

Formal recognition of CAHWs can take several forms: full legal recognition of CAHWs; recognition of CAHWs in national livestock policies but without legal recognition; no legal recognition but frequent use of CAHWs by public veterinary services; and, rarely, a formal policy that expressly forbids CAHWs (see Appendix 2). The examples of countries in which CAHWs have a legal framework suggests that official recognition allows more appropriate training standards, accreditation and registration, and monitoring that can improve the level of CAHWs’ knowledge and skills. The establishment of competency guidelines by WOAH and/or regional economic communities can form the foundation for such legislation and provide the needed stimulus for countries to move towards full legal recognition of CAHWs.

Coordination of CAHW Programs
Lack of coordination in CAHW programs is common and can result in numerous problems, including: CAHWs with very different knowledge and skill levels due to different training standards; disequilibrium in the geographical
distribution of CAHWs, with too many CAHWs in some areas and none in others; and the offering of free animal health services to communities where CAHWs are trying to run a business. Together, these compromise the reputation and financial viability of CAHW service delivery. Creation of a national coordinating body should help ensure that the design and implementation of CAHW-related programs complement a country’s livestock development policies and priorities.

Planning and Designing CAHW Programs

Inadequate planning and design are important contributors to poor implementation and unsustainability of CAHW projects and result in lack of confidence in CAHWs by animal health stakeholders. Common examples of poor planning include inadequate duration and quality of training as well as inadequate exit strategies that fail to offer CAHWs a realistic chance of running a successful business after donor funding ends. These results when CAHWs lose access to technical support and supervision, refresher training and recertification, and a stable source for restocking of quality drugs, vaccines, and other inputs. Some of the more sustainable programs have in common that they involve all animal health stakeholders from the earliest stages of project design, are transparent, and emphasize raising community awareness of the benefits of animal health care.

Selection of CAHW Candidates

CAHW candidate selection involves not only deciding on the criteria used in their selection (e.g., age, experience, education level…) but also on how many CAHW candidates are selected for a given area. All stakeholders should participate meaningfully in the choice of CAHW selection criteria. Trust in CAHWs is reinforced when communities clearly understand how CAHWs are selected, how they are to be trained, and what their roles and responsibilities are. To promote the sustainability of CAHW service delivery, in many cases it is advisable to prioritize quality over quantity. Providing fewer CAHW candidates with longer training in technical and business topics can improve CAHW capacities and avoid overwhelming competition between them.

CAHW Training Programs

Training is the cornerstone of successful CAHW programs because it strongly impacts technical knowledge and skills. Several countries have developed national CAHW training curricula. In countries without standard curricula, the divergences in training within the country can be significant. In addition, good practices for training semi-literate adults – which describes many CAHWs – involve the use of participatory adult learning methods and hands-on instruction. But CAHW training manuals rarely address pedagogic approaches. Establishment of CAHW training standards at the national or regional level would likely improve and harmonize the level of CAHW skills, clearly distinguish CAHW trainings from those of other categories of animal health workers, and increase stakeholder confidence in CAHW competencies.

Supervision and Monitoring of CAHWs

Ensuring monitoring and supervision is one of the biggest obstacles to CAHW programs. Effective monitoring and supervision help to maintain and improve CAHW performance, limit misconduct, strengthen confidence in CAHWs, better harmonize CAHW knowledge and skills, and establish a chain of command that is necessary for efficient animal health service delivery and disease surveillance and reporting. CAHW motivation may be positively linked to the capacity of public or private animal health services to supervise them. And good CAHW supervision and monitoring are essential if public veterinary authorities and policy makers are to support initiatives to offer legal status to CAHWs. Yet, CAHW programs sometimes provide little supervision or monitoring of the CAHWs they train. Ideally, veterinarians and VPPs supervise and monitor CAHWs, but it is precisely the lack of veterinarians and VPPs that creates the need for CAHWs in the first place.
Public Good Functions of CAHWs

CAHWs offer a cost-effective, efficient tool for public veterinary services to conduct a broad range of public animal health activities in remote areas. CAHWs have been instrumental in mass livestock vaccination campaigns and delivering animal health services to vulnerable communities following disasters, they are ideal front-line actors in animal disease monitoring and surveillance in remote areas, and are sometimes used as meat inspectors, not without some controversy. One Health principles are increasingly included in training curricula, helping CAHWs recognize and report human diseases encountered during their livestock work.

A common objection to formal recognition of CAHWs is that they are inadequately trained to administer drugs appropriately and so will promote the development of antimicrobial resistance (AMR). Proponents, on the other hand, argue that CAHWs will limit AMR development because they prevent livestock owners from purchasing poor quality drugs and administering them on their own. Linking each CAHW with a veterinarian supervisor who acts as the source of drug procurement for the CAHW is a potential model for improving supervision and providing advice to CAHWs on good drug use practices.

Well-trained CAHWs can serve very useful roles as public health protectors, promoters, and communicators, including raising community awareness of issues such as food safety, zoonotic diseases, and AMR. Payment to CAHWs for these services can supplement their incomes and reinforce the financial viability of their services.

Women and CAHWs

Women CAHWs are conspicuously lacking in most CAHW programs. The obstacles for women CAHWs are numerous and include: preferential selection of men over women to become CAHWs; training logistics that are poorly adapted to the needs of mixed gender groups; lack of women instructors; subject matter that focuses on cattle and less on poultry or small ruminants, for which women CAHWs are more likely to be called on; and the significant time requirements placed on women to perform domestic tasks. Despite these obstacles, the potential for women CAHWs to expand the reach of animal health services, particularly to other women, is great. Simple changes to CAHW training programs can encourage larger numbers of women recruits. These changes involve more use of women training instructors, making all instructors more gender-sensitive, and offering more flexible training schedules and locations. Sensitization of communities to gender and women's empowerment can further reduce barriers to women's recruitment as CAHWs.

Sustainability of CAHWs

The sustainability of CAHWs is as important an issue as their technical skills and knowledge, and in many ways more difficult to address. To be successful, there must be demand for CAHW services. Demand stems from public confidence in CAHWs, which this literature review suggests is a consequence of good training and supervision; dependable access to drugs and other inputs; availability to respond to calls in a timely manner; and absence of overwhelming competition (from other CAHWs and from governments and development partners).

Access to veterinary drugs, vaccines, and other inputs is particularly critical for a sustainable CAHW business. CAHW programs may need to incentivize the establishment of veterinary input suppliers in a CAHW area while CAHWs are being trained to work there. Poor entrepreneurial skill among CAHWs is another serious obstacle to sustainability. Increased emphasis on business topics in training can assist with this. And promoting community awareness of the benefits of good animal health care can stimulate demand and willingness to pay for CAHW services, thereby increasing their financial viability.
CAHW Policy Frameworks
1. WOAH should formulate clear, concise competency guidelines for CAHWs to promote harmonization of minimum CAHW competencies.
2. Countries should recognize and define CAHWs in national veterinary legislation.
3. Encourage CAHWs to organize into associations to advocate for their interests.

Planning and Designing CAHW Programs
1. Individual countries should consider creating a national coordination authority to coordinate and guide the design and implementation of CAHW programs.
2. All animal health stakeholders should be consulted at all stages of project design.
3. Realistic exit strategies should be included in project planning and design.
4. Public veterinary services and NGOs should implement community awareness strategies on the benefits of good animal health care.
5. Emergency/humanitarian interventions should integrate measures to support private sector animal health service providers.

Selection of CAHW Candidates
1. Any entity intending to train new CAHW candidates should conduct a thorough study to estimate the optimal number of CAHWs to be trained.
2. Favor using existing animal health workers, when present, rather than training new CAHWs.
3. Prioritize quality over quantity in CAHW selection. Select fewer CAHW candidates and offer them high quality technical and business training.
4. Selection criteria for new CAHW candidates should be established in consultation with animal health stakeholders—particularly livestock owners and their communities—and consistently applied.

CAHW Training Programs
1. WOAH should formulate CAHW training curricula guidelines.
2. Countries should create a regulatory entity to establish minimum CAHW training standards.
3. Entities that train CAHWs should develop teaching approaches for adult learning, and CAHW instructors should use these approaches.
4. Consider carefully the use of stipends, expense reimbursements, and free inputs to CAHW candidates to avoid attracting poorly motivated candidates.

Supervision & Monitoring of CAHWs and CAHW Programs
1. Countries should establish clear regulatory frameworks that encompass CAHW supervision and monitoring.
2. Public veterinary services should strengthen their capacity to regulate and monitor CAHWs.
3. Consider ways to promote willingness of veterinarians and VPPs to supervise CAHWs.

Public Good Functions of CAHWs
1. National guidelines should establish CAHW responsibilities in disease reporting and remuneration, if any, for performing these duties.
2. One Health and public communication topics should be included in CAHW training curricula.
3. Facilitate the supply of licensed, quality veterinary drugs through strengthened value chains, enforcement of drug quality standards, and building community awareness of the dangers of poor-quality drugs.
4. CAHW supervision should include assessing inappropriate use of drugs.

CAHWs and Women
1. Recruitment of more women CAHW candidates should be facilitated by better adapting training programs to their needs.
2. Raise community awareness concerning gender and women's empowerment.
3. Community animal health awareness campaigns should include issues that specifically concern women, such as poultry, small ruminants, and food safety.

Sustainability of CAHWs
1. Veterinarians and qualified staff of veterinary pharmacies should participate in CAHW training to strengthen supply chain relationships.
2. Promote the establishment of pharmacies in or near areas with CAHWs.
3. Link CAHWs to a veterinarian or pharmacy to facilitate restocking.
5. Provide frequent technical support and mentoring to new CAHWs.
6. Offer CAHWs opportunities for professional development, upward mobility.
7. Free or heavily subsidized animal health care should be strongly discouraged, with some exceptions, so as not to undermine private sector providers.
1. INTRODUCTION

1.1 BACKGROUND TO THE LITERATURE REVIEW

Community-based animal health workers (CAHWs) are present in dozens of countries of Asia, Africa, and Latin America. They deliver valuable animal health services to livestock keepers in rural areas where other animal health service providers are lacking. The VSF International network has been working for decades to strengthen and advocate for the development of CAHWs. This has involved reinforcing their technical competencies and supporting sustainable business models, as well promoting the formal integration of CAHWs into local and national animal health systems and regulatory frameworks in collaboration with public and private veterinarians.

Despite CAHWs’ important role in providing animal health services to populations that depend heavily on animals for their livelihoods and food security, the successful, sustainable development and deployment of CAHWs faces numerous challenges and constraints. To address these, the World Organisation for Animal Health (WOAH, founded as OIE) and VSF International are jointly implementing a two-year project entitled “Strengthening the enabling environment for community animal health workers through development of competency and curricula guidelines,” funded by the United States Agency for International Development’s Bureau for Humanitarian Assistance.

This project will allow implementing organizations to provide an in-depth assessment of the training context and needs for CAHWs at the global level based on regional and national-level analyses. This in turn will allow WOAH to develop competency and curricula guidelines for CAHWs (after appropriate validation and testing), and VSF International to produce guidelines and recommendations for sustainable CAHW models. These will be key to supporting global recognition and harmonization of CAHW training and services.

As an integral part of the project, this literature review consolidates learnings from various CAHW programs in order to better understand the success factors and impediments for the sustainability of CAHW programs.
1.2 SCOPE, AIMS, AND PURPOSE OF THE LITERATURE REVIEW

This literature review focuses on Africa and South and Southeast Asia, all regions in which CAHWs have been trained and deployed in large numbers over more than three decades. The lessons learned from this review, however, and any CAHW competency and training curricula guidelines resulting from them, have the potential to be scaled and adapted successfully to other regions, namely Latin America and the Middle East.

The “Strengthening the enabling environment for community animal health workers through development of competency and curricula guidelines” project mentioned above aims to:
- Inform key stakeholders involved in CAHW training and supervision of the strengths and weaknesses in current training models and provide them with recommendations to improve the sustainability of CAHW programs;
- Allow WOAH to produce competency and curricula guidelines for CAHWs and disseminate them to key stakeholders involved in CAHW training and management, and;
- Inform key stakeholders involved in veterinary services legislation and management of the value of harmonization and role definition for CAHWs.

1.3 LITERATURE REVIEW DESIGN AND METHODOLOGY

This literature review was conducted between June and October 2022 and based on the review of 125 documents relative to CAHWs and animal health services in 37 countries. Documents included peer-reviewed academic papers; donor project reports, including monitoring reports and evaluations / assessments; internal documents from NGOs on CAHW training and implementation recommendations; policy documents from government ministries and multilateral institutions related to CAHWs and animal health; and donor, NGO, and multilateral organization websites related to CAHWs and specific CAHW programs. All but two of the documents consulted were published after the year 2000. Additional information and clarifications were obtained through email or virtual communication with NGO staff currently or recently active in CAHW programs covered in this literature review.

CAHW training manuals and curricula were acquired through online Google searches and directly from NGOs, multilateral organizations, and donor projects involved in the training of CAHWs.
2. BACKGROUND

2.1 HISTORY OF CAHWS

Animal health services are made up of many components, including animal and zoonotic disease detection and diagnosis, treatment, prevention, monitoring and surveillance; food safety; antimicrobial resistance; and environmental stewardship (e.g., managing human-livestock-wildlife interfaces, limiting damage to the environment from pesticides and drugs…).

Animal health services affect much more than simple animal health, with broader impacts on human health and well-being (through food and income security), trade (managing transboundary animal diseases), and even climate change (healthy animals use feed and water more efficiently and produce less greenhouse gases).

Delivery of animal health services is expensive. In the first decades after independence from colonial rule in the 20th century, governments in Africa and Asia tended to take responsibility for most aspects of animal health. But the high financial burden, coupled with structural adjustment programs in the 1980s, led many of these countries to turn over responsibility for delivery of most animal health services to the private sector. In many cases, governments retained control only over trade-relevant animal diseases and food safety.

On the ground, however, some government animal health professionals continued to provide curative and preventative services to livestock keepers, often at below market rates. This observation is still valid today and hinders the enabling environment for private practitioners to set up.

The privatization worked relatively well in some countries and places, particularly in peri-urban areas and where market-oriented livestock systems such as intensive dairy operations were common. However, coverage in many rural and marginal areas was often limited or even absent as private sector animal health actors tended to favor working in urban areas and, when possible, in the public sector.

In the 1980s, to fill this gap in rural animal health service delivery, reduce inequalities in access to animal healthcare, and strengthen livestock-based livelihoods, non-governmental organizations (NGOs) in Asia and Africa began training a few select livestock keepers in basic animal health care and furnishing them with equipment, medications, and vaccines with which to provide these services to their respective communities.

Some of the earliest reported CAHW initiatives include the training of 2,000 village animal health workers by United Mission to Nepal in 1981; the training of 2,100 “village keymen” in animal health in 1984 by the Government of Thailand; training of CAHWs in Togo in 1988 by Agronomes et Vétérinaires Sans Frontières (AVSF); and the training of 54 “nomadic animal health assistants” by Germany’s GTZ in Somalia in the 1980s. Many other CAHW programs followed in the 1990s: Bolivia, Peru, Ghana, Senegal, Ethiopia, Sudan, Kenya, Malawi, Afghanistan, Cambodia, and Indonesia.

The aim of these programs has not been to replace animal health services in rural areas but rather to complement them. The argument for the creation of CAHWs has been that the often-difficult conditions and low income generated by animal treatments and prevention in rural areas fail to attract trained veterinarians or even veterinary paraprofessionals (VPPs) to service those areas. Livestock owners in remote rural areas would either do without animal health services or would treat their animals on their own, with associated high risks of misdiagnosis, unsuccessful treatments, and inappropriate use of antimicrobials that can promote pathogen resistance to these drugs.

The initial NGO-led CAHW projects were on a limited scale, training a small number of CAHWs in selected villages. But this changed in the early 1990s when it was proposed that CAHWs could be used to assist with the Global Rinderpest Eradication Program. UNICEF and AU-IBAR led the initiative to recruit and train thousands of CAHWs and contract them for work in southern Sudan, Ethiopia, Kenya, and Uganda, where they proved crucial to the success of rinderpest eradication.

In the 2000s, stakeholders gathered evidence on CAHW models, defined good practices, and advocated for formal recognition of CAHWs by governments. Through this process, the potential efficiencies and cost-effectiveness of CAHWs were recognized, as demonstrated by rinderpest eradication in southern Sudan, Somalia, and Ethiopia’s Afar and Somali Re-
gions and by gains made in tsetse fly control in Ethiopia, Uganda, Zambia, and Zimbabwe. These positive impacts of CAHWs were supported by a growing number of qualitative and quantitative studies claiming reduced animal morbidity and mortality rates and improved animal disease surveillance in areas where CAHWs were active.

More recently, part of the rationale behind the use of CAHWs is that, for a given place, the overwhelming majority of livestock health problems in small-scale, non-intensive production systems is limited to just a handful of well-known infectious diseases and an even smaller number of parasite species, all of which can be prevented, diagnosed, and treated effectively by CAHWs.

The basic skills taught to CAHWs in order to address these few major diseases and parasites may not be adequate in areas of intensive dairy farming and ranching, where metabolic and other non-infectious diseases can be more complex to diagnose and treat successfully. However, CAHWs are typically not needed in such areas as the higher demand for animal health services by these market-oriented producers tends to attract veterinarians and VPPs. Though there is a rising number of exceptions, most livestock owners in extensive production systems that dominate rural areas are not intent on having fat animals or high-volume milk producers in their herds and flocks. Their primary objectives are large herds, low mortality rates, and animals strong enough to produce healthy offspring from time to time. This requires a different kind of animal health care, one that CAHWs are better suited to provide.

Rather than being in competition with veterinarians and VPPs, CAHWs are active in areas where demand for animal health services and ability to pay for them may not be sufficient to allow veterinarians and VPPs to operate financially viable businesses. Further, the CAHWs are seen by development partners and some policy makers as tools to increase rural development and food and income security through higher livestock production, improved human nutrition, and decreased public health risks.

By 2001, CAHWs had been trained in over half of the 30 countries of West, Central, and East Africa participating in the Pan African Programme for the Control of Epizootics (PACE), and by 2005 more than 390 projects focused on CAHWs had been implemented in the Horn of Africa alone. When successful, the positive impacts can be significant. Governments spend less on animal health service delivery, while communities benefit from decreased livestock mortality and morbidity rates, increased livestock vaccine coverage, a drop in the use of counterfeit and poor-quality drugs, strengthened animal disease surveillance, more appropriate use of antimicrobials, higher production of and income from milk and meat, and increased availability of draught power.

However, despite the potential improvements in animal health service delivery to underserved communities, numerous problems persist after four decades of implementing CAHW programs around the world. Lack of institutional memory among donors, implementers, governments, and other animal health sector stakeholders means errors are often repeated. Poor or absent coordination of CAHW programs leads to duplicated activities and the inability to leverage synergies between programs, confusion and mistrust over objectives and roles of CAHW programs, and lack of standardization in CAHW trainings. Perhaps most daunting is the problem of sustaining CAHWs in animal health work beyond the end of the programs that train them. Numerous strategies to address this problem have produced variable results and ultimately this remains perhaps the most formidable obstacle to CAHW programs worldwide.
2.2 WHAT IS A CAHW?

CAHWs have been, and continue to be, known by several different names from one country to the next, and sometimes within the same country. This results in confusion among stakeholders, from policy-makers to livestock-owning communities and everyone in between\textsuperscript{11,19,28}. In other cases, the term CAHW is used for people whose animal health training and knowledge are well below that of even the broadest criteria for defining a CAHW.

WOAH’s definition of a veterinary paraprofessional (VPP) in the Terrestrial Animal Health Code and Competency Guidelines for Veterinary Paraprofessionals\textsuperscript{29,32} has been interpreted by some stakeholders – including governments – to encompass CAHWs\textsuperscript{10}. However, this does not appear to be the intent of these documents\textsuperscript{11,19}. A VPP has completed a formal training program at certificate, diploma, or degree level from a training institution accredited by the government or veterinary statutory body in the country where the VPP practices, and works under the supervision of a veterinarian\textsuperscript{10,13,20,30,31}. These criteria are met by very few CAHWs today.

According to WOAH’s Terrestrial Code, a veterinary paraprofessional is “a person who is authorised by the veterinary statutory body to carry out certain designated tasks (dependent upon the category of veterinary para-professional) in a territory, and delegated to them under the responsibility and direction of a veterinarian. The tasks for each category of VPP should be defined by the veterinary statutory body depending on qualifications and training, and in accordance with need” (WOAH Terrestrial Animal Health Code\textsuperscript{32}).

Vétérinaires sans Frontières International has published a relatively clear definition of CAHWs\textsuperscript{11}. CAHW candidates should be selected in a participatory manner, with input from the communities in which they are meant to work, from local private veterinarians (when present), public veterinary services, and development partners (donors, implementing NGOs…). And CAHWs may conduct some or all the following activities:

- Provide basic animal health care, to include:
  - Treating sick animals, including basic surgical procedures
  - Advising livestock keepers on animal health and production
  - Organizing and managing livestock vaccination and deworming campaigns
  - Managing stocks of veterinary drugs and cold chain infrastructure
  - Collecting and sharing information
  - Creating or becoming a member of CAHW associations

- Offer livestock husbandry advice and services

- Disseminate practices that improve animal production

- Participate in animal disease surveillance

This definition does not recommend a minimum education requirement for a CAHW candidate, and training duration, frequency, and curricula are not addressed.

How India works

The case of India demonstrates some of the considerations and complexities in defining CAHWs and other animal health workers. The country’s Ministry of Skill Development & Entrepreneurship describes the roles and responsibilities of animal health workers in general\textsuperscript{33}, while the much older Indian Veterinary Council Act of 1984 mentions specific categories of animal health workers and the animal health services they can provide – under the supervision of a veterinarian.

India today has VPPs, veterinary field assistants, veterinary clinical assistants, community-based animal health workers, and, in some states, artificial inseminators, the latter trained in AI techniques and in administering livestock vaccines\textsuperscript{34}. In many Indian states, female farmers (called pashu sakhi, or “friends of animals”) have been trained in basic extension and health care of poultry, sheep, and goats to provide services in their communities\textsuperscript{35,105}. 
What’s in a Name?

Early on, CAHWs were often referred to as para-veterinarians. Over time, many other names evolved to refer to CAHWs, while at the same time some occupations are referred to as CAHWs when probably they should not be. Without a formal definition, confusion will remain. Some of the more common names in both English and French are given below.

**English names meant to refer to CAHWs:**
- Village animal health worker – Cambodia
- Village veterinary worker – Lao PDR
- Para-veterinarian – Vietnam
- Basic veterinary worker – Afghanistan
- Village veterinary promoter or auxiliary – Burkina Faso
- Village vaccinator or poultry vaccinator – West Africa
- Livestock correspondent – Bénin
- Sons of livestock keepers – Bénin

**French names referring to CAHWs:**
- Agent communautaire de santé animale – West Africa, Burundi, Madagascar
- Auxiliaire (villageois) d’élevage – Burkina Faso, DR Congo, Mali, Senegal, Togo
- Agent de Proximité en Production et en Santé Animale - Madagascar
- (Agri-) éleveur relais – Mali, Senegal, Rwanda
- Auxiliaire vétérinaire – Togo
- Vaccinateur volontaire villageois – Burkina Faso
- Vaccinateur villageois de volailles – Mali
- Vulgarisateur volontaire villageois – Burkina Faso

Sources: 9,10,12-14,22,36
CAHWs operate in many countries where they are not formally recognized. In most cases, governments tolerate their work. In some cases, governments actively use CAHW services without formally recognizing them and may even train them. However, basing rural animal health services on CAHWs without a clear legal status is risky and confusing for stakeholders at all levels of the system. It also allows poorly trained or untrained persons to claim to be CAHWs with no way for the public to verify their claims.

3.1.1 History of CAHW institutionalization

Consideration of CAHWs’ legal status and enabling environment began by the late 1990s, partly driven by CAHWs’ potential use in surveillance of transboundary animal diseases that affect international trade (e.g., rinderpest, at the time) and therefore having significant economic and political implications. The World Trade Organization, for example, began calling for countries to provide a legal framework within which CAHWs could operate, based on defining the training, supervision, and permitted activities of CAHWs. Several countries and many development partners formulated policies supportive of CAHWs by the mid-2000s. AU-IBAR was active in this initiative, creating the Community Animal Health and Participatory Epidemiology Unit, advocating for CAHW recognition by member countries, and recommending the establishment of CAHW guidelines. The Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (UEMOA) have made efforts in recent years to coordinate legislation on animal health care and drugs. However, they have yet to address the legal status of CAHWs.

3.1.2 Opposition to formal recognition of CAHWs

Since initiatives promoting legal recognition of CAHWs strengthened in the late 1990s and early 2000s, there has been considerable hesitancy, in some cases outright opposition, to this recognition. In Kenya, for example, the Veterinary Surgeons and Veterinary Paraprofessionals Act of 2011 expressly forbid CAHWs and the training of CAHWs in the country. Achieving formal recognition of CAHWs without support from the great majority of animal health stakeholders – including veterinarians, VPPs, and other animal health workers – will jeopardize success as CAHWs will depend on collaboration and mutually beneficial relationships with public and private animal health actors for their work.

The reasons given for this opposition are usually sincere and must be taken into consideration. The more common reasons cited involve the following concerns:

- CAHWs are not adequately trained to perform effective animal disease diagnosis, treatment, and prevention;
- CAHWs will become independent and practice without supervision or monitoring;
- CAHWs will undertake veterinary activities they are not authorized or trained for;
- CAHWs will not use antimicrobials correctly, which in turn will promote resistance to these drugs by pathogenic microbes and parasites;
- CAHWs will compete with and take work from veterinarians and VPPs;
- CAHWs have no representatives to dialogue with public veterinary authorities and policy makers on what form CAHW legal status should take.

3.1.3 Current approaches to recognizing CAHWs

Approaches to formal recognition of CAHWs have taken several forms around the world. These include full legal recognition of CAHWs by ministerial decree; recognition of CAHWs in national livestock policies but without legal recognition; no legal recognition but frequent use of CAHWs by public veterinary services; and, rarely, a formal policy that expressly forbids the existence of CAHWs (see Appendix 2).

In Asia, examples of full recognition are found in Myanmar, Cambodia, and Vietnam. In Myanmar, the Ministry of Agriculture, Livestock and Irrigation’s Animal Health and Livestock Development Law of 2020 recognizes...
CAHWs and gives responsibility for CAHW training, certification, and supervision to the ministry’s Livestock Breeding and Veterinary Department. The Government of Cambodia’s policy objective of ‘a CAHW in every village’ is backed by Ministry of Agriculture, Fish, and Forestry legislation and a subnational decree (No. 26). In this system, CAHWs that complete the required training curriculum established by the Ministry are registered and maintain contact with district or provincial veterinary authorities for disease reporting, in addition to their participation in the country’s national hemorrhagic septicemia vaccination campaign.

In India, CAHWs operate under many different names but their status, registration, and regulation are not addressed in the Indian Veterinary Council Act of 1984. To help overcome opposition and facilitate the formal recognition of CAHWs by the Veterinary Council of India, the public entity Agriculture Skill Council of India in 2015 created standardized training curricula and assessment criteria for animal health workers, specifically mentioning CAHWs.

In Afghanistan, the Animal Health (Veterinary) Law of 2017 defines what it calls “basic veterinary workers” and requires them to be trained for 1 month by an accredited training organization and to work under the supervision of a VPP. Some NGOs have trained CAHWs for shorter periods and without using an accredited training institution, however these cannot be called “basic veterinary workers” as defined by the Animal Health Law.

In Madagascar, CAHWs have worked for years without any formal status. The country’s 2006 livestock law (Law 2006-030) defined veterinarians and VPPs but did not mention CAHWs, though post-training examinations and issuing of certification to CAHWs have been carried out by the public sector Regional Livestock Services (RLS), conferring an informal recognition of CAHW services. Development partners have advocated since 2006 for a change in the legislation that would formally recognize CAHWs, a change supported by the government’s Veterinary Services Office (DSV). Little progress was achieved until 2016, when the Ministry of Livestock initiated efforts to formulate minimum standards for CAHW training and competencies in the country.

In Niger, formal recognition of CAHWs (generally called “auxiliaires d’élevage”) has occurred within the framework of the community-based animal health system that has developed steadily over the past two decades and, since 2011, is a key component of the Ministry of Livestock’s national livestock development strategy. Two legislative texts from 2015 establishing the framework for private animal health service delivery in Niger recognize the important role to be played by CAHWs in this system. This offers CAHWs judicial status and establishes requirements for their training, certification, supervision, and monitoring.

CAHWs were included by South Sudan’s Ministry of Animal Resources and Fisheries in its first policy framework in 2006, even before that country’s independence. In Ethiopia in 2009, the Ministry of Agriculture and Rural Development (MoARD) published guidelines and minimal standards for CAHW-based animal health service delivery, referring to CAHWs as “animal health representatives” in current legislation (proclamation No. 267/2002). However, the lack of capacity to supervise CAHW activities has mitigated the positive effects of these initiatives.

In Africa, several countries have granted formal recognition to CAHWs in national legislation. Examples include Togo, Republic of Guinea, Sudan, Ethiopia, and Tanzania. In Guinea, CAHWs were recognized through ministerial decree (N°980878CAB/MAE) promulgated in 1998 and subsequently included in the country’s Stockbreeding Code. The decree defined CAHW activities and established training, supervision, monitoring, disciplining, payment, and evaluation of CAHWs, requiring them to be registered with the National Livestock Office and recorded by the District Section for Animal Resources at district and sub-district levels.

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With help from AVSF and the National Order of Malgache Veterinarians, these standards were finalized in January 2022. AVSF is now set to implement a pilot project to test implementation of the approved CAHW
standards in various parts of the country, in collaboration with public veterinary services and CIRAD.47

In Chad, by the early 2000s, CAHWs were supervised by public veterinarians and monitored by the Division for the Promotion of Professional Organizations, part of the Ministry of Livestock’s Office of Animal Production and Pastoralism Development. Despite this relationship with the public sector, Chad’s legislation did not recognize CAHWs. And up to at least 2017, CAHWs continue to be trained in Chad not only by NGOs through donor projects but also in some cases by the government. The Ministry of Livestock issues successful trainees with professional identity cards that allow the CAHWs to acquire veterinary drugs from pharmacies, while supervision of CAHW activities is conducted by public veterinarians under the Division for the Promotion of Professional Organizations.25

Formal CAHW recognition is lacking in Mali and Burkina Faso, and their status in Nigeria is vigorously debated among stakeholders. The Veterinary Council of Nigeria (VCN) officially recognized CAHWs in 2006, but the training and regulation of CAHWs is the prerogative of the Department of Veterinary Services and professional veterinarian associations within Nigeria’s individual states.48,49

Kenya has backtracked on its initial support for CAHWs and since 2011 has forbidden any further training of CAHWs in the country. Nonetheless, previously trained CAHWs apparently remain active in some pastoralist areas of the country. In some cases, previously trained CAHWs have transitioned to “community disease reporters,” supporting veterinary authorities in animal disease surveillance and reporting. But they are nevertheless officially forbidden from undertaking other animal health care activities.10,13,14

In Uganda, CAHWs are tolerated by the Ministry of Agriculture, Animal Industries, and Fisheries (MAAIF) to work in the pastoralist regions of Karamoja in the country’s northeast, but they have no legal status. Development partners frequently train, refresh, and use CAHWs in livestock projects in the area, while public District Veterinary Officers also contract CAHWs for help with vaccination programs. A stakeholder workshop organized in 2001 by Makerere University’s Department of Veterinary Medicine to discuss animal health service delivery in pastoralist areas of the country succeeded in reducing opposition to CAHWs from animal health stakeholders and raising awareness of the benefits of CAHW services. Participants included academics, the Uganda Veterinary Association (UVA), Uganda Veterinary Board, Ministry of Agriculture, Animal Industries, and Fisheries officials, NGOs, and private veterinarians. The following year, the UVA recognized CAHWs as “a major force in supplementing veterinary service delivery in Uganda.” Though no changes have been made to Uganda’s Veterinary Surgeons Act and National Drug Statute to formally recognize CAHWs, this was an important step in overcoming opposition from the veterinary profession in general in Uganda.21,50,51

The literature review shows that CAHWs enjoy formal recognition in only a minority of countries where they operate, placing them and those who employ them in an ambiguous legal position. Numerous animal health stakeholders have opposed recognition of CAHWs in various countries, citing legitimate concerns that need to be addressed if legal status for CAHWs is to come about.

Examples of countries that have brought CAHWs within a legal framework suggest that official recognition allows more appropriate training standards, accreditation and registration, and monitoring that can improve the level of CAHWs’ knowledge and skills. It can also protect livestock owners by facilitating the detection of people claiming to be CAHWs without having completed the required training, without being accredited, or having had their accreditation revoked. While not all countries that provide a legal status for CAHWs have achieved these gains, formal recognition nevertheless appears to be a prerequisite for achieving them.

While individual countries will want to formulate their own legal frameworks for CAHWs tailored to their specific needs and priorities, the establishment of competency guidelines by WOAH and/or regional economic communities can form the foundation on which such legislation is built and can provide the needed stimulus for countries to move towards full legal recognition of CAHWs.
Lack of coordination in CAHW programs can worsen existing animal health service dysfunctions. This is often most obvious regarding CAHW candidate selection and training, where poor coordination results in CAHWs with very different levels of competencies as well as disequilibrium in the geographical distribution of CAHWS that compromises their financial viability and sustainability. With over 200 NGOs estimated to be involved in CAHW initiatives in the Greater Horn of Africa alone, for example, poor coordination is a significant problem.19,21,51

In Afghanistan, the government has exercised little oversight or coordination of donor projects. Consequently, some NGOs provide animal health trainings of 1-2 weeks duration and then deploy these CAHWS to work unsupervised, sometimes in areas where they compete with the officially recognized basic veterinary workers.27

By the early 2000s, the importance of coordination in the training and use of CAHWS in humanitarian and emergency interventions (see Section 4.6 below) became clear. One important issue was (and still is) the provision by governments and NGOs of free or heavily subsidized veterinary drugs and vaccines to vulnerable livestock owning communities or local animal health service providers in the face of drought, floods, animal disease outbreaks, or military conflict. Despite the urgent need to deliver health care to livestock, many development partners argue that the widespread distribution of undervalued drugs and vaccines undermined rather than supported private sector animal health care initiatives where these were present.14 Further, many emergency interventions by nature do not have time to train new CAHWS to the standards used in a non-crisis setting. Yet new recruits receiving sometimes just a few days of rudimentary training are called CAHWS by those that trained and employed them. When the emergency, or project, is over, some of these trainees offer their services as animal health care providers, again causing confusion and disillusionment over the quality of CAHWS' work.

These and other issues led to the establishment of guidelines and standards for the design, implementa-
tion, and evaluation of interventions in livestock emergency settings, published in 2009 by the Livestock Emergency Guidelines and Standards (LEGS) Project. The role of CAHWs in emergency interventions is described in-depth in this document (a new edition of LEGS is scheduled for publication in 2023). Lack of coordination between CAHW programs also leads to problems outside of humanitarian and emergency settings, and for many of the same reasons. In Uganda’s Karamoja region, for example, lack of coordination between development projects has resulted in diverse levels of training for people referred to as CAHWs, despite the development of standards developed in 2017 by Uganda’s Makerere University working with the NGO Mercy Corps. Some CAHWs have received no refresher training several years after completion of their initial training, while others have received far too many refresher trainings. In addition, training of large numbers of CAHWs has contributed to the observed clustering of CAHWs in urban areas, far from the communities they are meant to serve.

Poor coordination of CAHW projects has also been a concern in Burkina Faso and Mali. The large number of CAHWs trained and recruited by donor projects in these countries are left to their own devices when the project comes to an end. Some of these CAHWs attempt to work as independent animal health service providers, with varying levels of success.

This literature review suggests that lack of coordination between CAHW programs is a hindrance to the improvement of animal health services in many countries. Uncoordinated projects tend to lead to highly variable training quality and duration, resulting in CAHWs with different competency levels in providing animal health services to their communities. This hurts the reputation of all CAHWs, no matter how well trained, and causes confusion among animal health stakeholders regarding what can be expected of CAHWs and what their roles and responsibilities can and should be.

Further, lack of coordination promotes poor geographical distribution of CAHWs when the projects that train them are located in the same or nearby areas. This can result in too many CAHWs being trained in an area, making competition too high for any of them to generate sufficiently high income as a CAHW to make the activity sustainable.

These findings suggest that a coordinating body at national level could be beneficial in ensuring that the design and implementation of CAHW-related programs complement or, at a minimum, do not conflict with the country’s CAHW and livestock development policies and priorities.

In countries where such a coordinating authority does not exist, it may be beneficial for donors and project implementers to initiate their own coordination with other donors, implementers, and local veterinary authorities to fill a similar role. While donor and project implementers will have little or no authority to sanction or prevent CAHW-related projects deemed to conflict with good practices or national policies, pressure may be applied or recommendations offered that can improve the design or implementation of such projects.
Inadequate planning and design are important contributors to poor implementation and unsustainability of CAHW-related projects. In some cases, existing CAHWs may be recruited, given short, inadequate refresher training, then deployed for field work. Many of these CAHWs may not have been involved in animal health activities for months or even years. When CAHWs are not present in sufficient numbers, project implementers often recruit new candidates and provide them with training that can be inadequate. In both cases, the quality of these CAHWs’ work is poor, leading to lack of confidence by communities in CAHWs and undermining the role they could play in animal health service delivery under better conditions.

Inadequate exit strategies pose another problem. CAHWs employed in a project must find another source of income once the project has ended. This is very difficult when large numbers of CAHWs have been trained in an area, training quality or duration has been inadequate, community awareness of the benefits of CAHWs and animal health care in general is weak, sustainable supply chains to replenish veterinary drugs and inputs have not been promoted, and good business models have not been used. Exit strategies that do not take these factors into account make continued CAHW activities very difficult in the absence of external funding.

Lack of institutional memory among development partners worsens these problems. Government, donor, and NGO staff turnover and failure to create and effectively disseminate internal policies, best practices, and lessons-learned all contribute to repeating the mistakes of previous work with CAHWs. And implementers with little or no experience working with CAHWs do not always seek or know where to find good guidance in best-practices.

Involving local communities, local veterinary authorities, and other animal health stakeholders intimately in project planning and design from the earliest stages seems to be a necessary and effective tool for overcoming many of the problems cited above. Indeed, local public veterinary services can play an influential role in legitimizing CAHWs and building confidence in them among communities, government, development partners, and private sector animal health service providers. For example, in some projects imple-
mented in Rwanda and Niger, veterinary authorities formally presented to community leaders the CAHWs that would be working in their communities and ensured their roles and responsibilities were understood by the public.\textsuperscript{5,36}

Some projects (for example, in Niger, Lao PDR, and Rwanda) have reported challenges with livestock owners lacking adequate understanding of animal health issues and being sometimes suspicious of animal health care providers, thus hindering the sustainable deployment of CAHWs.\textsuperscript{5,14,36,39}

Transparency and raising awareness among all animal health stakeholders are common themes in several successful CAHW projects examined in this literature review. Lao PDR and Niger are two examples where livestock-owning communities, livestock associations, and local authorities were provided with a better understanding of the benefits of preventive care such as vaccinations, but also of good treatments, herd health, biosecurity, and general husbandry practices. They learned what improved veterinary care can do for their animals and for their families and how CAHWs and private animal health service in general can help achieve this improved veterinary care.\textsuperscript{5,36,39}

These awareness campaigns have taken many forms. In Lao PDR, for example, CAHWs themselves displayed illustrated animal health posters in villages and invited successful CAHWs from nearby areas to attend village meetings and share their experiences and answer questions.\textsuperscript{39}

In Niger, awareness campaigns have used posters, banners, brochures, billboard signs, theatre, radio, and audiocassettes to good effect. Targeting awareness raising efforts at relevant events is also used, such as at festivals, livestock markets, and places where livestock gather for vaccinations or at dipping tanks. Assessment of these methods and strategies in Niger has shown that they have resulted in higher animal vaccine coverage, improved acceptance of both veterinarians and CAHWs by the public, and greater adherence to recommended animal health practices, including decreased use of poor-quality veterinary products.

The experience also showed that building awareness is achieved only over the long-term, with sustained effort, significant financial and human resources, and use of multiple tools to reinforce the intended messages. Further, the experience of VSF Belgium in Niger is that behavior change in communities is influenced to a large extent by livestock-owner associations, traditional community leadership, municipalities, and public veterinary authorities.\textsuperscript{5}

This literature review indicates that poor planning and design can lead to problems for CAHW programs, the effects of which commonly show up as lack of confidence in CAHWs by livestock-owning communities, government authorities, and other animal health service providers.

A common result of poor planning and design across many donor-funded CAHW programs noted in the literature is the apparent absence of exit strategies that offer CAHW programs and businesses a realistic chance of continuing after donor funding ends. Important elements are glossed over or ignored, such as continued technical support for and supervision of CAHWs;\textsuperscript{38} continued access to medications, vaccines, and other animal health inputs; the ability of local actors to provide both refresher training and new CAHW training; and matching the number of CAHWs to be trained with the number of CAHW service providers that an area can reasonably support.

Some of the more sustainable CAHW programs noted in the literature review have in common that they involved all animal health stakeholders from the earliest stages of project design, and in particular local communities, local veterinary authorities, and private animal health service providers. Successful CAHW programs appear to require broad support and engagement from stakeholders across the animal health sector. Participatory approaches to creating and implementing CAHW programs are an important means of gaining this support, allowing all stakeholders to voice their concerns, and giving them a say in what the system looks like.

Another shared element of seemingly successful CAHW programs is an emphasis on raising awareness of the benefits of animal health services among livestock-owning communities. Together, these last two elements likely help raise public confidence in CAHWs and increase demand for their services.
4.2 SELECTION OF CAHW CANDIDATES

CAHW candidate selection involves not only deciding on the criteria used in their selection but also on how many CAHW candidates are selected for a given area. Choosing and applying criteria for CAHW candidate selection appear to be critical for community acceptance of these CAHWs. A recent study in southern Lao PDR – and presumably applicable in most other countries – showed that poor community acceptance of CAHWs (based on farmer willingness-to-pay and awareness of the benefits of animal health care, but also on the perceived skill of CAHWs) was a major constraint to CAHW sustainability and resulted in low demand for CAHW services. As such, these criteria should be considered carefully by those initiating new CAHW trainings.

Selection criteria differ between countries and regions within countries, between donors and NGOs, and between projects. This is due both to lack of coordination between development partners and with public veterinary authorities, and to specific circumstances. In some remote areas, a literacy requirement for CAHWs, for example, would severely limit the number of eligible candidates.

The possible criteria for the selection of CAHW candidates are numerous, sometimes controversial, and not all are applicable in every setting. The most common criteria used across countries and projects address the level of education and/or literacy, age, presence and reputation in the community, and experience working with livestock.

Studies from nearly two decades ago in Ghana, Kenya, Peru, and Guatemala suggest that communities most appreciate CAHWs that are trustworthy and committed, followed by responsible, knowledgeable, and, lastly, literate. In the same studies, policy-makers in those countries ranked the characteristics they considered most important as literacy, trainability, knowledge, familiarity with the area, trustworthiness, availability, and commitment. These qualities encompass many of the criteria still used today in countries where CAHWs are active. In some cases, these criteria have been formalized, sometimes by public veterinary services and sometimes by development partners (see sidebar: Examples of Criteria for Selecting New CAHW Candidates below).

Examples of Criteria for Selecting New CAHW Candidates

Project implementers often formulate their own selection criteria for choosing CAHW candidates. For instance, Heifer International has published in-house guidelines on selecting new CAHW candidates in the countries where it works. These criteria require that the candidate:

- Have a letter of recommendation from a local veterinarian;
- Be engaged in or interested in livestock;
- Can read, write, and perform simple arithmetic;
- Have some business, farm management, and leadership skills;
- Have some access to credit for business purposes.

In the 2015-2020 LLRP IV project in Somalia’s Gedo region, CAHW candidates were selected according to:

- Mutual approval of the candidate by the community, local authorities, the regional livestock owner association (SOWELPA), and the implementing partner (VSF Suisse);
- Residence in the local community they will work with;
- Ownership of livestock or engagement in livestock production;
- Hardworking, trustworthy, and enjoying good relations with the community.

In Cambodia, the government requires CAHWs to be 18 years or older, able to read and write, in good health, and reside in the communities they will work with. In addition to these criteria, AVSF programs that train new CAHWs require candidates to be under 45 years old, not work outside of their communities for long periods, have experience raising one’s own livestock, and not have other employment.
4.2.1 Selection process

This literature review suggests that the importance of a participatory approach to CAHW candidate selection is recognized, if not always adequately utilized, by most development partners today. The meaningful participation of all stakeholders, but most importantly local communities, in the choice of criteria and in the selection of CAHW candidates based on those criteria was an important recommendation stemming from a recent study of CAHWs in Ethiopia. In Nepal, in some instances CAHW candidates appear to have little or no intention of practicing as CAHWs at the end of the project that recruited them. The involvement of communities and local leaders can recognize and eliminate such potential candidates much more effectively than other stakeholders can.

Participatory methods are not always used. In Lao PDR, for example, CAHW candidates are sometimes chosen solely at the discretion of the village head and a small number of other village authorities. Villagers may be given little or no say in the selection process.

More commonly, however, participatory methods of some sort tend to govern CAHW candidate selection processes. As part of the recent One Health Program (OHP) in Sierra Leone, a single CAHW candidate was chosen from each of 325 communities following community discussions attended by officials from the Ministry of Agriculture, Forestry and Food Security (MAFFS). Additionally, a longer list of potential CAHW candidates was generated from discussions between local politicians and the paramount chief of the area. All participants were informed of minimum selection criteria beforehand. Interestingly, the paramount chiefs – many of whom did not live in the communities from which the CAHWs were chosen – tended to choose CAHW candidates with stronger ties to their communities than those candidates chosen by the community members themselves.

In Burkina Faso, community members, livestock agents, donor project staff, and livestock owner associations all frequently have a say in candidate selection. And recent experience from the LLRP IV project in Somalia’s Gedo region found that CAHW candidate selection and community trust in the CAHWs was improved when the project implementer explicitly confirmed that candidates chosen in a participatory manner indeed met the selection criteria. Community trust in CAHWs was further reinforced when communities clearly understood how CAHWs were selected, how they were to be trained, and what their roles and responsibilities would be.

The criteria used in selecting candidates for CAHW training are important if CAHW standards are to be of adequate quality and if CAHWs are to have the confidence of the communities among which they work. The appropriate criteria will differ between and sometimes even within countries, depending on factors unique to each place. The literature review suggests that CAHW programs have a greater chance of success when the criteria for CAHW candidate selection are established through a participatory process in which all stakeholders have a say. It is possible that this increases transparency and promotes buy-in to the program by stakeholders, leading to greater trust in the CAHWs and demand for their services.

4.2.2 Age

CAHW candidates in most countries tend to be in their 20s and 30s, but few countries appear to apply an age limit or range as a selection criterion. All 94 CAHWs employed in the FAGNATSARA project (2015-2018) in Madagascar were under 35 years old. A 2019 study in southern Lao PDR recorded CAHW ages ranging from 23 to 57 years old, with a mean of 44 years. There is a common belief that while youths tend to be more dynamic, enthusiastic, and mobile as CAHWs,
they may be less experienced, enjoy less confidence from villagers, and are more likely than older CAHWs to leave CAHW work and move to urban areas for better employment opportunities.20,25

4.2.3 Literacy and education level

CAHWs who are expected to sit through a certain amount of theoretical training, read and interpret drug labels, keep written records of activities, and perform basic financial book-keeping will experience difficulties if they are unable to read and write. Yet in many areas where CAHWs are most needed, literacy is uncommon.

Requirements for literacy and minimum education levels vary sometimes considerably between countries, regions, and even projects. Areas with little or no formal education infrastructure by necessity tend to have few or no CAHW candidate selection criteria related to literacy or education. This is generally the case in Uganda’s Karamoja region58 and in much or all of Somalia, where the 2015-2020 LLRP IV project in Gedo region for example favored but did not require CAHW candidates to be literate57. In South Sudan around the time of its independence in 2011, CAHW candidates were meant to be literate, but literacy was defined as “having oral knowledge”59. A more traditional definition would have made recruitment difficult.

A small survey of CAHWs active in Burkina Faso in the 2010s showed that 27% were literate in their native language, 33% had finished primary school, and 23% had completed secondary school25, suggesting that literacy was not a requirement for CAHW candidates. In Nepal, CAHW candidates are required by the public Department of Livestock Services to have at least 10 years of education, however compliance has not been possible in all areas of the country43,127. A 2019 study in southern Laos PDR found that 83% of CAHWs surveyed were literate, though the variation between districts was considerable, with some having CAHW literacy rates of only 25% and others of 100%39. This variance likely reflects different levels of community access to education rather than different policies on CAHW selection. Vietnam has perhaps the highest average education level for its CAHWs. Except in a few very remote areas, CAHW candidates there are selected from among existing livestock technicians who, by definition, already have a livestock-related degree10.

A 2014 evaluation of CAHWs in the Horn of Africa found that illiterate CAHWs were not significantly hampered by the inability to read the label information on antimicrobial packaging, which is a common concern cited for the use of illiterate CAHWs. The study found that illiterate CAHWs were able to find a literate person in the community to read the label for them14. This does not necessarily suggest that literacy is not a factor in CAHW performance, however. In Uganda, the high number of CAHWs that rate poorly in technical knowledge is speculated to be associated with low education levels among those CAHWs51.

Literacy and education requirements appear to be prominent considerations in criteria selection. These must be determined by individual countries according to their specific circumstances and needs. While there is evidence that illiterate CAHWs can provide basic animal health services effectively, they are undoubtedly more limited in certain important aspects such as reading drug labels, seeking information from written sources such as websites or books, and keeping veterinary and financial records. It seems feasible that literacy and education requirements might be set at the highest levels that still allow enough CAHW candidates to be recruited into the program. The recruitment of traditional livestock healers as CAHW candidates may also be considered in areas where they are active.

4.2.4 CAHW numbers and distributions

The number and distribution of CAHWs in a geographical area are critical to the sustainability of CAHWs systems. Too few, and needs are not met, while too many, and competition makes it impossible for any to be financially viable as CAHWs.

Public veterinary services and their development partners must consider the normal drop-out rate of CAHWs (through retirement, emigration, taking up other employment opportunities…), that some CAHW candidates will not pass the training program, that some CAHW trainees do not intend to work as CAHWs, and that many CAHWs will have other, usually more important, sources of income than that provided by their CAHW activities, meaning they work only part-time as CAHWs7.

This literature review suggests that the lack of coordination between projects and with stakeholders, as
well as inadequate planning, are important contributors to the presence of CAHW numbers that are poorly adapted to the area.

In parts of Madagascar, newly trained CAHWs have faced stiff competition from vaccine workers and VPPs employed by the public veterinary services, contributing to low incomes from CAHW work. A 2016 study in Karamoja, Uganda, supported by FAO mapping from 2011, showed large numbers of the region’s estimated 600 CAHWs clustered in a few towns, waiting for the next donor project to employ them while pastoralist communities simultaneously described CAHW services as mostly inaccessible to them. While other factors may contribute to this phenomenon (such as insecurity in rural areas), the absolute number of CAHWs is well above that needed for the region.

In Afghanistan, examples are given of several NGOs moving into the same district or village and each trains a group of CAHWs (that do not meet the official definition of basic veterinary worker as set forth by the Animal Health Law of 2017). This results in large numbers of informal animal health workers competing with the basic veterinary workers in a single district or even in one village, destabilizing animal health services there.

There are examples in which strong consideration has been put into the number of new CAHWs trained. Over 11,500 CAHWs had been trained in Lao PDR up to 2011. A 2019 study in three southern provinces found 1 CAHW present in every village visited and calculated that there was one CAHW for every 67 households on average. Nearly three-quarters of villages visited had 2 CAHWs present. And the FAGNATSARA project in Madagascar chose to train 94 CAHWs, based on each CAHW working in an area with a 10-kilometer radius that could be covered on a bicycle.

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### How Many CAHWs Are There?

While absolute numbers of CAHWs in a country do not give the whole picture, they can suggest trends. The numbers below are broad estimates taken from sources consulted as part of this literature review and in most cases do not take into account how many trained CAHWs are no longer active as CAHWs. In some countries, the total is influenced by large numbers trained for rinderpest eradication, a large percentage of which are no longer active as CAHWs.

**Africa:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>&gt;1400</td>
<td>10</td>
</tr>
<tr>
<td>Horn of Africa (total)</td>
<td>&gt;15,000</td>
<td>Up to 2004</td>
</tr>
<tr>
<td>Sudan</td>
<td>5165</td>
<td>10</td>
</tr>
<tr>
<td>South Sudan</td>
<td>1570</td>
<td>2017 by FAO</td>
</tr>
<tr>
<td>Uganda</td>
<td>&gt;1100</td>
<td>A high portion trained for rinderpest</td>
</tr>
<tr>
<td>Tanzania</td>
<td>&gt;2000</td>
<td>10</td>
</tr>
<tr>
<td>Dem. Republic of Congo</td>
<td>70</td>
<td>Trained by VSF Belgium, North Kivu; others exist elsewhere</td>
</tr>
<tr>
<td>Burundi</td>
<td>ca. 1,500</td>
<td>10</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>105</td>
<td>Up to 2017, plus 4,000 village vaccinators</td>
</tr>
<tr>
<td>Senegal</td>
<td>1000-1500</td>
<td>10</td>
</tr>
<tr>
<td>Togo</td>
<td>2500-3000</td>
<td>Estimated 10</td>
</tr>
<tr>
<td>Mali</td>
<td>1000-2000</td>
<td>10</td>
</tr>
<tr>
<td>Madagascar</td>
<td>200</td>
<td>Trained by AVSF, probably more elsewhere</td>
</tr>
</tbody>
</table>

**Asia:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>&gt;12,000</td>
<td>Up to 2019</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>&gt;11,500</td>
<td>Up to 2011</td>
</tr>
<tr>
<td>Vietnam</td>
<td>23,553</td>
<td>Up to 2017</td>
</tr>
<tr>
<td>Mongolia</td>
<td>27</td>
<td>All trained by AVSF</td>
</tr>
<tr>
<td>Nepal</td>
<td>15,000</td>
<td>Up to 2011 of which 26% believed to be active</td>
</tr>
</tbody>
</table>
The over 14,000 CAHWs trained up to 2019 in Cambodia were part of the Ministry of Agriculture’s goal of having one CAHW in each village, an objective it has nearly met. A different approach has been used recently in Nigeria, where the Veterinary Council of Nigeria charges CAHW candidates in Benue, Kaduna, and Jigawa states a fee (the equivalent of about US$ 35) to attend CAHW candidate training. The fee helps to attract highly motivated candidates and helps cover some of the costs of the training, which are conducted by each state’s Department of Veterinary Services. This strategy places a greater burden on CAHW candidates to determine whether they can make a viable business from CAHW work, helping to regulate the number of CAHW candidates.

The literature review suggests that the number of new CAHWs trained in an area is important to avoid imbalances in the geographical distribution of CAHWs. Both too few and too many CAHWs hinder animal health service delivery. The examples of Lao PDR and Madagascar (FAGNATSARA) in the literature review provide useful starting points for assessing how many, if any, new CAHW candidates to train in an area. The optimum density of CAHWs will vary greatly from place to place and depends on many factors, including human and livestock density, livestock production systems, community awareness of the benefits of animal health care, ease of transport, cold chain and other infrastructure, and presence of other animal health service providers.

Training more CAHWs is not a viable solution to high turnover or large numbers of inactive CAHWs in an area. In many cases, high turnover and inactivity are the result of too many CAHWs. To promote the sustainability of private CAHW service providers, it might be advisable to prioritize quality over quantity. Providing fewer CAHW candidates with longer trainings in technical and business topics can improve CAHW capacities and limit overwhelming competition between them.
4.3 CAHW TRAINING PROGRAMS

While clear competency and curricula guidelines have been published by WOAH for the training of veterinarians and VPPs, such guidance does not yet exist for CAHWs. Lack of standardized CAHW training programs that establish minimum requirements for the duration, course content, qualifications of trainers, objectives, and teaching approaches result in CAHWs with highly variable levels of skill and knowledge operating in the same country or sometimes the same district. Further, CAHW training curricula can differ significantly within countries, with some projects providing training only in very restricted subject matter usually related to some important project activity such as poultry or ruminant deworming. Yet these graduates may still be referred to and treated as CAHWs.

Literature review findings suggest that training is the cornerstone of successful CAHW programs as it impacts heavily on technical knowledge and skills and should also convey essential entrepreneurial skills. Poor training leads to low technical and business competencies, lack of confidence in CAHWs by public veterinary authorities, private animal health actors, and, most importantly, livestock owners, and consequently low demand for CAHW services.

4.3.1 Trainers

CAHW training instructors set the tone for the quality of CAHW competencies achieved. Training-of-trainers is clearly a critical aspect of providing good quality CAHW training. Evaluation of individual CAHW performance as part of the STI LEAP project (2002-2007) in Ethiopia showed that CAHWs were significantly more likely to be rated as “good” or “very good” when they had been trained by more qualified instructors, in this case veterinarians or animal health assistants. CAHWs receiving lower ratings were more likely to have been trained by less qualified instructors, i.e., animal health technicians or CAHWs.

The choice of training instructors can also impact CAHW performance post-training. For example, it is suggested that CAHW trainings in Karamoja, Uganda that did not involve private veterinarians as instructors reinforced mutual distrust and competition between CAHWs and private veterinarians.

Some countries have established criteria for CAHW trainers, while many others have not. Ethiopia established an official training-of-trainers manual in 2009. In Tanzania, a draft curriculum for CAHW training calls for veterinarians or VPPs acting as training instructors to have received training as a trainer, to have at least two years of experience working in animal health, and to be recognized by the Tanzania Veterinary Council. In Cambodia, a 2001 sub-decree on the creation and regulation of CAHWs requires CAHW training instructors at a minimum to have a degree from a secondary animal health and production technical school and to have three or more years of experience working in animal health. In addition, the decree calls for CAHW trainers to be accredited and monitored by a committee established for that purpose by the Ministry of Agriculture's Department of Animal Health and Production.

In at least one case where CAHW training conducted by local actors continued after the end of a donor project, the quality of CAHW training reportedly declined in the absence of external funding. While diminished resources may partly explain this phenomenon, it nonetheless suggests that providing for ongoing support and regular continuing education for instructors can strengthen training quality control.

To be sustainable, the role of the private sector and public veterinary services in either initiating or managing ongoing training needs to be considered. With this goal in mind, in Cambodia the NGO AVSF organized CAHW training instructors into a national NGO called Rural Veterinarians of Cambodia, with the intention that this entity would take responsibility for CAHW training programs in the future.

In Myanmar, the public sector occupies a strong role in CAHW development, with the Livestock Breeding and Veterinary Department training some 1400 CAHWs in townships around the country. Similarly in Nepal, the Department of Livestock Services (DLS) trains more CAHWs than do NGOs. Training is managed by Nepal’s Regional Livestock Services Training Centers upon request and payment by DLS, NGOs, the Council for Technical Education and Vocational Training, or Village and
In Guinea, at least three similar CAHW training centers trainings, when requiring overnight stays, this poses a significant barrier to the recruitment of women to attend these facilities or conference facilities rented by the hour or day within the project area.

Donor projects most often conduct training at project facilities or conference centers rented by the hour or day within the project area. When training is held far enough away from where the CAHWs live, particularly when requiring overnight stays, this poses a significant barrier to the recruitment of women to attend these trainings. In Guinea, at least three similar CAHW training centers are operated by the government (in Faranah, Dalaba, and Mamou) and possibly two more, the Institute of Agricultural Research and the Labé Center for Livestock Training. In Niger, some CAHW trainings are conducted at a center in Maradi, while 6-month CAHW training programs in Mali are conducted by an accredited training institute and typically held in Gao and Ségué by the Ecole secondaire agropastorale de Ségué. In South Africa, the KZN GAP project (2016-2021) held refresher trainings for CAHWs at dip tanks.

### 4.3.3 CAHW training curricula

Standardized CAHW training curricula that establish minimum standards are important if CAHWs are to earn the confidence of animal health stakeholders. Several countries have developed national CAHW training curricula that any entities training CAHWs in the country are meant to follow.

A national CAHW training strategy and curriculum were developed in Guinea in 1992 and endorsed by the National Livestock Office. Ivory Coast’s Office of Veterinary Services published a CAHW training program by the early 2000s. Chad developed a training curriculum in 1993, updating it in 1996 and 2017. In 2020, ICRC hired a consulting firm to work with the Ministry of Livestock in Chad to again update the curriculum. The Veterinary Council of Nigeria has recently approved a national CAHW training curriculum, which is already being used by the EU-funded LIDISKI project (2020-2024) in northern Nigeria.

Madagascar’s public veterinary services developed its first CAHW training curriculum in 2016, which was validated in January 2022 following long debate over its content. The public Agriculture Skill Council of India led the development of a training curriculum for CAHWs in 2015, in consultation with animal health stakeholders.

In other countries, development partners involved in CAHW programs may use CAHW training manuals developed either in-house (e.g. Heifer International, the various national VSFs), by AU-IBAR (which published a manual for African countries in 2006), by FAO (e.g. VSF Suisse in the recent LLRP IV project in Somalia), by the European Union, or sometimes by other NGOs (e.g. the VSF Belgium training manual initially developed for Niger and popular in West Africa; the training manual developed by the Small Scale Livestock & Livelihoods Program and widely used in Malawi).

In nations without standard curricula, the divergence in training can be significant between donor projects,
many of which may be conducted hurriedly and with little thought. In Uganda’s Karamoja region, for example, many CAHWs were trained through various NGO projects with highly variable standards for recruitment, training quality, and the curriculum taught. Many such trainings were taught by poorly qualified instructors and focused on classroom-based learning rather than hands-on teaching that would better suit learning for illiterate or semi-literate trainees. Some training even included livestock owner participants alongside the selected CAHW candidates.

This situation may explain the low trust in CAHWs by livestock owners surveyed in seven districts of Karamoja in one 2017 study. The same study found that a majority of the 204 CAHWs observed was not able to identify the class of various common acaricides, and a significant number lacked adequate knowledge to determine drug doses, manage a cold chain, administer vaccines, and manage ticks and tick-borne diseases. To improve this situation in Uganda, in 2016 the NGO Mercy Corps contracted the College of Veterinary Medicine at Makerere University (Kampala) to formulate a standard CAHW training manual, which appears to be widely distributed currently among donor programs in Karamoja.

CAHW training programs, whether officially endorsed by the state or on an ad hoc basis by donor project implementers, generally aim to teach CAHW candidates both theoretical knowledge and practical hands-on skills in basic animal health care relevant to small-scale and extensive livestock production systems. Cattle, sheep, goats, and, where present, pigs and sometimes camelids are the main focus of most training programs. Poultry is often included, especially in West Africa and Southeast Asia, but may be glossed over quickly, for example in East Africa.

The premise of these trainings is that the health problems of livestock in extensive production systems are typically limited to a handful of infectious diseases, plus internal and external parasites. CAHWs that can diagnose, treat, and help prevent these few common pathogens and parasites with relative success can significantly decrease livestock morbidity and mortality rates.

AU-IBAR published a CAHW training curriculum in 2006 for use in West and Central Africa. It proposes a set of core competencies to be taught to every CAHW candidate in basic animal health care, including common transboundary animal diseases and parasites. In addition, it recommends that each country, and sometimes regions within countries, should include instruction on location-specific diseases and other animal health problems.

While CAHW training programs vary greatly in duration, the technical subjects taught during those trainings tend to be similar. Topics include: basic animal anatomy and physiology; animal restraint; physical examination; veterinary drugs (sometimes including ethno-botanical drugs); vaccines, and stock management of these pharmaceuticals; the diagnosis and treatment of helminths and other internal parasites, ticks and other external parasites, and common animal diseases including zoonoses; basic first aid and wound care; and basic record-keeping (for CAHWs to submit reports to supervisors). Longer training programs may include instruction in animal breeding (occasionally artificial insemination, especially in India and Bhutan), toxicology, and castration techniques. Nutrition, housing, and reproduction may also be taught to allow CAHWs to share good practices and provide broader advice to their clients.

One Health concepts play an increasingly prominent role in livestock projects (see section 5.3) and some CAHW training programs reflect this. In South Sudan, for example, VSF-run CAHW training covers public health topics including zoonotic diseases but also human epidemic diseases that CAHWs could potentially recognize and report during their visits to cattle camps.

More diligent training programs include a significant portion of course work in business development, including entrepreneurship, business management and planning, budgeting, accounting, and marketing of CAHW services and products. Some training manuals feature specific modules on business skills and management, teaching how to calculate profits and losses,
the principles of cost-recovery services, and explaining why livestock owners should pay for services received from CAHWs. Business skills appear to be critical for the sustainability of CAHWs (see section 7.3).

Other topics occasionally offered in some manuals include the respective roles and responsibilities of CAHWs, VPPs, and private and public veterinarians. Furthermore, some training manuals in Niger, Tanzania, and Ethiopia encompass specific modules on extension services, teaching sensitization techniques and participatory approaches. The recently approved CAHW standards in Madagascar include a specific 16-hour module on communication skills addressing oral and written expression techniques. Heifer International recommends a full day’s course work in ethics and code of conduct.

4.3.4 Duration of training

The time spent in training affects the quality of CAHW skills and knowledge. Yet ideas on what constitutes “adequate” time vary greatly between development partners. Evidence that training duration impacts CAHW quality can be seen in the FAGNATSARA project in Madagascar (2015-2018). CAHW candidates were trained for 12 weeks except those in Bekily district, where training was significantly shorter. Not surprisingly, the CAHW candidates in Bekily experienced lower exam pass rates than those who received longer training. AVSF also found that CAHWs that had undergone previous animal health training of from 2 to 6 weeks conducted by other NGOs demonstrated a higher success rate in passing the final exam for the FAGNATSARA project’s 12-week CAHW training.

In Burkina Faso, rather than completing the entire training on consecutive days, individual instruction sessions of 3-5 days each were spread over many weeks, with breaks in between each session presumably to allow attendees to return home to help with livestock or farming work.

In Myanmar, the Livestock Breeding and Veterinary Department (LBVD) currently provides two distinct training programs, based on the CAHW candidates’ age, education, and previous experience working with the LBVD. The curriculum is the same for both groups, however the program for younger, less experienced trainees lasts nine months (comprised of 20 days of classroom work and 8 months of practical field work), while the program for older, more experienced and/or better educated trainees lasts only five months (10 days of classroom work and 4.5 months of practical work). This allows instructors to go over the material more slowly and thoroughly for the first group.

Guidelines for Duration of New CAHW Training Programs

2003 AU-IBAR policy document recommends no less than 14-21 days.

Heifer International’s in-house guidelines: 70 hours of classroom learning and 40 hours of practical field application learning, to be spread over 2 weeks.

Lao PDR: training duration is not standardized. Some recent donor projects have trained as little as 1-3 days; in a few cases CAHWs received no training. A 2019 survey in southern Lao PDR showed a range of 1-15 days, with 4 days being the average.

Cambodia: government requires 25 days minimum.

Nepal: government requires 5 weeks in order to receive CAHW certificate.

India: 3 months training provided by Agriculture Skill Council of India.

Afghanistan: 4 weeks training provided by Dutch Committee for Afghanistan.

Burkina Faso: 2 weeks provided by ICRC; other projects train from a few days up to 12 weeks.

Chad: 10 days provided by government / ICRC in Lac Province.

Mali: up to 6 months offered by ICRC.

Niger: government provides 15-25 days; VSF Belgium offers 25 days over 7 weeks.

Dem Rep. of Congo: 6 days provided by recent LUSAPEL project.

Ethiopia: minimum 21 days required by government guidelines.

Uganda: 1 month or less is most common.
The division of the CAHW training program into several sessions of a few days each, as described for Burkina Faso, appears to offer several advantages. It allows trainees time to process and absorb what they have learned between sessions and prevents long absences from home during which time domestic and other work responsibilities cannot be met. Such long absences make it especially difficult to recruit women CAHW candidates.

4.3.5 Teaching approaches

While CAHW training manuals typically offer detailed course material to cover, they rarely address pedagogic approaches to maximize training effectiveness. Good practices in conducting CAHW training courses for adult, semi-literate to illiterate trainees have been described in the literature. These involve concentrating on the use of participatory adult learning methods and hands-on practical instruction while de-emphasizing classroom work. This ‘learn-by-doing’ approach to training, taught in the local language of the CAHW candidates, is used by many development partners engaged in CAHW training. As noted by one VSF Canada instructor in Lao PDR, “Time in the field with a small number of CAHWs is more expensive and time-consuming, but CAHWs retain much more information” than in the classroom.

AU-IBAR’s 2003 policy recommended that a minimum of one-half of the training duration for CAHW candidates consist of practical sessions. A 2017 study of various CAHW training programs in Burkina Faso found that the ratio of theoretical (classroom) to practical (field) instruction was typically about 50:50 or 60:40 and participatory teaching methods were used often. The size of training cohorts is rarely mentioned in the literature, however this study reported that training sessions in Burkina Faso typically contained from 10 to 30 participants. Each trainee was given a course manual as a learning aid during training, and for later use as a reference and to assist in community awareness activities. The AU-IBAR policy document recommends a maximum of 15 trainees per instructor.

The Water & Land Resource Center in northwestern Ethiopia includes as part of its participatory CAHW training techniques the use of focus group discussions, brainstorming and question-and-answer sessions, visual aids, and case studies, alongside abundant practical training involving physical examination, diagnosing, and treating livestock under the supervision of an instructor.

As in Burkina Faso, CAHW trainees in Ethiopia receive a course manual, but illustrations in the manual are lacking, possibly taking away from its effectiveness.

In Uganda’s Karamoja region, it has been noted in the past that CAHW trainings have focused excessively on classroom work, to the detriment of often illiterate trainees. Additional challenges are posed by the lack of veterinary equipment and drugs for trainees to use during practical sessions, an emphasis on livestock housing, breeding, nutrition, and other husbandry topics and not enough on animal disease diagnosis, treatment, and prevention.

In Lao PDR in 2012, CARE International experimented in Sayaboury Province with a CAHW training program that included training numerous groups of 2-3 CAHW candidates each on a specific, but different topic. Each group then instructed the other CAHW candidates on the topic they had learned, with assistance from training staff. CARE found this peer-to-peer training approach provided strong motivation to the CAHW candidates and reinforced relationships and networking between them that endured beyond the training.

CAHWs trained through FAGNATSARA in Madagascar were required to pass a final exam administered by the public Regional Livestock Services. Ethiopia’s Water & Land Resource Center requires a final assessment of CAHWs. And CAHWs trained by Heifer International in India must pass a “skill test process” involving both theoretical and practical knowledge and skills before being authorized to administer drugs and vaccines. However, information on the requirement to pass an
exam and the depth and quality of knowledge and skills tested in these exams for most other CAHW candidate training programs is not readily accessible.

We found that significant variation in training curricula, duration, locations, and teaching approaches translates into variation in the quality of CAHW skills and knowledge. Establishment of CAHW training standards at the national level would likely improve and harmonize the level of CAHW skills and clearly distinguish CAHW trainings from those of other categories of animal health workers. Standards should include core competencies in technical, business, and ethics topics; minimum number of hours of training in each subject; ratio of classroom: practical field work or minimum number of hours for each; cohort size or number of students per instructor; and equipment and materials to be available during training.

Pedagogical approaches often seem to be neglected in CAHW training programs. The peer-to-peer training technique used in Lao PDR in which highly motivated CAHW candidates are identified, trained intensively, and then used to train other CAHWs under the supervision of an instructor has the potential to scale successfully to other countries.

4.3.6 Refresher training

The duration of CAHW refresher training varies considerably between countries and training programs. Refresher training, in the absence of formal national standards, is sometimes absent or occurs at irregular intervals based on availability of time and budget resources and is often of questionable quality and duration\(^\text{25,44,45}\). Refresher training is critical for CAHWs, as for all animal health workers, to help sharpen existing skills and learn new ones, to recognize and correct poor habits, adapt to changing circumstances, and keep current on new recommended practices\(^\text{59}\). The content of refresher courses in most countries and projects is unclear, which is not surprising given that these tend to vary according to the needs of CAHWs at a specific time and place.

One survey of 46 CAHWs in South Sudan showed that poor motivation, low income, and high drop-out rates were linked to loss of technical knowledge due in part to lack of refresher training\(^\text{59}\). Refresher training and its content and duration in South Sudan are typically at the discretion of the training provider, and end – if they were ever conducted – at the termination of a donor project until another development partner offers refresher training as part of a new project\(^\text{59}\). In Chad, ICRC has attempted to mitigate this problem by promoting more government engagement in initiating CAHW refresher trainings\(^\text{77}\).

The European Commission for the Control of Foot-and-Mouth Disease (EuFMD) provides numerous virtual learning tools for personnel in the animal sector, including platforms such as Whatsapp™ or Facebook™ for discussion forums, learning platforms like Moodle and Thinkific, along with Zoom™ calls and Google docs. While these tools are not specifically used for either initial or refresher training of CAHWs, some of the lessons learned may be useful for any future use of virtual learning in CAHW refresher trainings (and possibly as a small

Guidelines for Duration of CAHW Refresher Training

While the recommended duration of refresher training can sometimes be found, guidance on the frequency of refresher training is less forthcoming.

AU-IBAR: recommends a minimum of 5-10 days of refresher training once a year in its 2003 Policy Document on CAHWs\(^\text{36}\).

Ethiopia: lacks national regulations on refresher training\(^\text{19}\).

Uganda: lack of coordination results in some CAHWs with too much refresher training and others with none\(^\text{51}\).

Lao PDR: a 2019 study revealed that 69% of CAHWs surveyed had never received refresher training. Of those that had, trainings were several years apart and lasted 1-3 days\(^\text{39}\).

Niger: the training center in Maradi offers refresher training lasting 5 days\(^\text{45}\).

Cambodia: a 2008 study of 445 CAHWs in 19 of Cambodia’s 24 provinces found that over 75% received refresher training on a yearly basis and more than 40% attended refresher training every 6 months\(^\text{12}\).

Heifer International: recommends 5-6 day of refresher training\(^\text{56}\).
Component of initial CAHW candidate trainings). Virtual learning trainings should utilize user-friendly, sustainable technologies that trainees can access with relative ease. If the internet is used, connectivity must be reliable and with adequate bandwidth, internet access fees must be considered, and web page design should be simple to reduce download times and costs. In addition, local, accessible IT support must be available to trainers and trainees alike. A short computer literacy course should be considered in the initial stage of training.

Our review suggests that refresher training should be adapted to the local animal health and disease context, which may differ between and within countries. This can be determined through a needs assessment that includes disease prioritization by community members. These better targeted refresher courses should better adapt CAHWs’ knowledge to their specific context, increase demand for their services, and reinforce sustainability.

4.3.7 Financial and material incentives for CAHW trainees

Many development partners pay CAHW candidates a stipend for attending CAHW training, both initial and refresher. For training programs lasting several days or weeks, many trainees cannot afford to be away from work (whether caring for family livestock or at an existing job) without some form of income during their absence. For shorter training programs, especially in emergency interventions, stipends may be offered to simply attract enough CAHW candidates for the work at hand.

An alternative approach has been tried in Nigeria. CAHWs recruited by the recent FCDO-funded Propcom Mai-karfi project (2012-2021) were trained by their respective State Department of Veterinary Services. Not only did these candidates receive no stipends as part of their training program, but they were required to pay the equivalent of about US$ 35 in attendance fees to the Veterinary Council of Nigeria to help cover the training costs. Nothing about these CAHW trainings is offered or communicated as “free”, even if subsidies are embedded in the system, so CAHW candidates seem to have no expectations of any hand-outs when they apply. For motivated candidates who cannot easily come up with the fee, a handful of options are offered. These include the possibility of partial payment by the candidate, with the balance paid by an interest group such as an NGO or the government. In other cases, the training fee can be incorporated into an input loan to the candidate that is paid back over time. Though not applied to CAHWs per se, Propcom Mai-karfi piloted a community vaccinator’s model in Nigeria that had pharmaceutical companies pay for the training program. Each trainee had to commit to purchasing a minimum quantity of veterinary drugs after the end of the training program. CAHW candidates present themselves in sufficient numbers to fill the animal health care needs in the three states where the fee-based system is operational.

It is also common practice to hand over a start-up kit to newly graduated CAHWs. Such kits typically contain a supply of common veterinary medications, syringes and needles, a cool box, sometimes a uniform and gum boots, and other basic veterinary equipment. The assumption is that most new CAHWs will not have sufficient financial resources to procure these items on their own. While some development partners continue to restock CAHWs with drugs and some equipment at no charge going forward, most expect CAHWs to use a portion of their income from CAHW activities to restock their inventories on their own after the initial starter kit is depleted.

While it may be necessary to provide some level of stipends, expense reimbursements, provision of free drugs and equipment as starter-kits or for restocking, and other material or monetary enticements to CAHW candidates to enable them to attend trainings, these also attract candidates with low motivation and poor entrepreneurial skills. Ideally, such assistance should be significant enough to overcome reasonable financial obstacles to attending trainings and engaging in CAHW work, but low enough to avoid attracting unmotivated candidates interested only in obtaining the stipends and free inputs. Finding a balance is undoubtedly not easy. Requiring some form of cost-share from CAHW candidates for help with setting up their business (e.g., stocking drugs and equipment) can further dissuade poorly motivated candidates. In some cases, payment to attend CAHW training may be advisable, as is reported to be successful in the Propcom Mai-karfi project in Nigeria. Whatever policies are used, making them very clear to potential CAHW candidates before their selection can help eliminate candidates that are less serious about working as CAHWs for the long run.
Effective monitoring and supervision of CAHWs help maintain and improve CAHW performance, limit misconduct, strengthen the credibility of and stakeholder confidence in CAHWs, better harmonize CAHWs’ knowledge and skill levels, and establish a chain of command that is necessary for efficient animal health service delivery. CAHW motivation may be positively linked to the capacity of public or private animal health services to supervise them. This may be because supervisors often provide technical advice, encouragement, and mentoring for CAHWs. And good supervision and monitoring of CAHWs is essential if public veterinary authorities and policy makers are to support initiatives to offer legal status to CAHWs.\(^5,11\-13,38,51,59\)

Supervision means taking some responsibility for a CAHW’s actions, which is not without risk for the supervisor. For supervision and monitoring to be effective, this literature review suggests that mutual trust between public and private veterinarians and CAHWs is critical. Each must respect the role played by the other and conflicts of interest must be eliminated or mitigated.\(^5,38\)

Public animal health authorities and development partners vary widely in their criteria for adequate CAHW supervision and monitoring. Establishment of a formal framework for CAHW supervision and monitoring requires engagement by relevant ministries and public veterinary services, veterinary statutory bodies, other professional veterinarians and animal health worker entities, donors, NGOs, and other development partners. Supervision works best when it is finely balanced between protecting consumers of CAHW services without making the costs of compliance with regulations too high for CAHWs to operate viable businesses.\(^40\)

In the absence of a formal supervisory framework for CAHWs, a few donor projects provided minimum supervision or monitoring of the CAHWs they trained or contracted for work. In other cases, supervision and monitoring protocols put in place by projects were not used systematically by the CAHWs, reports were not turned in regularly to the supervisor, or the information being turned in was disorganized and confusing to interpret for the supervisor.\(^20,79\)

Where good CAHW supervision and monitoring mechanisms exist, development partners in many instances do not have a viable exit strategy. In these cases, the system tends to stop operating or declines sharply in quality after the end of the intervention due to budgetary constraints of public veterinary authorities or other supervisors. Unless a supervisor is financially rewarded for undertaking this responsibility, they will either not accept it or will not remain engaged in their supervisory duties.\(^5,20,38,63\)

The literature review suggests that lack of an exit strategy for CAHW projects is not always explained by lack of effort by the implementer. In many cases, options for post-project CAHW supervision and monitoring are very limited. Both public and private veterinarians and even VPPs are scarce or totally absent from the remote areas that CAHWs tend to work in. As such, the best candidates for supervising and monitoring CAHWs are not available.\(^57\)

Another obstacle, particularly in the many countries without formal recognition of CAHWs, is the poor relationship that sometimes exists between CAHWs and other animal health professionals (e.g., VPPs, public and private veterinarians, drug suppliers) who often view each other as competitors. In these circumstances, the hierarchy imposed by a supervisor-subordinate relationship may be ineffective and fraught with conflict.\(^11\)

In other cases, public field veterinarians have limited motivation to add supervision of CAHWs to their existing workload. Efforts to raise motivation by paying them to supervise CAHWs are usually considered unsustainable and inappropriate as these veterinarians...
already receive a government salary. In some areas of Cambodia, however, a mutually beneficial relationship has evolved between CAHWs and district veterinarians acting as supervisors. The latter hold monthly meetings with nearby CAHWs to answer questions and offer refresher training. In return, the district veterinarian receives animal disease reports and information on livestock numbers from the CAHWs. Without this assistance, the district veterinarian would find it difficult to provide the livestock census information required by province-level livestock authorities each year. In Nepal, CAHWs are supervised by the head of each District Livestock Service Office. However, the number of supervisors is insufficient for this task. This may partly explain the issue of late or no reporting by CAHWs to supervisors in Nepal.

The supervision of CAHWs by the communities they serve has been tried in some settings and with varying success. CAHWs, as with anyone, tend to feel most accountable to those they perceive as providing their main source of income. In Guinea in the past, livestock rearing associations participated alongside public and private veterinarians in the supervision and monitoring of CAHWs. The associations assessed CAHWs’ technical performance and ethics, and could successfully request that the public veterinary authority revoke the license and right to practice of a CAHW facing multiple complaints. The District Section for Animal Resources registered all trained CAHWs at district and sub-district levels in Guinea, kept a file with a photograph and list of training dates and subjects studied, and issued each CAHW with a professional identity card. This card could be revoked in the event of misconduct, temporarily or permanently, and the case of misconduct noted in a ministerial decree. In parts of Ethiopia, however, efforts at community participation in monitoring of CAHWs appear to have enjoyed less success. Veterinary Supervisory Committees made up of various community members were established in pastoralist districts bordering Kenya and Somalia in the early 2000s. Committee members reportedly engaged only minimally in monitoring CAHW performance and helping address obstacles such as large numbers of inactive CAHWs and problems with drug restocking by CAHWs. More recently, national regulations on the level of supervision are still lacking and CAHW supervision by public veterinary services is limited.

Poor CAHW supervision and monitoring is generally related to lack of resources. Studies in India suggest limited contact between CAHWs and supervising veterinarians in some states. In Lao PDR, government authorities at provincial and district level said recently that they maintain up-to-date records of CAHWs, but that they do not monitor their activities. In a recent survey in Lao PDR’s Saravane Province, all CAHWs questioned said they had no contact with private veterinarians, nor were any private veterinarians present in the four districts studied, suggesting that CAHWs there were not being supervised.

In Burkina Faso, supervision of CAHWs is undertaken only when CAHWs participate in mass vaccination campaigns. Trained CAHWs in Chad receive identity cards issued by the Ministry of Livestock, authorizing the CAHWs to procure veterinary drugs from dispensaries. CAHWs are supervised by field veterinarians within the Ministry of Livestock’s Animal Production and Pastoralism Development Office. However, lack of budgetary resources, time, and possibly motivation limit the effectiveness of supervision and monitoring in at least some parts of the country. CAHWs in Nigeria are supervised by either a public or private sector veterinarian whose duties also include advising and supplying the CAHW with drugs and other inputs necessary for the job.

In Niger, private veterinarians running rural clinics supervise, provide advice, and supply drugs and other veterinary inputs to CAHWs in their network. CAHWs in turn refer difficult clinical cases to their supervising veterinarian. Local public veterinary services monitor CAHWs, including quality of services provided, adherence to regulations, and correct storage and handling of veterinary products. Like Guinea in the past, livestock owner associations in Niger also participate in these evaluations. In support of these efforts, donor projects have furnished materials for creating CAHW registries and provided financial support to public veterinary services for CAHW monitoring. The result has been strengthened monitoring and regulatory capacity and the improved perception and acceptance of CAHW work by livestock owners and public veterinary services. Nonetheless, deficiencies still exist in the timely submitting of reports by CAHWs and in the supervising and monitoring duties of the veterinarians.

In Rwanda, supervision and monitoring of CAHWs is the responsibility of the public sector, including the District Livestock Head and veterinary technicians. In Uganda, CAHW supervision is informally the responsibility of District Veterinary Officers (DVOs), to whom...
CAHWs are supposed to submit monthly reports on services provided, drug types and volumes administered, prices charged, and animal diseases diagnosed. However, many CAHWs fail to submit regular monthly reports and one survey found that just 55% of CAHWs even keep treatment records. In some cases, DVOs may see the CAHWs they supervise only during mass vaccination campaigns, which can be few and far between.\textsuperscript{21,51,58}

In the Democratic Republic of Congo, VSF Belgium has helped set up local animal health networks in which CAHWs are linked to rural veterinary clinics and work under the responsibility of a private veterinarian who “manages” the CAHW’s work. The CAHWs are further monitored through quarterly inspections by public sector authorities (Agripel – Decentralized Technical Services).\textsuperscript{10}

**Literature review findings strongly suggest that effective supervision and monitoring of CAHWs are important for instilling public confidence in CAHWs. Supervision and monitoring arrangements already exist in many countries regarding VPPs, who typically must work under the direction of a veterinarian. A similar framework for CAHWs to work under the supervision of a veterinarian or VPP should also be feasible in many, if not most, countries, and indeed is being implemented with success already in Niger and Myanmar, for example.**

However, ensuring the sustainability of supervision and monitoring is one of the biggest obstacles to CAHW programs. Ideally, veterinarians and VPPs are needed to supervise and monitor CAHWs, but it is precisely the lack of veterinarians and VPPs that creates the need for CAHWs in the first place. And when veterinarians and VPPs are present, they sometimes view CAHWs as competitors if the latter are not integrated into these existing animal health service systems in a synergistic manner. This can present a potential conflict of interest if these veterinarians and VPPs are to supervise and monitor CAHWs.

Nonetheless, it is important to consider how to attract a minimum number of veterinarians and/or VPPs to at least the periphery of CAHW areas, from which they can practically supervise and monitor CAHW activities. Also important are how best to incentivize them for agreeing to supervise and monitor CAHWs and providing them with a modest budget for necessary resources such as transport and communications, computers, internet access, notebooks, etc.

While daily supervision of CAHWs is impractical in most settings, regular contact between CAHWs and their supervisors is necessary for the proper functioning of the system. Public veterinary services often lack the resources to station veterinarians in such areas and, when they do, there may be a shortage of applicants to fill these positions in remote areas.

Private veterinarians and VPPs often consider the rural areas where CAHWs are present as having insufficient demand for their services and therefore offering minimal business opportunities. Greater awareness of the supportive role that CAHWs can provide to a private veterinary clinic or pharmacy could help attract veterinarians and VPPs to these areas. Examples of this support include CAHWs generating business for the veterinarian by selling drugs and other inputs and referring difficult clinical cases to the veterinarian, as well as CAHW networks allowing the veterinarian to serve more potential clients over a wider geographical area.

If private veterinarians and VPPs can be attracted to these areas, one promising strategy could be a contractual relationship between CAHW and supervisor in which the supervisor acts also as the supplier of drugs and other veterinary inputs for the CAHW.\textsuperscript{38} Such a relationship would require regular contact between CAHWs and their supervisors, facilitating supervision and offering opportunities for answering questions and offering advice.

The literature review reveals mixed results concerning community participation in CAHW monitoring. One suggested approach has been to conduct “upstream” monitoring by a veterinarian focused on technical aspects of CAHW services, combined with “downstream” monitoring by livestock owner associations focused on the impacts of CAHW services and conduct of CAHWs in the communities they serve.\textsuperscript{7,22,63}
4.5 MONITORING, EVALUATION, AND LEARNING IN CAHW PROGRAMS

Monitoring, evaluation, and learning (MEL) related to CAHW programs is important to ensure that progress is being made towards achieving expected results and goals, to identify bottlenecks and other problems that hinder that progress, to recognize any unintended effects, and to build institutional memory. MEL for CAHW programs is similar to MEL for broader animal health services and faces similar challenges. Guidance can be found on the FAO’s Investment Learning Platform website.

Public veterinary services in most countries do not allocate sufficient resources for meaningful MEL of CAHWs. This is more commonly conducted through donor programs and limited to restricted geographical areas.

For animal health services, including CAHWs, MEL frequently focuses on the impact of these services on livestock morbidity and mortality rates. Measuring these impacts can be complex. In relatively “normal” periods (in terms of rainfall, disease outbreaks, political stability), the statistically significant impact of CAHW services on livestock morbidity and mortality rates may be quite small. It is during crises, such as droughts or flooding that negatively impact nutrition and stress levels in animals, that impacts become clearer. A list of common MEL indicators for CAHW programs is given in the table below.

### Determining Monitoring & Evaluation Indicators

Indicators used in monitoring and evaluation of CAHW programs often seek to measure the following:

- CAHW tools and equipment, their condition, maintenance, good use
- Drug and vaccine quality, availability, stocking and handling practices
- Reporting to supervisor, including accuracy, completeness, and timeliness
- Services provided, including range of services, quality, follow-up
- Rate of self-employment and sustainability of CAHWs
- Technical knowledge and skills related to common diseases, treatments
- Livestock owner satisfaction with CAHW services
- Number of clients visited, services performed, price charged, was appropriate action taken, record of visits kept…
- Willingness-to-pay by farmers as measure of perceived benefits of CAHWs
- CAHWs’ geographic coverage – measured by the number of veterinary livestock units/CAHW in an area and the number of active CAHWs/km²
- Equity in access to CAHWs by livestock owners
- CAHW attitudes towards and general relationship with stakeholders
- Supervisor’s impression of the CAHW
- Change in livestock mortality and morbidity rates, by species of livestock
- Change in production, including milk, body condition, eggs laid, herd size

Sources: 9, 14, 19, 23, 51, 59, 80, 127
The preservation of livestock is always of considerable concern when emergencies and humanitarian crises threaten the livelihoods of rural peoples. For pastoralists, animals comprise their primary assets, a source of nutrition, and a source of cash or barter with which to acquire those necessities their animals cannot produce. Farming communities too depend to varying degrees on animals – for draught power, fertilizer from manure, and as a coping mechanism when crops are poor or not yet harvested. The loss of large numbers of livestock would make it difficult, if not impossible, for these communities to return to their former way of life once the crisis has passed.

Veterinary support is a key component of livestock preservation in emergency and humanitarian situations. This support, as defined by the LEGS Handbook, includes clinical veterinary services (e.g., treatment and vaccination of animals) and public sector veterinary functions (e.g., public health, livestock disease surveillance). CAHWs have been instrumental in delivering animal health services to vulnerable communities isolated by disaster. Even governments that do not formally recognize CAHWs sometimes use their services in emergencies.

Nonetheless, livestock interventions in emergencies bring to light some important issues whose effects can extend well beyond the period of the actual crisis they are meant to address. For example, by their nature, emergency interventions do not allow the luxury of time to ensure that new CAHW candidates are trained adequately. When CAHWs are desperately needed but in low numbers, candidates may be recruited quickly and with little scrutiny as to motivation, then trained for a couple of weeks or even a few days, usually focusing on vaccination and drug administration techniques. Because they will likely be closely supervised during the emergency, more in-depth topics integral to being a CAHW may be absent or glossed over quickly. Yet these trainees are called CAHWs and the relatively low quality of their skills and knowledge will influence how people view CAHWs in the future.

A second issue in emergency livestock interventions is the use of free or heavily subsidized products and services with the potential to harm private sector initiatives in the area. When large volumes of vaccines, antibiotics, anthelmintics, and acaricides are brought in by emergency responders and delivered to communities by animal health personnel from outside the area, any animal health clinic or veterinary pharmacy serving the area will be unable to compete with the free or very low prices charged for these products. However, these same private animal health service providers will be especially needed in the recovery phase of the crisis, when emergency responders have left. When these actors then must charge for the same products and services that were provided for free during the crisis, communities are often confused and angry, believing that these providers are still receiving the products for free but charging for them to make an unfair profit at the community’s expense.

One tool that has become more prominent since 2005 is the use of vouchers. NGOs implementing emergency interventions give a voucher with a known value to a household. The voucher can then be presented to a participating private animal health service provider (e.g., agrovet shop, veterinary clinic or pharmacy, CAHW) in exchange for products or services of the same value as the voucher. In this way, local private sector actors are supported rather than circumvented and undermined by the emergency intervention.

The use of CAHWs in emergency and humanitarian actions has undeniable benefits. However, the potential to distort existing animal health services is a constant risk. Provision of free animal health care is one factor. Admittedly, many vulnerable households in a crisis do not have the resources to pay for veterinary care. Denying care to people who cannot pay a fair price is not the answer.

However, more consideration needs to be given in emergency and humanitarian responses to mitigating the longer-term effects of providing free animal health care.
5. PUBLIC GOOD FUNCTIONS OF CAHWS

Public veterinary services generally do not have the resources to provide a steady income for CAHWs. As such, CAHW programs are more likely to be successful and sustainable when they concentrate on private animal health care service delivery by CAHWs\textsuperscript{14}.

Additionally, reliance on CAHWs can be a cost-effective, efficient way for public veterinary services to conduct a broad range of public animal health activities, and many countries have taken advantage of this. Labor-intensive activities such as mass vaccinations are particularly well suited to this strategy. In other cases, such as animal disease monitoring and surveillance, CAHWs can contribute significantly in the course of their normal work routine\textsuperscript{21}.

The literature review suggests that well-trained CAHWs can serve very useful roles as public health protectors, promoters, and communicators, including raising community awareness of public health issues regarding animal source food safety, zoonotic diseases, and the risks of inappropriate use of antimicrobials.

Payment to CAHWs by public veterinary or even human health services for providing these services can supplement their incomes and reinforce the viability of their businesses without making them dependent on it.

5.1 ANIMAL DISEASE MONITORING & SURVEILLANCE

Animal disease monitoring and surveillance (M&S) is an important component of any national animal health program. It informs the design and implementation of effective disease control strategies, facilitates efficient allocation of resources, and mitigates animal morbidity and mortality rates when outbreaks occur by detecting them early and allowing more rapid response\textsuperscript{58}.

CAHWs working in rural areas with large livestock populations are ideal front-line actors in animal disease M&S as they are in contact daily with herds and flocks in remote areas where disease outbreaks may go undetected by public veterinary services for weeks or months in the absence of animal health workers. They may also be in regular contact with public health workers and wildlife rangers with whom they can exchange information on potential zoonotic disease outbreaks in people, wildlife, and livestock. Moreover, well-trained CAHWs can perform very useful M&S work as part of their normal work routine, with very little or no added time or expense\textsuperscript{58,83}.

Unfortunately, several obstacles hinder the efficient use of CAHWs by veterinary authorities for animal disease M&S. One of these is lack of resources with which to incentivize CAHWs to diligently communicate the animal disease status in their areas\textsuperscript{13}.

More significant is the lack of veterinary diagnostic laboratories with the resources to conduct regular testing of submitted diagnostic samples. For governments to respond to an animal disease outbreak, confirmation of the disease is necessary and this usually requires diagnostic testing. Too often, these laboratories lack the necessary chemical reagents or the actual test kits or equipment. In addition, sample submission from the field costs money for collecting, preserving, and transporting samples appropriately (often requiring maintaining a temperature at or near 0°C). Remote locations with poor roads and cold chain infrastructure add to the cost of sample submission, and livestock owners typically do not want to pay for diagnostic testing of their animals.

In other cases, samples are submitted to a laboratory and an outbreak is confirmed, but inability to obtain funds in a timely manner means a response from public veterinary authorities is not forthcoming or is delayed until after the disease has spread well beyond its point of origin. These situations negate the usefulness of CAHWs for M&S service.

Another challenge referred to in the literature is that CAHWs know that reporting a suspected animal disease outbreak could result in a government-imposed
quarantine of the area. The consequent halt in animal transport and closure of livestock markets causes hardship for livestock owners and traders and loss of tax revenue for local governments. This could lead to distrust of the CAHW by the communities they serve and, as seen in the example of Uganda, likely influences CAHWs’ decision on whether to report a suspected outbreak.

An 18-month study conducted in 2005 in mostly arid and semi-arid parts of northern Tanzania’s Arusha region assessed the effectiveness of CAHWs for public animal disease surveillance systems. Three different models were used to incentivize CAHW reporting. One model trained CAHWs in diagnostic sample collection and provided Livestock Field Officers with a fuel allowance to supervise CAHW surveillance activities. A second model trained CAHWs in sample collection and arranged for the signing of a memorandum of understanding between CAHWs and village governments committing the CAHWs to monthly reporting of animal diseases. It did not provide a fuel allowance. The third model provided none of the three incentives mentioned above. No direct payments were made to CAHWs in any of the models. Animal disease case reports as a percentage of the cattle population in the study areas increased from 0.20% or less immediately prior to the study to 5.0% or greater by the end of the study. Reporting was timely and the diagnosis was confirmed in 88% of the 170 clinical cases reported and examined by the authorities.

The model with none of the three incentives produced half as many disease cases reported by CAHWs, but cost the equivalent of only US$ 0.02 per case reported, compared to US$ 0.03 per case reported for the model with a fuel allowance and training provided and US$ 0.06 for the model with memorandum of understanding and training provided. These results suggest that CAHWs have the potential to play an important role in animal disease surveillance and monitoring systems.

In a 2008 cross-sectional study of 445 CAHWs in 19 of Cambodia’s 24 provinces, more than 70% of these CAHWs claimed to report cattle disease information to their district or provincial officer on a monthly basis. The majority did so either by telephone or by visiting the officer in-person. In a 2019 survey of 23 CAHWs in three provinces of southern Lao PDR, 61% said they had reported suspected animal disease outbreaks, though admittedly often long after the outbreak had begun. Most of these reports were made to the village head, who then decided whether to contact public veterinary authorities.

Over 100 CAHWs trained by VSF Suisse in Somalia’s Gedo region in 2015-2020 have been used for animal disease M&S, reporting to the Jubaland State Ministry of Livestock at state and district levels. In South Africa, CAHWs are required by the Veterinary and Para-Veterinary Professions Amendment Bill of 2012 to report a suspected outbreak of a notifiable animal disease to the state veterinarian.

Smartphone-based M&S reporting systems for CAHWs have been tried in several countries and hold some promise, though problems remain to be resolved. CAHW training through the Propcom Mai-karfi project (2012-2021) in Nigeria included a smartphone-based “open data kit” to assist with submitting activity reports to supervisors but also with animal disease reporting. The latter information is accessible in real time to state Departments of Veterinary Services.

A 2017-2018 study in Isiolo County, Kenya showed that community disease reporters using web-based smartphone applications were effective at providing early warning of animal disease outbreaks to public veterinary authorities even among mobile pastoralist herds.

The FAO-supported EMPRES-i Event Mobile Application (EMA) was launched in 2015 in Uganda. Many CAHWs in Uganda’s Karamoja region do not have a smartphone and had to be given one to use the EMA system. The entry of epidemiological data is meant to be user-friendly but could potentially still pose problems for CAHWs with limited literacy. Overall, the pilot project showed more rapid and consistent M&S reporting to public veterinary services with the EMA system than without it.

The training and geographic location of CAHWs make them potentially valuable links in animal disease monitoring and surveillance (M&S) networks. Lack of resources by public veterinary services in most countries means CAHWs cannot generally depend on a significant percentage of their incomes coming from these duties. But payment for occasional specific assignments may supplement CAHW incomes to some extent. More generally, M&S can comprise part of CAHWs’ regular work, as CAHWs regularly visit remote...
areas and may be the first to recognize a disease outbreak or the presence of a novel disease in the area. These can be reported to an appropriate authority at little or no extra cost to the CAHW.

The creation of guidelines on how M&S networks are expected to function would likely contribute significantly to more effective utilization of these networks, even in countries where CAHWs have no formal legal status. Such guidelines might include the respective responsibilities of CAHWs, VPPs, veterinarians, and public veterinary authorities in M&S, and to whom a CAHW is expected to report M&S information – whether to a supervising veterinarian or VPP, local public veterinarian or community leader.

5.2 VACCINATION CAMPAIGNS

Mass vaccination campaigns in many countries would not be possible without the participation of CAHWs. This was clearly demonstrated in the successful rinderpest eradication effort. The deployment of CAHWs to remote areas and war zones filled a gap that threatened the success of that program. In Chad in the early 1990s, government animal health workers reported rinderpest vaccination rates of about 30% in the areas they were responsible for. Private animal health workers including CAHWs, on the other hand, attained 80% vaccination coverage in their areas. While the government staff received only their salary in compensation – regardless of how many animals they vaccinated – the private workers were paid only for the animals they vaccinated. This appears to have motivated them to spend more time convincing livestock owners of the benefits of vaccinating.

But even in a post-rinderpest world, mass vaccination campaigns for other animal diseases continue (including as part of a WOAH- and FAO-led global eradication campaign for peste des petits ruminants) and CAHWs play an important role in extending their reach. The Cambodian government engages CAHWs in its national hemorrhagic septicemia vaccination campaign. And both Lao PDR and Indonesia (where staff of District Livestock Services often opposed the presence of CAHWs early on) contract CAHWs to work in mass vaccination campaigns.

CAHW Income from Vaccination Campaigns

By charging a relatively low price to livestock owners for each animal vaccinated, it seems possible that CAHWs could derive a good income from mass vaccination campaigns. A back-of-the-envelope calculation by one animal health professional in Uganda proposes the following scenario, using a private sector-delivery model:

“Livestock owners are charged 1,000 shillings (US$ 0.27) per animal vaccinated. With a team of CAHWs, a veterinarian might vaccinate 100,000 animals during the campaign, generating 100 million shillings. Of this, he might pay 55 million shillings to the CAHWs working for him, plus maybe 11 million shillings in operational expenses, while over 30 million shillings (over US$ 8,000) remains for the veterinarian, all for three-months of work.”
5.3 CAHWs and One Health

Increasing numbers of donor programs are including One Health principles in their CAHW training curricula. In South Sudan, for example, CAHWs are being trained in public health and learning more about human diseases of public health concern, such as cholera, that CAHWs are apt to recognize among the communities they work in. Following graduation, these CAHWs are linked to human health services to encourage collaboration.

In Somalia, the LLRP IV project in Gedo region (2015-2020) trained nine CAHW training instructors in One Health concepts including rangeland and other natural resource management principles, zoonotic diseases, WASH, water-borne diseases, food safety related to animal products, other human health and nutrition topics, animal disease surveillance systems, and use of antimicrobials and antimicrobial resistance. These instructors were used to train both CAHWs and human health workers in these same topics. These trainees were then linked to other health workers, pharmacy staff, and local human and animal health government authorities as part of a One Health surveillance system.

Similarly, in Sierra Leone, the GHSA-supported One Health Program worked with the Ministry of Agriculture, Forestry and Food Security, Ministry of Health and Sanitation, Njala University, and Wageningen University of the Netherlands to promote One Health collaboration in zoonotic disease control in the country. Through this project, one CAHW was selected from each of 325 communities to attend a 21-day One Health training course, then returned to their respective communities with the expectation that they would apply these concepts through working closely with nearby human community health workers and herbal medicine specialists.

The literature suggests that when CAHW programs introduce One Health, this tends to be limited to 1-2 topics of interest to the program. Environmental pollution and proper disposal of acaricides and other veterinary wastes, for example, are not often included in CAHW training manuals, even when other One Health topics are covered. One exception is found in Cambodia, where AVSF has been offering CAHWs additional training in the appropriate storage of medical waste and good drug use practices and helps organize a “community health day” to raise awareness of zoonotic disease risks and environmental health and biodiversity.

5.3.1 Zoonotic diseases

In the remote areas in which they work, CAHWs may be the only health workers of any kind that communities have regular contact with. As such, their animal
health knowledge can be harnessed to improve and protect public health. CAHWs involved in monitoring and surveillance already look for zoonotic diseases, among other animal diseases, and CAHWs are likely to be the first to recognize these outbreaks when they occur among remote communities.

Beyond recognition and reporting of zoonoses to relevant authorities, CAHWs can also prove invaluable in other ways. Rabies offers one important example, with CAHWs able to significantly reduce the costs of vaccinating dogs against rabies. In pastoralist communities in Tanzania’s Serengeti ecological region, for example, the use of CAHWs reduced the cost per dog vaccinated from well over US$ 5 to about US$ 4, while reaching over 80% of the dog population\textsuperscript{118}.

5.3.2 Food safety

CAHWs have also been used as meat inspectors, not without some controversy, in areas without anyone else trained to undertake this important public health activity. CAHWs have been used either by governments, as in Nigeria in the past, or through donor projects, as at slaughter slabs around refugee camps in South Sudan’s Upper Nile State and in collaboration with public veterinary authorities\textsuperscript{68}.

Nonetheless, use of CAHWs as meat inspectors is not acceptable to public veterinary services in many countries as they consider food inspection too important to be the responsibility of non-professionals given its impacts on public health, consumer protection, and access to export markets\textsuperscript{22}. CAHW training curricula rarely offer sufficient coverage on the topic of meat inspection. This would need to be remedied when CAHWs take on meat inspection duties, whether through adding the subject to curricula where it is absent or requiring that CAHWs undergo supplementary training.

The use of CAHWs for meat inspection is controversial, with legitimate arguments both for and against. The training level of CAHWs is an important consideration as instruction on post-mortem examination of animals, food safety, and meat inspection may be insufficient to give trainees a firm grasp of a topic that has implications for human health.

On the other hand, CAHWs would likely be used as meat inspectors only in areas where qualified inspectors are absent, and it may be argued that inspection of meat by CAHWs is better than no inspection at all. Each country will have to come to its own conclusions on this subject. At a minimum, CAHWs could assess animals slaughtered informally in the communities where they work to detect signs that the meat may pose a health risk.

In addition, CAHW training could include good practices in food hygiene (e.g., milk collection, storage, boiling before consumption, handwashing before and after handling animal products, etc.) that can be communicated to the communities they work with.

5.3.3 Antimicrobial resistance and CAHWs

Misuse of antimicrobial medications, anthelmintics, and acaricides is a major contributor not only to failed treatment of sick animals but also to the development of resistance to these products by pathogens and parasites. It also erodes public confidence in, and demand for, animal health services and is a major objection cited by public veterinary services to the formal recognition of CAHWs.

Poor quality drugs are an important part of this problem. The abundance of counterfeit, diluted, adulterated, expired, and poorly stored and handled drugs in
many countries means that even when a drug is administered as recommended, the effect may be harmful to the animal or, at best, have no effect\textsuperscript{21,38,86}.

The problem is compounded by legislation that hinders drug regulation; lack of resources to enforce drug regulations when they do exist; poor knowledge by livestock owners of veterinary drug use; inadequate logistical infrastructure (good roads, cold chains, presence of drug distributors or retailers in remote areas…); porous borders that facilitate import of counterfeit or poor quality drugs; and corruption\textsuperscript{13,86}. In some countries, the public veterinary drug inspectors are further limited by the enormous geographical area they must cover and by poor cooperation from law enforcement\textsuperscript{21}.

In other cases, even if good quality drugs are used, they are administered inappropriately by livestock owners in areas without access to animal health services. Poor practices include incorrect dosing, number and spacing of treatments; using the wrong route or site of administration; mixing more than one drug in a single administration; and occasional use of human drugs in livestock\textsuperscript{57}. These practices too lead to ineffective treatment outcomes, promote the development of pathogen and parasite resistance, and increase drug residue levels in animal products consumed by family members or the public\textsuperscript{86}.

The presence of appropriately trained CAHWs has, at least in some cases and periods\textsuperscript{58,81}, succeeded in reducing the misuse of veterinary drugs detailed above. Access to CAHW services has resulted in fewer livestock owners self-medicating their own animals with drugs of questionable quality and suitability for the disease, instead turning this activity over to trained CAHWs\textsuperscript{5,19,57,87,88}.

There is evidence that livestock owners tend to view drugs sold by CAHWs as of better quality than those sold in local markets or by itinerant traders\textsuperscript{19}. This is an important selling point for CAHWs in marketing their services.

Another consideration for animal health workers in many countries is that a large portion of their income is generated by the sale of veterinary drugs. This can exert pressure, whether conscious or not, to sell more drugs than may be necessary for the adequate care of an animal. Added to this is the ubiquitous tendency to administer medication in circumstances when perhaps doing nothing is a viable or recommended option, whether to give the client the impression that something has been done or to ensure the farmer’s willingness to pay for the CAHW’s visit\textsuperscript{9,89}. Both factors may be acutely experienced by CAHWs, given the great distances covered between field visits.

The linking of CAHWs with a veterinarian supervisor who acts as the source of drug procurement for the CAHW is a potential model for improving supervision, answering questions, providing advice to CAHWs on good drug use practices, and ensuring drug practices are appropriate\textsuperscript{38}.

Antimicrobial resistance (AMR) is another controversial topic related to CAHWs and is an important obstacle to formal CAHW recognition in some countries. As the literature review shows, CAHWs can be either part of the solution or part of the problem, depending to a large extent on the quality of their training and supervision. When these are of high quality, CAHWs are almost certainly more likely to use antimicrobials in ways that do not promote the development of AMR.

In addition, CAHWs with even moderate levels of training are more likely to use antimicrobials appropriately than are livestock owners administering these drugs by themselves.

The presence of a financially viable CAHW service provider also implies a relatively stable supply of quality drugs, which can help replace the volumes of counterfeit, adulterated, or expired drugs that tend to be available when quality drugs are absent. Given these considerations, well-trained and supervised CAHWs should more often be a part of the solution to AMR, rather than part of the problem.
Women CAHWs are conspicuously lacking in most CAHW programs. When present, they have often been trained exclusively for poultry work or extension-type activities. In India, by the mid-2010s women farmers were being trained as pashu sakhi, or “friends of animals”, to provide their communities with basic animal health care and extension advice on poultry and small animals. In Afghanistan, too, training for women animal health workers focuses on poultry and small ruminants.

However, in some countries such as Niger and Nepal, women CAHWs are scarce. And of Lao PDR’s more than 11,000 trained CAHWs in 2011, only 12% were females. The obstacles to women CAHWs are numerous. Many are related to cultural norms that lead to a preferential selection of men over women as CAHW candidates. Training logistics may not cater to the needs of mixed gender groups, such as field training settings or dormitories where overnight stays are required. In many instances, CAHW trainers are males. And in some cases, insufficient instruction is given to those species for which a woman CAHW is more likely to be called on, such as small ruminants, poultry, and swine.

In India’s Odisha State, female community (human) health workers had fewer years of education than their male counterparts and required longer training than did men to become community health workers. Confidence-building measures integrated into trainings by instructors in Odisha appeared to benefit female trainees.

New CAHWs trained through the FAGNATSARA project (2015-2018) in Madagascar were comprised of 8% females. When surveyed, none of these female CAHWs said they experienced any gender discrimination nor any obstacles to their work that were not also faced by the male CAHWs – other than the occasional need for maternity leave. However, data showed that female CAHWs made significantly fewer client visits than male CAHWs in the same or nearby areas and consequently also earned lower average incomes.

In Niger, women CAHWs complained that community awareness campaigns through donor projects focused too much on CAHW services related to cattle and much less on services for species for which female CAHWs would be more likely called, such as small ruminants and poultry.

Travel also poses more obstacles to women than to men. Public transport may be unsuitable or unsafe for females traveling alone. Political insecurity can make travel in remote areas very risky for women, and a social taboo on women riding bicycles exists in some countries. Acknowledging that limited mobility can hamper the ability of women to train as CAHWs, Feed the Future Innovation Lab for Livestock Systems and Heifer International implemented a project in Nepal to increase accessibility of training for women CAHW candidates through offering hybrid distance learning. Results of this project seem promising, as 52% of women who were offered hybrid distance learning completed the training, against 29% for women who attended traditional training.

Male community members in Uganda’s Karamoja region have expressed lower confidence in female CAHWs compared to males, citing inexperience in working with large animal species such as cattle, household obligations that limit their availability to visit clients, and perceived lower competence in animal health care. These same concerns have been echoed in Kenya. This community feedback raises interesting
questions about how community preconceptions or biases may be influencing women CAHWs’ ability to work.

Despite these barriers, the potential for women CAHWs to expand the reach of animal health services, particularly to other women, is great. A 2013 report commissioned by OFDA in East Africa found no significant difference in technical competence between male and female CAHWs. Evaluation of CAHWs in pastoralist areas of southeastern Ethiopia in 2002 gave a similar result, with the addition that many community members described women CAHWs as more responsible and committed to the work than their male counterparts. In South Africa, women CAHWs were found to have lower turnover rates than men.

Perhaps most significantly, women in many countries have more daily contact with their livestock than do men, taking care of the household animals, milking them, feeding them, and collecting eggs. As such, men and women tend to use CAHW services in different ways and often women will prefer to call on and interact with a female CAHW.

In addition, there is growing interest in poultry health in many rural communities. The popularity of poultry vaccination campaigns against Newcastle disease, for example, have been documented in Mozambique, Malawi, and Tanzania, as well as poultry owners’ increased willingness to pay for poultry health care once the benefits of vaccination became clear. As women are the household members most likely to be responsible for poultry, and women are more likely to call on women CAHWs, poultry health care presents an opportunity for women CAHWs to fill a gap that male CAHWs are often not interested in filling.

The literature review strongly suggests that women have an important potential role to fill as CAHWs. This potential has gone largely unrealized as the recruitment of women CAHW candidates has been limited for many reasons. None of these obstacles appears to be insurmountable in most countries, but perhaps one of the more significant factors is the high labor and time requirements placed on women in many countries for the completion of domestic tasks such as caring for children, older relatives, and family livestock, cooking, fetching water, and agricultural work.

Women are often responsible for the care of livestock and have more regular contact with them than do men. This includes poultry, small ruminants, and pigs, but also is true for larger species such as cattle and camels. As such, women are the most likely to recognize the presence of disease in their animals and be able to initiate treatment. The option to call on a female CAHW is a great benefit for many of these women, but one that is rarely available. Raising community awareness of gender and women’s empowerment can play an important role in facilitating the recruitment of women as CAHWs.

Simple changes to CAHW training programs have the potential to encourage a much larger number of women recruits. These changes involve better adapting training programs to women’s needs, such as including women training instructors, making all instructors more gender-sensitive, and including more flexible training schedules and locations that make it more practical for women to attend.

For existing women CAHWs, dependable access to and widespread use of Newcastle disease vaccine can promote their animal health activities. Protection against Newcastle disease is a prerequisite for poultry health care and is a strong marketing niche for women CAHWs. Unvaccinated poultry in most places are highly vulnerable to regular outbreaks of this disease that can kill large percentages of individual flocks, making investment in other poultry health care practices uneconomical. While PPR vaccines for sheep and goats have the potential to serve a similar role for women CAHWs, access to these vaccines for the time being tends to remain under the control of public veterinary services and they are not easily accessible outside of organized vaccination campaigns.
7. SUSTAINABILITY OF CAHWS

CAHWs cannot operate in isolation. Nor can they be simply provided with technical training and turned loose to make their own way. They need to be one part of a broader, mutually beneficial institutional framework encompassing CAHWs, veterinarians, VPPs, pharmacies, agrovet shops, animal health input suppliers, and public veterinary services. The activities of each of these actors should support and promote each of the others. Ideally, as public demand grows for the services of one of these, so demand should grow for the services of all1,11.

Unsuccessful CAHW programs fail for many reasons. Some of the more common factors associated with failure include:

- Insufficient access to technical knowledge and advice for CAHWs;
- Poor access to veterinary inputs necessary for CAHW work;
- Undermining of CAHW and other private sector animal health service providers through the provision of free or subsidized veterinary products and services by public veterinary services and development partners;
- Excessive dependence on external financing, and;
- Inadequate or non-existent exit strategies for CAHW projects11,19,20.

7.1 ACCESS TO VETERINARY MEDICATIONS AND OTHER INPUTS

The sale of veterinary antibiotics, anthelmintics, acaricides, and vaccines to livestock owners is generally the primary source of income for CAHW work (excluding employment by donor projects). Inability to procure these products on a regular basis makes it less likely that livestock owners will request their services, increases the likelihood that CAHWs will purchase counterfeit or poor-quality drugs from informal channels, diminishes CAHW incomes, diminishes their motivation, and makes it more likely they will stop working as CAHWs.

For example, CAHWs in Cambodia that have dependable supplies of drugs and equipment have more interactions with livestock owners12. The literature makes clear that regular access to good quality veterinary drugs and vaccines is required for CAHWs to operate sustainably7,9,39,45,51,59.

The barriers to access to veterinary pharmaceuticals for CAHWs are numerous. Logistical restraints including poor roads, unreliable power grid, lack of temperature control, and reliance on passively-cooled containers for transport all limit the type and quantity of products that can be safely delivered21,63.

Many CAHW projects provide a single solar-powered refrigerator for the storage of veterinary pharmaceuticals meant to service livestock-owning communities spread over vast areas. Procurement of drugs or vaccines that requires a CAHW to travel several hours to

The sustainability of CAHWs is as important an issue as the quality of their technical skills and knowledge, and in many ways more difficult to address. The obstacles to viable CAHW service provision are many but some solutions have been found. To be successful, there must be demand for CAHW services.

Demand stems from public confidence in CAHWs, which this literature review has shown to be a consequence of good training and supervision, access to safe, quality drugs, ability and availability to respond to calls in a timely manner, and absence of overwhelming competition (from government, development partners, and other CAHWs).
a stocking facility is not sustainable. CAHW programs in Madagascar and Niger found that the creation of secondary stocking facilities with refrigeration capacity and trained staff is needed. These, however, are expensive to operate and manage in remote areas.\(^5,20\)

In the FAO-led SANGA project in Angola (2009-2014), mobile pharmacies were created to supply networks of CAHWs in project areas. Rather than construct or rent buildings to house these pharmacies, drug inventories were instead stored in mobile containers. If demand for CAHW services proved insufficient in one area, the “pharmacy” moved to an area where demand was higher. This strategy eliminated the costs of establishing a brick-and-mortar pharmacy and was highly responsive to demand for veterinary drugs.\(^132\)

Poor business management skills are often identified in the literature as another important obstacle for CAHWs. This affects access to pharmaceuticals through failure to collect payment from clients, acceptance of payment on credit, and/or charging at below replacement cost, leading to cash flow problems for the CAHW. Underestimating the cost of capitalization; lack of access to financing; and loss of drug inventory through theft and deterioration of drug quality are also problems.\(^9,63\)

In addition, CAHWs operating near donor projects may be accustomed to distribution of free drugs and vaccines from implementing agencies and therefore be reluctant to use their own funds to purchase these products.\(^51\)

Various efforts have been made to address these obstacles. Heifer International often establishes a revolving fund as part of its animal health projects to finance the restocking of pharmaceuticals and other inputs for CAHWs.\(^9,66\) In northwest Ethiopia, CAHWs working with the Water & Land Resource Center handed over all proceeds from drug sales to their district veterinary office. The office placed this money in a revolving fund with which it restocked CAHW drug supplies each month.\(^26\) In Indonesia, the Decentralized Livestock Services in Eastern Indonesia (DELIVERI) project in the late 1990s offered CAHWs favorable loan terms for purchasing drugs and other veterinary inputs.\(^24\)

The Support for Decentralized Veterinary Services project (2021-2022) in Chad’s Lac Province began issuing CAHWs with vouchers (worth the equivalent of about US$ 200 each) with which they choose the drugs and other inputs to acquire from private suppliers, rather than receiving a set restocking kit with items chosen by the project. Accredited suppliers only accept the vouchers if the CAHW also purchases from their own pocket the equivalent of about US$ 40-worth of inputs. This approach seems to have reinforced business links.
between CAHWs and private suppliers and works relatively well, despite some examples of accredited suppliers raising prices.

In Nigeria’s Jigawa State, private veterinary input suppliers moved into the state as CAHW networks expanded there in the late 2010s. A similar process occurred in Cambodia, where private veterinary pharmacies and feed stores were present in every district center in the country by 2007. According to a 2008 study, 70% of CAHWs said they spent more than the equivalent of US$10 on drugs and other veterinary inputs each month, purchased largely from these private suppliers.

In the Democratic Republic of Congo’s North Kivu Province, three veterinary clinics were used by the LUSAPEL project (2013-2018) to supply drugs and other inputs to CAHWs. Many CAHWs, however, began procuring drugs from other private pharmacies operating in the area and that offered better pricing or easier access. Similarly, in Somalia’s Gedo region, the LLRP IV project (2015-2020) made sure that at least one licensed private veterinary pharmacy was operating in each district where CAHWs were active. VSF Suisse trained staff at these pharmacies in supply chain management and business skills.

The goal in the previous two examples appears to have been the creation of strong, mutually beneficial business links between input suppliers and CAHWs that will endure after the end of project funding. This result has been documented to some extent in Burkina Faso, where CAHWs generally have positive relationships with the private veterinary pharmacies and clinics that supply them with drugs. In some cases, the input suppliers provide the CAHWs with product sales incentives and occasionally with supervision and continuing education. In return, the CAHWs contribute to sales for the private suppliers and help expand their geographical reach.

CAHWs have also opened their own veterinary pharmacies to ensure a regular supply of drugs. In three southern provinces of Lao PDR, 9% of 23 CAHWs surveyed recently were running small pharmacies, though refrigeration capacity was absent in most cases. Elsewhere in Lao PDR, CARE International selected a handful of CAHWs in 2011-2013 and offered each a solar refrigerator and initial supply of vaccines. They were encouraged to contact other CAHWs in their network and sell them vaccines as needed. By 2015, CAHWs were reportedly initiating livestock vaccination campaigns on their own, independent of CARE. In Rwanda, such CAHW-operated pharmacies have enjoyed more success when located close to livestock markets, where they experience steady demand for their products. In East Africa, veterinary pharmacies in remote areas were more successful when they were owned by a CAHW or animal health technician, were regulated by the public veterinary authority, and used a network of CAHWs to sell their products.

Another model has been the ownership and operation of veterinary pharmacies by CAHW associations. In Uganda, for example, a 2016 study found that of 31 veterinary pharmacies operating in Karamoja, a majority had been created by CAHW associations. Similar pharmacies initiated by CAHW associations have been established in Kenya’s northeastern Wajir County in the past and in southeastern Ethiopia. There is evidence, however, that CAHW association-operated pharmacies do not generally work well due to limited business knowledge and poor accountability.

In some countries, CAHW associations have been promoted as a means for CAHWs to increase their attractiveness to and bargaining power with drug suppliers to improve accessibility. By 2014, some 16 CAHW associations were active in Cambodia, out of 25 that had been created since 1996.

This literature review shows that access to quality veterinary drugs, vaccines, and other inputs for CAHWs is critical to CAHW sustainability. A thriving CAHW business can attract drug and input suppliers, but it is difficult or impossible for a CAHW to thrive before such a supplier(s) is present.

As such, CAHW programs may need to incentivize the establishment of veterinary input suppliers in a CAHW area while CAHWs are being trained to work there (e.g., through start-up grants and loans, preferential payment terms, tax breaks...). Linking CAHWs with these suppliers – whether pharmacies, veterinary or VPP clinics, or agrovet shops – can offer CAHWs a dependable source for restocking and provide technical support and even supervision. In turn, suppliers working with CAHWs will see a way to expand their client base.
7.2 CAHW MOTIVATION AND MORALE

Several perceived benefits provide motivation for becoming a CAHW across many countries. For CAHWs surveyed in recent years in both Lao PDR and Madagascar, the prospect of becoming a better livestock keeper for their communities, but especially for their own animals, topped the list of motivations for becoming a CAHW. This was followed by the enhanced social status that comes with being a CAHW. In Lao PDR, making money was only the fourth most important motivation, followed by the education CAHW training provides and the possibility of taking on greater responsibilities.\(^7,20,39\)

It must be noted that significant stipends and resource outlays attract a certain number of potential CAHW candidates that have little interest in engaging in CAHW work after the project that trains them has ended. This highlights the importance of careful selection of CAHW candidates\(^21,43\) (see Section 4.2).

Factors that affect the morale, and therefore motivation to work, of existing CAHWs include the person’s skills and capacities; opportunities for professional growth and rewards; access to regular feedback from a supervisor and through periodic evaluations; accessibility of veterinary drugs, inputs, and other resources; and adequate roads, power sources, and other infrastructure that facilitate CAHW work.\(^7,9\)

Opportunities for professional growth include the upward mobility of CAHWs, which can be a strong motivator and morale-booster. In Somalia, the LLRP project in the Gedo region identified the most experienced and skillful CAHWs it worked with and made them team leaders. These came to be recognized for the high quality of their work and some have gone on to work for the South West Livestock Professionals Association and one was made a District Veterinary Officer by the government.\(^57\) Despite this example, upward mobility for CAHWs appears to be quite limited in all countries where they are active.

Conversely, factors which tend to lower morale among CAHWs and diminish their motivation to work include lack of close interactions with other animal health workers such as private and public veterinarians or VPPs; poor or no supervision; inability to regularly re-stock drugs and other inputs; and accepting payment on credit from clients.\(^51\)

One innovative approach to build morale has been used recently by ICRC in Chad’s Lac Province. Ten CAHW candidates from a much larger cohort were selected to receive an intensive 6-week training compared to the other CAHWs. These subsequently become “team leaders,” presumably to act as examples and mentors for the other CAHWs.\(^77\)

As suggested by the literature, higher morale could also be promoted through the creation of CAHW associations to represent and advocate for CAHWs with policy-makers and other animal health stakeholders. If truly representative, these can give CAHWs a sense that their concerns and suggestions are being heard.
### 7.3 CAHWs as Entrepreneurs

The sustainability of CAHW programs depends not just on the technical skills and knowledge of the CAHWs, but also on the financial viability of the individual CAHW service providers that comprise the program. As early as the 1990s, development partners recognized that CAHWs trained and employed through donor projects stopped working as CAHWs once donor support ended. AU-IBAR and a few NGOs began to concentrate on promoting a more favorable business environment and developing the business skills of CAHWs. This involved forging links with animal health care supply chain actors such as pharmacies, facilitating access to credit for these supply chain actors willing to work in areas with CAHWs, and integrating small business development into CAHW trainings.

#### 7.3.1 Obstacles to Viable CAHW Service Provision

Numerous obstacles hinder the sustainability of CAHW programs. Nearly all of them directly or indirectly affect CAHWs’ capacity to generate sufficient income to make the work worthwhile for them to pursue either as a full-time or even part-time activity.

Inadequate training, supervision, and monitoring result in poor technical skills and knowledge that make livestock owners hesitant to call on CAHWs. Lack of institutional support and formal recognition by governments lower the confidence livestock owners and other stakeholders have in CAHWs. Poor roads and affordable transportation options increase the time and cost of visiting clients. Irregular supplies of quality drugs and other veterinary inputs, and the presence of counterfeit and poor-quality drugs to fill this void, further damage CAHW activities.

Limited access to credit inhibits starting, expanding, or even maintaining an animal health business. Close ties to the communities they work in means CAHWs sometimes offer their services on credit or even at no charge, leading to cash flow problems and the inability to restock the inputs required for their work. CAHWs who depend on technologies that need spare parts or skilled maintenance are also more likely to stop working when these are unavailable.

In some cases, CAHW businesses are also undermined by the opening of public veterinary clinics or donor programming that offers free or heavily subsidized vaccination campaigns and other veterinary care in places where CAHWs work.

Too many CAHWs trained and supported by development partners in an area creates too much competition for any of these CAHWs to survive as a private service provider (see Section 4.2) and further may undermine the work of VPPs and public veterinary services in areas where these are present. In Lao PDR, a recent study found that the presence of two CAHWs in a single village occasionally materialized into mutually beneficial collaboration through the exchange of information and equipment. However, in many other instances this situation resulted in competition that limited the financial viability of either CAHW. In many countries, competition from public veterinarians engaging in private practice as a side activity may further diminish opportunities for CAHWs.

The number or density of private CAHWs that a geographical area can support is highly variable. It is not simply a ratio of tropical livestock units per CAHW. Other relevant factors may include existing infrastructure such as roads and cold chain capacity, quality of CAHW trainings, dominant livestock production systems, and the status of institutional support and recognition, among others.

Many countries have high total numbers of CAHWs but they provide very poor geographical coverage. The converse may also be found in some cases. In Niger, 42 of the country’s 63 departments have active CAHWs. The density of CAHWs in these departments is not particularly high, but the geographical coverage and...
services offered are generally recognized as very good. This may be because of, rather than despite, the low density of CAHWs. The FAGNATSARA project (2015-2018) in Madagascar assigned each of its CAHWs to work in an area with a 10 km radius. This calculation was based on the feasibility of covering the area on a bicycle and avoiding overlap between CAHWs that could produce too much competition.

Similar calculations in Niger have resulted in a recommended radius of 7 km, considered what a CAHW can reasonably cover on a bicycle there.

### 7.3.2 Entrepreneurial skills of CAHWs

Good entrepreneurial skills and access to guidance in the early stages of running a small business are fundamental to the success of CAHW service providers. In general, CAHWs lack these skills, making them particularly vulnerable in the first couple of years following their initial training. They negotiate poorly or not at all with suppliers for the purchase of drugs and other inputs, do not put aside sufficient funds for restocking, do not market their services well, do not see the importance of keeping good business records, and mix their personal and business finances.

In most areas of the world where they exist, animal health services make up only a portion of CAHWs’ total income. In Somalia’s Gedo region, 95% of CAHWs say livestock rearing is their primary source of income. One recent study in Sierra Leone showed CAHWs spent an average of seven hours per week on CAHW activities. In southern Lao PDR, survey of 23 CAHWs in 2019 showed that no CAHWs spent more than 41% of their time on CAHW activities, with the average being 14%.

Some two-thirds of CAHWs surveyed in Cambodia said CAHW work provides less than 40% of their total household income. In Niger, VSF Belgium even recommends that CAHWs should have a second, primary source of income during the first two years following initial training, to support themselves until they become better established as CAHWs and increase their client base.

On the other hand, some CAHWs demonstrate strong business acumen. In southern Lao PDR, over one-quarter of CAHWs surveyed say they have initiated livestock vaccination campaigns in the villages they serve, procuring the necessary vaccinations from either private pharmacies or public veterinary authorities. A majority of CAHWs in Indonesia in the early 2000s were reported to be operating profitably within 3-4 months of starting their CAHW activities, though whether this income was sufficient to be sustainable is not known.

Recognizing the lack of business skills among CAHWs, Heifer International began more than two decades ago to refer to the CAHWs it trained as “community agro-vet entrepreneurs,” or CAVEs, and placed more emphasis on entrepreneurism in their training. In Nepal, for example, many of the 500 CAVEs active today run profitable agrovet shops that sell not only animal health supplies but also seeds, farm equipment, tools, and other agricultural inputs.

Private veterinary pharmacies that are managed by a veterinarian and use CAHW networks to sell their products have been cited as a good CAHW model. Drug sales tend to make up the most important part of CAHW (and other animal health worker) incomes. Employing CAHWs to help market these drugs greatly expands the potential client base to areas further away from the pharmacy.

Nonetheless, care and diplomacy must be taken when introducing CAHWs into a setting where a veterinarian or veterinary pharmacy already exists. This has led in some cases to the CAHWs being viewed as business competitors. Some CAHWs in Somalia run their own pharmacies, stocking them through close links to drug
suppliers in Mogadishu and neighboring Kenya. And nearly 10% of CAHWs surveyed in southern areas of Lao PDR operate small pharmacies.

A related but less successful scenario, at least in East Africa, has been the creation of veterinary pharmacies run by CAHW associations or cooperatives, often started and supported as part of a donor project. In some cases, these pharmacies are not linked to a veterinarian and have no license or other authorization to operate. In Uganda, for example, most of these businesses show little activity and many cease operating a short time after starting.

The prices charged by CAHWs for services and products, but especially drugs, are important criteria used by livestock owners in evaluating CAHWs. The (South) Sudan Productive Capacity Recovery Programme in South Sudan (2007-2012) found that livestock owners generally resist paying for CAHW services. In response, CAHWs have had to cover their service costs by including them in the drug markup.

In the LLRP project (2015-20) in Somalia, CAHWs charged clients only for the drugs they sold, priced at between KES 10 and KES 30 for small ruminants, KES 30-50 for cattle, and KES 50-100 for dromedaries. These prices included a 20-40% markup, based on the volume of drugs purchased by the client. CAHWs in one area of South Sudan charging a 65% markup to clients on the price of drugs found that this covered only the cost of the drugs and transport to and from the client’s animals. It was not sufficient to generate a profit.

Even these inadequate markups raise the price charged to livestock owners for drugs above what they would pay at an agrovet shop or veterinary pharmacy for these same drugs. In places where pharmacies are relatively accessible, livestock owners often prefer to save money by purchasing from the pharmacy. In parts of Lao PDR, for example, many clients buy their own drugs and only call on a CAHW to administer them in the case of injectables. But travel to retail outlets is not always practical for livestock owners.

CAHWs sometimes attempt to make their drugs and services more attractive by offering them on credit. This, or even free services, may be expected in tight-knit communities in which CAHW services are viewed as part of the normal socioeconomic exchange, in which money does not change hands. Such loans are often not repaid, leading to cash flow problems for the CAHW.

In Cambodia in 2008, just over half of CAHWs say they make an average of the equivalent of US$ 1 or less per farm visit. Some 20% report averaging the equivalent of US$ 5 per visit, and 38% of CAHWs said they visited less than one farm per day on average.

CAHW incomes are highly variable within and between countries. In Cambodia, just under half of CAHWs said...
In 2008 that animal health work generates the equivalent of around US$ 20 or more per month in income, while 31% said CAHW work brings in less than the equivalent of US$ 10 per month. In neighboring Lao PDR, 23 CAHWs surveyed in 2019 in three southern provinces showed that the proportion of their total income from animal health work ranged from 0% to 31%. The average was 8%, though the CAHWs reported that they spent 14% of their total working time on CAHW activities.

In Somalia’s Gedo region, income from animal health work varied between riverine and pastoralist areas. The latter, CAHWs reported visiting on average 2000-3000 animals per CAHW per month, spread between 50-60 households, generating average monthly income of the equivalent of US$ 300-350 per CAHW. In pastoralist areas, CAHWs treated as many as 10,000 animals per month spread between 60-70 households and generated average monthly income of US$ 500-600 per CAHW.

The willingness-to-pay of livestock owners for quality CAHW services and products is generally high even in relatively poor communities, but there are exceptions. An important concern is that CAHW activities are closely associated with donor projects among economically vulnerable communities. The provision of free or heavily subsidized animal health care in these circumstances is common and conditions livestock owners to expect free services and products in the future, leading to underestimating the value of animal health services and products by these communities, and results in suspicion of anyone offering animal health services for a fee.

Even when demand exists, livestock owners in these areas tend to refuse to pay in the hope that an NGO will soon come along offering the same service for free. This situation dissuades private sector animal health actors from investing resources in a place where demand for their products can disappear for weeks or months when free services are offered by others. Nonetheless, studies and anecdotal evidence from Somalia, Uganda, South Sudan and Indonesia suggest that a large percentage of communities served by CAHWs are willing to pay for their services, provided they perceive value for money.

The literature review suggests that a general lack of entrepreneurial skills among CAHWs is another serious problem, though not surprising given that CAHWs are typically recruited from communities with limited access to formal education. Increased emphasis on entrepreneurial skills in CAHW trainings can assist with this, as well as access to advice on business-related questions.

Pricing of CAHW products, especially drugs, is an important consideration for CAHW service providers. Prices must be high enough to generate sufficient profits, but low enough to dissuade clients from purchasing drugs elsewhere and administering them themselves. A CAHW’s ability to offer good animal health, nutrition, and other husbandry advice to their clients can help convince clients to pay more for a CAHW to supply and administer drugs. Along these lines, promoting awareness among communities of the benefits of good animal health care, especially preventive care, can lead to greater demand for CAHW services, thereby increasing their financial viability. Transparency in pricing, and even participation by community members in establishing drug prices and margins, can strengthen mutual trust and acceptance. Indeed, donor projects and public veterinary services (when training CAHW candidates in areas that already have CAHWs) may well achieve more gains from investing resources in raising livestock owner awareness of CAHWs’ and animal health care benefits rather than in training new CAHWs.
8. RECOMMENDATIONS

The project reviews and evaluations consulted in this literature review for the most part avoid overt criticism of CAHW programs. However, sufficient information was found to allow a degree of interpretation as to whether certain practices were of a largely positive or negative impact. In other cases – academic papers in particular – assessment of the status of CAHWs, independent of specific donor or government projects, produced a somewhat more objective critique. Taken together, the literature generated a relatively accurate picture of the obstacles to and opportunities for CAHWs in many countries. This in turn has helped generate the following recommendations intended to promote further improvements in CAHW programs.

8.1 RECOMMENDATIONS FOR CAHW POLICY FRAMEWORKS

1. WOAH should formulate clear, concise competency guidelines for community-based animal health workers (CAHWs) to promote harmonization of minimum CAHW competencies. These guidelines should allow enough flexibility to account for a range of types of CAHWs and accommodate differing priorities and contexts in different countries. [For: WOAH]

2. Regional economic communities (e.g. IGAD in the Horn of Africa, UEMOA and ECOWAS in West Africa, EC-CAS in Central Africa, and ASEAN in Southeast Asia) should support their member states to formulate a mutually acceptable, coherent policy framework that sets out roles, responsibilities, accountability, and minimum standards for CAHWs and those that supervise and monitor them. It should include a clear policy on the roles and responsibilities of both the private and public sectors in animal health service and how CAHWs (and other animal health actors) fit into that policy. [For: regional economic community institutions]

3. National veterinary authorities should take a lead role in reviewing the legislative framework for the veterinary professions, including all relevant and appropriate categories of personnel such as veterinarians, VPPs, and CAHWs. Results of these reviews can be used to advocate for a coherent legislative framework for these professions. [For: public veterinary services]

4. Individual countries can use results from the above legislative framework review, combined with any WOAH and regional economic community guidelines, to define CAHWs in national veterinary legislation. CAHWs and their work should be clearly described in a government Animal Health Policy / Strategy document. Ideally, this should be part of a larger initiative to formulate coherent legislative and policy frameworks for all animal health service actors, including public and private veterinarians and VPPs. [For: national policy-makers; relevant ministries; veterinary statutory bodies]

5. Encourage CAHWs to organize into associations with representatives that can effectively advocate for CAHW interests and dialogue with policy-makers, veterinary authorities, statutory bodies, and other animal health stakeholders. [For: FAO; donors; NGOs; other development partners; private employers of CAHWs; CAHWs]
8.2 RECOMMENDATIONS FOR COORDINATION OF CAHW PROGRAMS

1. Individual countries may consider creating a national authority responsible for coordinating and guiding the design and implementation of CAHW-related programs. This responsibility could be granted, for example, to a sub-committee of the national Veterinary Statutory Board that coordinates closely with NGO platforms. When a project is clearly in conflict with the country’s CAHW and livestock development policies, this entity could prevent those projects from being implemented until satisfactory amendments are made. Periodic monitoring of project implementation by this authority can ensure adherence to the country’s CAHW and livestock development policies. [For: relevant ministries; national coordination authority]

2. Coordination meetings at national and district levels attended by all stakeholders working with CAHWs should be held regularly to discuss issues of concern, take decisions, and initiate necessary actions. Meetings should be initiated preferably by a national coordination authority. [For: relevant ministries; FAO; donors; NGOs and NGO platforms; other development partners; CAHW associations; private drug and other veterinary input suppliers]

3. Where government coordination of CAHW programs does not exist, donors and project implementers should initiate coordination through country and livestock sector forums that meet on a regular basis to exchange information, keep stakeholders informed of interventions, mitigate conflicts, and facilitate collaboration. [For: FAO; donors; NGOs; other development partners]

8.3 RECOMMENDATIONS FOR PLANNING AND DESIGNING CAHW PROGRAMS

1. All animal health stakeholders should be closely consulted from the earliest stages of project design, while aligning with national livestock policies and objectives. This includes local communities, local veterinary authorities, private veterinarians, any district-level multi-stakeholder fora, and other animal health service providers. [For: public veterinary services; FAO; donors; NGOs; other development partners]

2. Project planning and design should carefully consider the geographical areas they will target when working with CAHWs. Human and livestock population densities, livestock production systems, willingness of livestock keepers to pay for animal health services, and existing animal health service structures should be considered before selecting and training CAHWs. [For: public veterinary services; FAO; donors; NGOs; other development partners]

3. Realistic exit strategies should be included in project planning and design to ensure CAHW programs have a realistic chance of continuing after the end of a project. Important elements include post-project technical support for and supervision of CAHWs; access to animal drugs and other inputs; and capacity of local actors to provide refresher trainings and new CAHW trainings. [For: public veterinary services; donors; NGOs; other development partners]

4. Donors, NGOs, and other development partners that work with CAHWs should align and coordinate to produce a joint manual of evidence-based best practices related to CAHWs, and distribute the manual widely among and within their institutions. A balance must be struck between offering sufficient detail to be meaningful, yet general and flexible enough to apply across many countries and regions. Organizations should monitor their project proposals and implementation for adherence to these guidelines. [For: donors; FAO; NGOs; other development partners]
5. Public veterinary services and NGOs should **implement medium- and long-term strategies for raising awareness** of the benefits of good animal health care and how CAHWs contribute to better animal health. Include a variety of tools, media, and venues, keep messages simple, and pace the campaign according to available resources such that it may be sustained over the long-term. [For: public veterinary services; FAO; donors; NGOs; other development partners]

6. **Initiation of and participation in awareness campaigns should involve public and private veterinarians, VPPs, CAHWs, extension workers, development partners, and livestock owner associations.** Local veterinary authorities should formally present to community leaders the CAHWs that will be working in their communities and ensure that the CAHWs’ roles and responsibilities are understood by all. [For: public veterinary authorities; public and private veterinarians; VPPs; CAHWs; extension workers; FAO; donors; NGOs; other development partners; livestock owner associations]

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**8.4 RECOMMENDATIONS FOR SELECTION OF CAHW CANDIDATES**

1. **Any entity intending to train new CAHW candidates should conduct a thorough study to estimate the optimal number of CAHWs to be trained.** The study should evaluate at a minimum:

   • Density of people and livestock;
   • Average herd/flock size and species proportions
   • Livestock production systems present;
   • Animal disease status;
   • Livestock owner attitudes towards using and paying for animal health services;
   • Gender issues affecting animal health services;
   • Presence or absence of other animal health service providers;
   • Attitudes of local leaders towards CAHWs;
   • Anticipated drop-out rate of existing and newly trained CAHWs;
   • Other factors impacting the financial viability of CAHW service providers.

   [For: public veterinary services; FAO; donors; NGOs; other development partners]

2. **Favor using the services of existing animal health workers, when present, rather than training new CAHWs.** This includes veterinarians, VPPs, and existing CAHWs, or upgrading training for existing village vaccinators to become CAHWs, as many of these already offer animal health services in their communities. [For: public veterinary services; FAO; donors; NGOs; other development partners]

3. **Prioritize quality over quantity in CAHW selection.** Select fewer CAHW candidates and prepare them well through high quality technical and business training. Understanding why CAHWs are inactive or dropping out (using the study described in 8.4.1 above), using selection criteria that favor highly motivated candidates, and providing them with better quality training is more likely to prove a successful strategy. [For: public veterinary services; FAO; donors; NGOs; other development partners]

4. **If not already stated in legislation or official policy documents, selection criteria for new CAHW candidates should be established in close consultation with animal health stakeholders** – particularly livestock owners and their communities. Criteria to define may include age range, literacy and education levels, presence in and relationship to the community, personal reputation, prior experience with livestock, prior business experience, ratio of male to female CAHWs, and willingness or ability to finance a portion of CAHW start-up equipment and materials. Once established, these criteria should be clearly communicated to stakeholders and consistently applied to avoid confusion and mistrust and to enhance legitimacy of the CAHWs. [For: public veterinary services; FAO; donors; NGOs; other development partners]
5. The recruitment of CAHW candidates should include a mechanism to facilitate and promote the selection of women. This is addressed in more detail in Section 8.8. [For: public veterinary services; FAO; donors; NGOs; other development partners]

8.5 RECOMMENDATIONS FOR CAHW TRAINING PROGRAMS

1. The formulation of CAHW competency and curricula guidelines by WOAH would be useful in stimulating relevant countries to adopt minimum standards for CAHW training that can improve animal health care quality. Such guidelines could be adapted to WOAH’s Curriculum Alignment Matrix tool (that allows a training institution to compare its training program to WOAH guidelines) and criteria from the guidelines could be included in WOAH’s Performance of Veterinary Services Evaluations and Gap Assessments. [For: WOAH]

2. Each relevant country should create a regulatory entity to establish minimum CAHW training standards in consultation with stakeholders and to oversee CAHW candidate training and CAHW refresher training. Monitoring of curricula, teaching techniques, and quality of instruction by this regulatory entity can ensure adherence to good practices. This can be achieved with periodic visits to the classroom and field training sites by trained staff to observe and, afterwards, make recommendations to the instructor or training institution. The regulatory entity can be part of the Ministry of Agriculture, Ministry of Education, or national veterinary statutory body, for example. [For: relevant ministries; veterinary statutory body; public veterinary services]

3. Where national CAHW training standards are not specified, development partners should have an in-house manual for CAHW training curriculum and ensure that staff adhere to it. [For: relevant ministries; veterinary statutory body; public veterinary services; FAO; donors; NGOs; other development partners; training institutions]

4. In 8.5.2 and 8.5.3 above (and on a more general scale in 1), consideration should be given to training venues; the language used by instructors and training materials; the use of illustrations in training manuals; the ratio or total number of hours dedicated to practical learning (as opposed to classroom learning); and the staggering of training programs over several weeks (rather than training on consecutive days until completed). [For: WOAH; relevant ministries; veterinary statutory body; public veterinary services; FAO; donors; NGOs; other development partners; training institutions]

5. A training needs assessment should be completed before any CAHW training program is launched. This should evaluate the status of animal diseases and animal health services in the area from which the CAHW candidates are recruited, livestock production systems, business environment, CAHW density needed to cover the area, and gender analysis relevant to animal health. [For: public veterinary services; FAO; donors; NGOs; other development partners]

6. Entities engaged in CAHW training should develop guidelines on teaching approaches for adult learning that consider the literacy level of trainees. Pedagogical expertise from farmer field trainings is one source of guidance in teaching approaches for CAHW training. Iles, 2002a and 2002b can be consulted for participatory adult learning methods and use of practical, hands-on instruction. Consider the peer-to-peer training used in Lao PDR in which highly motivated CAHW candidates are identified, trained intensively, and then used to train the other CAHWs under the supervision of an instructor. Linking CAHWs to a veterinarian or VPP for on-the-job training and mentorship can also be beneficial, including as part of refresher training. [For: public veterinary services; FAO; donors; NGOs; other development partners; training institutions]

7. CAHW training instructors should be knowledgeable in participatory training and adult learning techniques, and ideally accredited as instructors through a national CAHW training regulatory entity (as detailed in 8.5.2 above). Training-of-trainers standardized content should be established by the CAHW training regulatory entity and/or development partners. Instructors should have easy access to support from a training...
expert whenever training is taking place. [For: relevant ministries; veterinary statutory body; public veterinary services; FAO; donors: NGOs; other development partners; training institutions]

8. CAHW training initiatives should strive to use and strengthen the capacity of local training institutions and instructors, where these are present and of adequate quality. Ideally these will be accredited by a CAHW training regulatory authority. [For: public veterinary services; FAO; donors; NGOs; other development partners]

9. Consider carefully the use of stipends, expense reimbursements, provision of free drugs and equipment as starter-kits or for restocking, and other material or monetary enticements to CAHW candidates. Consider some form of cost-share from CAHW candidates in setting up their business (e.g. stocking drugs and equipment). [For: public veterinary services; FAO; donors: NGOs; other development partners]

8.6 RECOMMENDATIONS FOR SUPERVISION & MONITORING OF CAHWS

1. Countries should establish a clear regulatory framework that encompasses the supervision and monitoring of CAHWS. This can include the creation of guidelines as well as penalties for unsatisfactory performance by a CAHW as assessed by a supervisor. The relevant ministry, department of veterinary services, veterinary statutory body, and/or a CAHW coordination entity could lead this initiative, but all animal health stakeholders should participate in the design of this framework. [For: relevant ministries, veterinary statutory bodies; CAHW coordination bodies]

2. Consideration must be given to how to promote willingness of veterinarians and VPPs who could potentially supervise nearby CAHWS. There are no easy answers. Linking CAHWS to private veterinarians and VPPs usually leads to a win-win situation, as CAHWS benefit from supervision and referral advice, while supervisors earn more income through the selling of drugs to the CAHWS who work for them. In countries where this system is not applicable, CAHW supervision should be a duty for local public veterinarians or VPPs. A stipend paid by public veterinary services, the Ministry of Livestock, or national CAHW regulatory body to these supervisors would be logical, but availability of funds may prove unsustainable as priorities shift. Another option is that communities served by the CAHWs collectively contribute part or all of the payment to CAHW supervisors. [For: relevant ministries; public veterinary services; veterinary statutory bodies; FAO; donors; NGOs, other development partners; CAHW associations]

3. Public veterinary services should strengthen their capacity to regulate and monitor CAHW activities. While private veterinarians, VPPs or drug suppliers can ensure routine supervision of CAHWS, some additional form of independent monitoring (i.e., by someone without a business relationship with the CAHWS) would be needed. Consideration should therefore be given to establishing some minimal level of CAHW monitoring (through inspection and reporting) by a public veterinary authority. [For: relevant ministries, public veterinary services; veterinary statutory bodies; CAHW coordination bodies; FAO; donors; NGOs; other development partners; private veterinarians; CAHW associations]

4. Supervision of CAHWS should involve frequent performance assessments in the first couple of years after the CAHW becomes active - every 6 months, for example. Assessments should include a dozen or so indicators that help identify gaps in knowledge and skills. [For: relevant ministries, veterinary statutory bodies; CAHW coordination bodies; FAO; donors; NGOs; other development partners; private veterinarians; CAHW associations]

5. Promote community participation in CAHW monitoring. One approach might include “upstream” monitoring by a veterinarian focused on technical aspects of CAHW services, combined with “downstream” monitoring by livestock owner associations focused on the impacts of CAHW services and conduct of CAHWs in the communities they serve. [For: relevant ministries, veterinary statutory bodies; CAHW coordination bodies; FAO; donors; NGOs; other development partners]
**8.7 RECOMMENDATIONS FOR MONITORING, EVALUATION, AND LEARNING IN CAHW PROGRAMS**

1. **Conduct an animal health services and business potential study** before implementing CAHW programs. This can serve as a baseline for use with MEL assessments during the program. [For: relevant ministries, veterinary statutory bodies; CAHW coordination bodies; FAO; donors; NGOs; other development partners]

2. **Establish a CAHW MEL plan and conduct regular assessments** with veterinary staff trained in MEL practices. Seek the participation of livestock owners or their associations in the MEL process to gain insights into the impacts of CAHW services. [For: relevant ministries, veterinary statutory bodies; CAHW coordination bodies; FAO; donors; NGOs; other development partners]

**8.8 RECOMMENDATIONS FOR EMERGENCY / HUMANITARIAN INTERVENTIONS AND CAHWS**

1. Design of emergency and humanitarian interventions should use market-based modalities (e.g., vouchers, cash) that support and minimize the negative impacts on private sector animal health service providers, when these exist. [For: relevant ministries; public veterinary services; FAO; donors; NGOs; other development partners]

**8.9 RECOMMENDATIONS FOR PUBLIC GOOD FUNCTIONS OF CAHWS**

1. The potential of **CAHWs as public health protectors, promoters, and communicators** should be better harnessed by veterinary and human health authorities and donor projects. Tasks may include raising community awareness of public health issues such as animal source food safety, zoonotic diseases, and inappropriate use of antimicrobials. [For: relevant ministries; public veterinary services; human and public health authorities; FAO; donors; NGOs; other development partners]

2. **National guidelines should be established regarding the responsibilities and expectations of CAHWs, VPPs, veterinarians, and livestock owners in reporting suspected animal disease outbreaks.** The reporting pathway and hierarchy, along with who is responsible for covering the incurred costs and whether payment will be made for reporting, should be clearly described. [For: relevant ministries; public veterinary services]

3. **Public veterinary authorities should consider paying small stipends to CAHWs who submit regular, accurate reporting on the animal disease status** in their area. These small sums can contribute to the financial viability of CAHWs and provide a useful and inexpensive service. [For: relevant ministries, public veterinary services]

4. **Include a One Health component in CAHW candidate and refresher training curricula,** focusing on the importance of the One Health approach, collaboration with human health colleagues, and how CAHWs can communicate One Health messages effectively to the public. Consider covering basic information on zoonotic diseases, food safety, antimicrobial resistance, good practices in the use of antimicrobials, anthelmintics, and acaricides, safe disposal of medical waste (such as empty acaricide containers, syringes, sharps), and environmental health in relation to livestock. [For: relevant ministries; public veterinary services; veterinary statutory bodies; CAHW regulatory bodies; CAHW trainers and training institutions; FAO; donors; NGOs; other development partners]

5. Where present, **link CAHWs to multi-disciplinary One Health networks.** CAHWs can provide information and informed advice to network members on WASH (e.g., water for livestock), natural resource management...
(range management), and human health (zoonoses, food-borne diseases). [For: relevant ministries; public veterinary services; FAO; donors; NGOs; other development partners]

6. **Strengthen monitoring and enforcement of regulations governing veterinary drug quality.** Increase the geographic breadth and frequency of random testing of veterinary pharmaceutical products at retailers, distributors, and markets, veterinarians, VPPs, and CAHWs, and itinerant traders and other informal salespeople. [For: policy-makers; relevant ministries; national drug authorities; public veterinary services]

7. **Facilitate the supply of licensed, quality veterinary drugs** through strengthening livestock value chains and logistical infrastructure such as cold chains. Where quality drugs are inaccessible, counterfeit and other poor-quality drugs will fill the void. [For: relevant ministries; drug regulatory authorities, FAO; donors; NGOs; other development partners]

8. **Conduct long-term community awareness campaigns** in CAHW areas to improve livestock owner knowledge of the dangers of using poor quality drugs, recommended veterinary drug use practices, and the positive role CAHWs and other trained animal health workers can play. [For: relevant ministries; public veterinary services; FAO; donors; NGOs; other development partners]

9. **CAHW supervision should include means of assessing inappropriate use of drugs by CAHWs** so that these can be corrected and training curricula improved to fill this gap. [For: relevant ministries; public veterinary services; veterinary statutory bodies; CAHW regulatory bodies; FAO; donors; NGOs; private veterinarians; CAHW associations]

**8.10 RECOMMENDATIONS FOR CAHWS AND WOMEN**

1. Animal health project implementers should promote discussion of the important role women can play in animal healthcare and the benefits of women CAHWs during community dialogue prior to selection and training of CAHWs. [For: public veterinary services; FAO; donors; NGOs; other development partners]

2. **Facilitate the recruitment of women CAHW candidates by better adapting training programs to the needs of women.** Positive steps may include: providing awareness training to CAHW training instructors and training organizers on gender inclusion; using more women instructors; adjusting training times to women’s needs; locating trainings in or near the communities where women CAHWs are from, thereby limiting the need for overnight travel and lodging; and including more gender-relevant indicators in monitoring and evaluation of CAHW programs. [For: public veterinary services; FAO; donors; NGOs; other development partners; training institutions]

3. **CAHW training curricula should include material on small ruminants, poultry, or other species for which women are often responsible** as women household members are more likely to call on the services of a female CAHW for help with these species. [For: veterinary services; FAO; donors; NGOs; other development partners; training institutions]

4. **Ensure dependable access and widespread use of Newcastle disease vaccine** as it is a strong marketing niche for women CAHWs. [For: public veterinary services; FAO; donors; NGOs; other development partners; private veterinary vaccine suppliers and retailers]

5. **Community awareness campaigns on animal health should include issues that specifically concern women,** such as information on poultry and small ruminants and food safety issues related to animal source foods and animal health. [For: public veterinary services; FAO; donors; NGOs; other development partners]
8.11 RECOMMENDATIONS FOR SUSTAINABILITY OF CAHWS

8.11.1 Access to Veterinary Medications and Inputs

1. Have veterinarians and qualified staff of veterinary pharmacies participate in CAHW candidate and refresher trainings to strengthen business relationships that may lead to sales incentives offered to CAHWs and other mutually beneficial business arrangements. Also consider joint refresher training that includes both CAHWs and pharmacy staff. [For: public veterinary services; FAO; donors; NGOs; other development partners; training institutions; private veterinarians; pharmacies]

2. Promote the establishment of pharmacies and pharmacy stocking centers with trained staff within or, at a minimum, on the periphery of areas where CAHWs are active. Focus initially on places with relatively high demand, such as near livestock markets or areas with larger concentrations of animals, and/or areas with some cold chain capacity. This may require tax incentives, subsidies from the ministry of livestock or NGOs, and better access to finance, among other motivations, to jumpstart the process. [For: drug manufacturers; distributors; agrovet shops; private pharmacies; private veterinarians; FAO; donors; NGOs; other development partners]

3. Build CAHW capacities in business and finance to help CAHWs manage cash flow and inventories. This will assist CAHWs in overcoming some common obstacles to restocking of drugs. [For: veterinary statutory bodies; public veterinary services; training institutions; donors; FAO, NGOs; other development partners]

8.11.2 CAHW Motivation and Morale

1. Provide frequent technical support and mentoring to active CAHWs during their first two years following initial CAHW training. This should include discussion of technical issues and monitoring of the CAHW’s activities using fixed parameters that include business management. Where numerous CAHWs are working close to one another, weekly meetings to discuss animal health service delivery topics can have positive effects on CAHW morale. [For: public veterinary services; veterinary statutory bodies; FAO; donors; NGOs; CAHWs]

2. Offer more opportunities for professional development for well-performing CAHWs. This can include recruitment of CAHWs as VPP candidates where these exist, contracting CAHWs to conduct specific activities for public veterinary services such as disease monitoring and surveillance, or offering certain CAHWs more responsibility in overseeing other CAHWs in vaccination campaigns, emergency livestock response, or other public good interventions. [For: public veterinary services; veterinary statutory bodies; FAO; donors; NGOs]

8.11.3 CAHWs as Entrepreneurs

1. Donor projects, public veterinary services, and politicians should strongly discourage provision of animal health care free of charge or at heavily subsidized rates. Exceptions to this policy may be made for certain priority diseases such as rabies or anthrax. When free or subsidized animal health services are deemed necessary, such as in response to a disaster or to reach extremely poor households, then a voucher system should be considered. Drugs and other inputs should be procured through local suppliers when possible and existing local service providers such as CAHWs should be contracted to assist with the activities. This should make these private sector actors stronger, not weaker, at the end of the intervention. [For: policy-makers; public veterinary services; FAO; donors; NGOs; other development partners]
2. Facilitate access to finance for CAHWs (and veterinarians and VPPs who might supervise the CAHWs) to start a business, including access to start-up grants and loans, preferential payment terms, etc. These can be offered by financial institutions, but also by private veterinarians, agrovet shops, and veterinary drug distributors who stand to benefit from strong CAHW networks. Donor programs and/or public veterinary services may also offer financial assistance such as access to credit, subsidies, and tax incentives to catalyze private sector engagement in the initial phases of CAHW programs. Such support should be just enough to promote, but not so much as to suppress, entrepreneurial spirit. In either case, care should be taken not to burden businesses with too much debt. [For: public veterinary services; FAO; donors; NGOs; other development partners; financial institutions; private sector animal health input suppliers]

3. Provide CAHWs with more support in financial administration and other skills necessary for running a successful business. Include business subjects in initial CAHW training and refresher courses and provide CAHWs with access to good advice and guidance on business-related questions such as offering voluntary audits of CAHWs to evaluate financial health. [For: veterinary statutory bodies; public veterinary services; FAO; donors; NGOs; other development partners; CAHW associations]

4. Consider having CAHW candidates conduct an animal health service baseline survey in their communities, to include livestock numbers; number and location of veterinary drug and input suppliers, veterinarians, VPPs, and existing CAHWs; presence of dip tanks; and animal diseases of most concern. This will help them understand better the business potential of their area. [For: veterinary statutory bodies; public veterinary services; FAO; donors; NGOs; other development partners]

5. Explore sustainable ways to supplement CAHW incomes to strengthen their financial viability. Opportunities include the creation of livestock owner associations with membership fees going to pay a stipend to the CAHW in their area; or the contracting of CAHWs by public veterinary services to provide public good services such as animal disease monitoring and surveillance or participation in mass vaccination campaigns. [For: CAHW associations; development partners; livestock owners; public veterinary services]

6. Build demand for CAHW products and services by increasing awareness among men and women livestock owners of the benefits of these services and products, particularly preventive care such as vaccinations, and the risks of using poor-quality drugs. Awareness-raising measures may include regular community meetings; attendance at these meetings by CAHWs from areas where CAHW networks are operating successfully in order to share their experiences; and displaying illustrated animal health care posters in villages [For: relevant ministries; public veterinary services; FAO; donors; NGOs; other development partners]

7. Link CAHWs to either a private veterinarian, veterinary pharmacy, or other drug retailer to facilitate restocking of drugs and other inputs. One scenario is a contractual relationship between one or several CAHWs and a drug supplier, preferably a veterinarian. The CAHWs procure drugs exclusively from this supplier, who in turn supervises the CAHWs’ activities. The supplier can be in a town at the periphery of the remote area covered by the CAHWs, providing relatively easy access. [For: FAO; donors; NGOs; other development partners; CAHW associations; private veterinarians; private veterinary pharmacies; agrovet shops; veterinary drug distributors]
9. CONCLUSIONS

This literature review has shown that the opportunities for CAHW programs to improve animal health services among pastoralist and mixed livestock-crop farming production systems are numerous. Common features of apparently successful programs are: thorough design and planning using participatory techniques that include communities, government, and other animal health stakeholders; trainings of sufficient duration and quality to ensure CAHW skill and knowledge levels instill confidence in livestock owners and public veterinary authorities; monitoring and supervision of CAHWs that ensures quality control and access to technical advice for CAHWs; and a strong exit strategy for donor-initiated CAHW projects, among others.

However, significant barriers to successful CAHW programs remain. These include lack of formal recognition of CAHWs in many countries as well as poor coordination and harmonization within countries of CAHW training standards, recruitment, authorized activities, and supervision and monitoring. This lack of harmonization and coordination results in CAHWs with variable levels of skill and knowledge. CAHWs with sub-optimal competence diminish public confidence not just in themselves but in all CAHWs, no matter how well trained, as livestock owners do not always have the means to differentiate between them. Furthermore, when a significant portion of CAHWs does not have adequate skills and knowledge, formal recognition is resisted by public authorities, veterinary statutory bodies, and other animal health care service providers.

Addressing differences in CAHW programs can go a long way towards improving technical competency that leads to acceptance and legal recognition of CAHWs. It will also generate confidence by livestock owners in CAHWs’ abilities such that demand for their services increases. This outcome is critical for the second aspect of CAHW programs, which is the sustainability of CAHW service providers. While CAHWs with poor technical skills rarely remain active beyond the program that trained them, there are also many examples of highly competent CAHWs who fail to operate a financially viable business, even when demand for their services is high.

Contributing factors include poor entrepreneurial and financial skills that lead to low income and/or cash flow problems; difficulties in restocking drugs and other inputs, leading to reduced livestock owner willingness to call on their services; and lack of affordable transportation to reach clients located at long distances. In other cases, the services of well-trained CAHWs are not in high demand because livestock owners are not aware of the tremendous benefits offered by animal health care providers, particularly the use of preventive care such as vaccinations.

Not surprisingly, finding a solution to any one or even a few of these obstacles will not ensure the success of CAHW programs. Rather each of these obstacles must be addressed simultaneously. Progress in one will promote advances in the others, steadily rising to a threshold when CAHWs can operate viable, demand-driven businesses over the long-term without the need for ongoing subsidies from development partners.
APPENDIX 1

Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis of CAHW Programs

**STRENGTHS**

- CAHWs provide animal health services in remote areas with little or no other animal health services.

- CAHWs are often first to see and report animal disease outbreaks to veterinary authorities.

- Communities are generally pleased with CAHW services when programs are well implemented.

- Improving livestock health positively impacts poverty. People with access to CAHWs generally score their quality of life higher than those without access.

- CAHW services benefit both the communities they work in and surrounding communities, generating positive externalities.

- Well trained CAHWs improve drug use practices, thereby reducing the rate of development of antimicrobial resistance.

- CAHWs complement and expand the reach of private veterinarians, VPPs, pharmacies, and agrovet shops to areas the latter cannot serve on their own.

**WEAKNESSES**

- Legal recognition of CAHWs is absent in many countries where CAHWs are active.

- Coordination between NGOs and other development partners regarding training standards and number and distribution of CAHWs is often low or non-existent.

- A focus on quantity over quality in CAHW programs can result in low quality of CAHW skills and knowledge and too many CAHWs in an area.

- Short trainings often lead to poor quality of CAHW services which reduces public confidence in CAHWs and thereby reduces demand for their services.

- Lack of monitoring and supervision of CAHWs because public and private veterinarians and VPPs that could supervise them are lacking.

- Limited transportation options increase the costs to CAHWs of covering long distances, which increases the prices they must charge clients.

- Limited access to cold chains restricts use of some vaccines.

- Restocking of drugs and other inputs by CAHWs can be difficult, which reduces demand for CAHW services and restricts CAHW incomes.

- In some areas, livestock owners are unwilling to pay for CAHW services. This may be associated with low confidence in CAHWs or with widespread offering of free or low-cost animal health services by development partners.

- Access to credit for CAHWs and other animal health providers is limited and often poorly adapted to rural animal health services.

- The regulatory capacity of public veterinary authorities is inadequate due to budget constraints.

- Business skills of CAHWs are low, resulting in non-viable businesses in the absence of external support.

- CAHW trainings are often not suited to women.

- Low morale and motivation are common among CAHWs due to the above-mentioned weaknesses.

- Low morale and/or insufficient income lead to high turnover or a large percentage of inactive CAHWs.
**OPPORTUNITIES**

- Stronger focus on business/entrepreneurship development as part of CAHW trainings will help improve the sustainability of CAHW service providers.

- CAHWs can be used effectively to increase the reach of private veterinarians, VPPs, agrovet shops, and pharmacies, helping them expand their client base.

- CAHWs can be instrumental in increasing public awareness of animal health service benefits, thereby increasing demand for these services.

- CAHWs can help disseminate public health and other government priority messaging to the public in remote areas.

- CAHWs and other animal health actors can place more emphasis on disease prevention-based service approaches such as vaccinations, both to generate more regular income for CAHWs and to benefit livestock owners and government disease control programs.

- CAHWs can become an integral field component of government animal disease monitoring and surveillance in remote areas.

- Communities that recognize the quality and benefits of CAHWs engage fully in and take ownership of CAHW selection and definition of duties and responsibilities; governments and NGOs can use truly participative methods in CAHW programs to promote this community engagement.

**THREATS**

- Continued lack of formal recognition for CAHWs.

- Lack of confidence in CAHW skills and knowledge persists among public veterinary authorities and veterinary statutory bodies, leading to resistance to formal recognition and/or the use of CAHWs.

- The offering of free or heavily subsidized services to the detriment of private CAHWs and other animal health service providers.

- CAHWs are viewed as competitors by other animal health workers.

- Competition for CAHWs from public veterinary services, itinerant traders, unlicensed service providers, or too many other CAHWs in their area.

- Poor quality, low-cost drugs and vaccines outcompete CAHW drugs and vaccines, resulting from low public awareness and inadequate enforcement of drug and vaccine quality control and certification.

- Low public awareness of animal health benefits, leading to low demand for services.

- Governments are unable or unwilling to engage sufficiently in CAHW monitoring, quality control, drug enforcement, and public awareness raising.
APPENDIX 2

Degree of recognition of CAHWs in Asian and African countries

<table>
<thead>
<tr>
<th>Countries where CAHWs are recognized in national legislation</th>
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</thead>
<tbody>
<tr>
<td>Afghanistan (BVWs)</td>
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<tr>
<td>Cambodia</td>
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<tr>
<td>Ethiopia</td>
</tr>
<tr>
<td>Ivory Coast</td>
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<tr>
<td>Lao PDR</td>
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<tr>
<td>Mauritania</td>
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<tr>
<td>Myanmar</td>
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<tr>
<td>Nepal</td>
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<tr>
<td>Niger</td>
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<tr>
<td>Philippines</td>
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<tr>
<td>Republic of Guinea</td>
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<td>Somalia</td>
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<td>Sudan</td>
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<tr>
<td>Tanzania</td>
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<tr>
<td>Togo</td>
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<tr>
<td>Vietnam</td>
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<tr>
<td>Yemen</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Countries where CAHWs benefit from supportive policies/guidelines without being recognized in national legislation</th>
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</thead>
<tbody>
<tr>
<td>Bhutan</td>
</tr>
<tr>
<td>Burundi</td>
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<tr>
<td>Cameroon</td>
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<tr>
<td>Chad</td>
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<tr>
<td>Guinea Bissau</td>
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<tr>
<td>Haiti</td>
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<tr>
<td>India</td>
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<tr>
<td>Madagascar</td>
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<tr>
<td>Nigeria</td>
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<tr>
<td>South Sudan</td>
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<tr>
<td>Thailand</td>
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<tr>
<td>Uganda</td>
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<table>
<thead>
<tr>
<th>Countries where CAHWs are trained and/or used by government services on an informal basis</th>
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</thead>
<tbody>
<tr>
<td>Angola</td>
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<tr>
<td>Bangladesh</td>
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<tr>
<td>Benin</td>
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<tr>
<td>Burkina Faso</td>
</tr>
<tr>
<td>Democratic Republic of Congo (at least in North and South Kivu provinces)</td>
</tr>
<tr>
<td>Ghana</td>
</tr>
<tr>
<td>Liberia</td>
</tr>
<tr>
<td>Malawi</td>
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<tr>
<td>Mali</td>
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<td>Pakistan</td>
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<td>Rwanda</td>
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<tr>
<td>Senegal</td>
</tr>
<tr>
<td>Sierra Leone</td>
</tr>
<tr>
<td>South Africa</td>
</tr>
</tbody>
</table>

Documentation and source available on request
REFERENCES


37. VSF Belgium (2016). Quality animal health services adapted to pastoralism in Western Africa: Policy Brief No. 4., VSF Belgium, Brussels.


64. AVSF (2014). Proximity Animal Health Services in Cambodia. AVSF, Lyon, France.


73. Boland P (2022). Rural Poultry Centre (Malawi), personal communication.


83. **Catley A, Mariner J (2002).** Where there is no data: Participatory approaches to veterinary epidemiology in pastoral areas of the Horn of Africa. Issue paper no. 110, IIED.

84. **Mdukatshani Rural Development Project (no date).** Community Animal Health Worker Guide, South Africa.


86. **Dovonou C (2016).** Des services vétérinaires privés adaptés à l’élevage mobile, Grain de Sel; 73: July 2016-June 2017.


103. FAO (2021). Sustainable Business in animal health service provision through training for Veterinary Paraprofessionals: The 3 Pillars. FAO and euFMD.


122. Royal Government of Cambodia (2001). Sub-Decree No. 26 SD on Creation and Regulation of VAHW. Cambodia.


124. Hnin Wai Zin (2022), Veterinary Officer, Myanmar Livestock Breeding and Veterinary Department. Personal communication, Aug 2022.


