Duguma et al.
CABI One Health (2025) 4:1, 0009
https://doi.org/10.1079/cabionehealth.2025.0009

CABI One Health

RESEARCH

OPEN ACCESS

Improving donkey welfare in Ethiopia: Using a sustainable scalable integrated community-based approach

Bojia E. Duguma[1]*, Sally J. Price[2] and Stephen Blakeway[3]

Abstract

Background and study aims: In Ethiopia, the country with the world's largest population of donkeys, how can people and donkeys live well together within thriving communities and a healthy environment? When human-animal relationships are often constrained by economic hardship and lack of options with limited access to equine health services and lack of awareness on proper management and care, how can external agencies best help? This article describes an integrated community-based (ICB) action-research programme to demonstrate a sustainable and scalable model for improving donkey welfare that ran from 2012 to 2017 in nine kebeles across Tigray, Amhara, and Sidama Regions in Ethiopia as part of an international body of work. **Methods:** A participatory approach involving communities, service providers, Departments of Animal Health, Education, Transport, and local administrations was employed from inception and design, planning, implementation and monitoring, through a series of participatory cycles. The programme integrated primary health care, harness improvement, community engagement, social behaviour change, and animal welfare education in schools. An exit strategy aimed at ensuring sustainability was built into each part of the programme with external support reducing as local capacity grew. **Main findings:** The programme built the capacity of partner institutions and empowered service providers in equine education. Recognition of the value of donkeys increased as relationships between donkeys and owners improved. Owners adopted improved harnesses and packsaddles and measures to reduce lameness. Disease burden was reduced alongside the transformation of veterinary clinics which became more education and equine focused. All this led to improved body and working conditions for donkeys with a significantly reduced prevalence of clinical wounds from 49.8% (95% CI: 47.8%–51.8%) in 2013 to 16.2% (95% CI, 13.7–18.7%) in 2016, a threefold reduction across the three regions. **Principal conclusions:** An integrated community-based approach proved an effective model for sustainably improving donkey welfare while also empowering communities and service providers with the knowledge, skills, attitudes, confidence and networks to become self-reliant. Better health and preventive approaches to wounds, parasites and other welfare challenges improved the efficiency of donkey work and reduced the use of environmentally harmful pharmaceuticals. Embarking on this sort of work requires an understanding of and commitment to a realistic time frame to achieve sustainable outcomes for local communities and institutions. Ideally, organizations planning to use the ICB model to improve working equine welfare would involve more partners, including but not limited to public-private partnerships and livelihoods, climate, gender and environment specialists within a One Welfare One Health framework.

One Health impact statement

This article describes an integrated community-based programme that includes animal health and welfare, improvement of equine harness technology, and inclusion of policy makers from affiliated sectors at each stage of the project cycle.

Exploring core beliefs and addressing donkey owners' knowledge, attitudes, and practices contributed to a significant long-term impact on improving donkey welfare. Life skills development in schoolchildren fostered empathy and strengthened relationships between children and donkeys.

By improving human-donkey relationships, harnesses and packsaddles, and reducing wound prevalence by a third, the programme reduced the need for antibiotics, extended the healthy working lives of donkeys, and helped owners increase revenue and improve their livelihoods.

Implementation of strategic and tactical deworming reduced the use and misuse of environmentally hazardous anthelmintics. The availability of humane euthanasia for end-of-life donkeys improved welfare and reduced abandonment of terminally ill animals, which reduced sources of infection while also improving the public image.

Keywords: Ethiopia, donkey, equine, animal welfare, One Welfare, One Health, community-based, behaviour change, life skills, participatory

[1]Ethiopian Veterinary Association (President), Addis Ababa, Ethiopia, [2]Practitioner in Applied Neuroscience, Equine Facilitated Learning, Sidmouth UK, [3]Trustee Vetwork UK, Devon, UK

*Corresponding Author: Bojia E Duguma. Email: dugumabojia@gmail.com

Submitted: 16 November 2024. Accepted: 12 February 2025. Published: 28 February 2025

Introduction

In Ethiopia, the country with the world's largest population of donkeys, how can people and donkeys live well together within thriving communities and a healthy environment? When human-animal relationships are often constrained by economic hardship and lack of options with limited access to equine health services and lack of awareness on proper management and care, how can external agencies best help? (Blakeway, 1994; Pickering and Hockenhull, 2019).

Ethiopia has 9.9 million donkeys and 0.4 million mules (FAOSTAT, 2022), 80% in rural communities and 20% in towns. They work in agriculture, improve access to water, help remove waste, provide transportation within communities and to nearby markets, assist in the empowerment of women, facilitate income generation, and play a vital role in disaster and emergency relief (Admassu and Shiferaw, 2011; Arnott, 2012; Valette, 2014; Clancy *et al*., 2022; The Conversation, 2024). While playing an essential role in the lives of rural and urban communities, they generally live miserable lives with poor welfare.

Donkeys are not recognized in Ethiopia's national development plans. Their contribution to human livelihoods goes unrecognized. Little is done to enhance their contribution or improve their welfare. It is assumed they will be replaced by tuk-tuks and squeezed out by increasing urbanization and mechanization and they are now being slaughtered for their skins. Yet there is little sign of their contribution diminishing. They have been part of human society for millennia (Goulder, 2022). In the face of human demographic changes, growing disparity in wealth between rich and poor, urban and rural communities, and in the face of climate and environmental changes, their availability, adaptability and the neatness of their low carbon hoofprints present an opportunity. Donkeys provide an entry point to empower low-income communities, help them deal with change, and recognize and value the contribution all animals make to their livelihoods.

Ethiopia has no animal welfare legislation and donkeys have been of little concern to veterinary authorities. Health and welfare challenges facing working donkeys and mules in Ethiopia include relationship and management problems such as poor communication and handling; poor nutrition; poor harnessing practice resulting in wounds, sores, and injuries; hoof associated problems and other causes of lameness; road traffic accidents, neglect and abandonment; and diseases such as tetanus, strangles, rabies, parasites, epizootic lymphangitis and colic (Yilma *et al*., 1990; Endebu and Roger, 2003; Curran *et al*., 2005; Biffa and Woldemeskel, 2006; Mekuria *et al*., 2013; Getachew *et al*., 2014; Chala *et al*., 2019; Meseret *et al*., 2014).

While traditional rural communities may still treat donkeys well (Hughes, 2012), rapid social change elsewhere has led to the acceptance of poor donkey welfare as normal, with technical gaps relating to harness, packsaddles and carts, and a lack of professional competence in equine health care. In addition, institutional and policy gaps exclude donkeys as a subject from training and education, technical support services, and national development policy and strategy.

This article describes a donkey welfare programme ('the programme') that ran from 2012 to 2017 to test the effectiveness of an integrated community-based (ICB) approach to improving donkey and mule welfare that engaged and empowered communities and service providers and influenced animal welfare policy and legislation for lasting change. It aimed to show that integrating education, donkey health care and other interventions bring measurable benefits: changing behaviour towards donkeys, improving donkey-positive working practices, embedding attitudes, behaviours and practice within all relevant sectors, and influencing policy at the local, state and ultimately national levels.

It was implemented by The Donkey Sanctuary (TDS), an international non-governmental organization, that has worked in Ethiopia since 1995 and understood that donkey welfare problems are deep-rooted and multifaceted. TDS started by supporting Addis Ababa University, Oromia Region (MOU, 1995), conducting research, and providing treatment services to the surrounding area, with a separate small primary school education programme, then in 2008 registered in Ethiopia and extended similar work to Amhara, Tigray, and Sidama Regions.

It followed an organizational review and internal capacity building. A new strategy grew out of lessons from the intersection of human, animal, and environmental welfare (the emerging concept of One Welfare) including philosophy, applied animal health and welfare, human community development, and environmental awareness (Schumacher, 1973; Chambers, 1989; Carson *et al*., 2000; Catley *et al*., 2002; Singer and Harari, 2024). It aimed to engage and learn across all aspects of donkey welfare and donkey-human-environmental interaction worldwide ultimately reaching all donkeys around the world; and had seven themes: assessment-led community-based donkey welfare interventions; donkey-assisted learning (DAL); understanding emerging themes (such as feral donkeys and the growing trade in donkey skins); tertiary education; policy and advocacy; support to local donkey sanctuaries; and building a worldwide network for donkey welfare.

Internal capacity building included institutional change and its associated processes and negotiations in UK and internationally including Ethiopia, putting in place the necessary agreements, and diversifying teams (recruiting community development and education officers, social scientists and anthropologists, and providing on-the-ground practical training in PLA tools and facilitation skills). International teams in Ethiopia, Egypt, Kenya, Mexico, and India already employed only local staff in all locations. Ongoing regional and international workshops allowed staff from different countries and organizations within a growing worldwide network to meet, set up skill-sharing inter-project visits, and exchange experiences and learning about how similar approaches worked out in different places and cultures.

TDS continued to support work at Addis Ababa Vet School; built new relationships with regional veterinary colleges; started a project with Alagae Technical and Vocational College to train animal health assistants; initiated a donkey-assisted learning project at Menegesha with Cheshire Services; and strengthened international connections, particularly within Africa.

The programme was implemented in nine communities, some rural, some urban across three regional states: Amhara, Tigray, and Sidama. Impacts on mule welfare within the Bahir Dar project has already been reported (Duguma *et al*., 2021) and other projects and activities within the wider worldwide programme are referred to within this article.

Methods

INTERVENTION AREAS

This integrated community-based programme was piloted in Amhara, Tigray, Oromia, and Sidama regions of Ethiopia, with the intention to extend the model nationally. Regions were selected purposefully for their high equine populations, the centrality of donkeys to the livelihoods of the people, and their relevance to policy formulation. According to the Ethiopian Statistics Services, the four regions constitute 93% of the equine population of Ethiopia (CSS, 2021).

Multistage sampling was used to select zones, woredas, and kebeles (the smallest administrative region). Zone selection used the same rationale as Regions and included regional capitals to involve policy makers. Woreda selection was based on donkey population, donkey welfare challenges, socio-economic relevance, availability of public veterinary clinics, primary schools, and farmer's training centres, and to capture evidence from across urban, rural, and urban-rural interface communities. The worst donkey welfare problems were observed at interfaces between urban and rural where donkeys are a lifeline for poor youth who immigrate from rural to urban areas (see Figs. 1 and 2).

Kebeles were selected after training and deploying a team of experts to scope working donkey and mule welfare in five kebeles in each of the selected woredas, including regional towns and equine welfare hotspots, before selecting three target kebeles (Fig. 2 and Table 1).

The work in the Oromia region, a partnership with Addis Ababa University, College of Veterinary Medicine and Agriculture, is not included in this report.

TARGET POPULATION

Populations (see Table 1) in the target kebeles included 8958 households with 12,703 donkeys: 9583 pack donkeys and 3120 cart donkeys. Donkeys in the Amhara and Tigray kebeles were used in agriculture and for the transport of local agricultural and household goods including water. Donkeys in Sidama were mainly used for pulling carts and transporting water, trade commodities, and solid waste.

Programme reach was extended through networking and advocacy and by extending training to animal health service providers outside target kebeles to include the rest of the kebeles in the target woredas.

Sample size and sampling strategy

The programme assumed all donkeys and households in the target kebeles would benefit from the intervention. Welfare assessment and wound surveys used systematic random sampling, with every other donkey sampled. All donkeys presented for treatment during the intervention were treated. It was considered unethical not to treat donkeys seeking help during the intervention.

STUDY FRAMEWORK

The programme took an action-research approach, engaging all stakeholders in the community and addressing immediate animal health and welfare issues, while also collecting evidence to bring long-term impactful change.

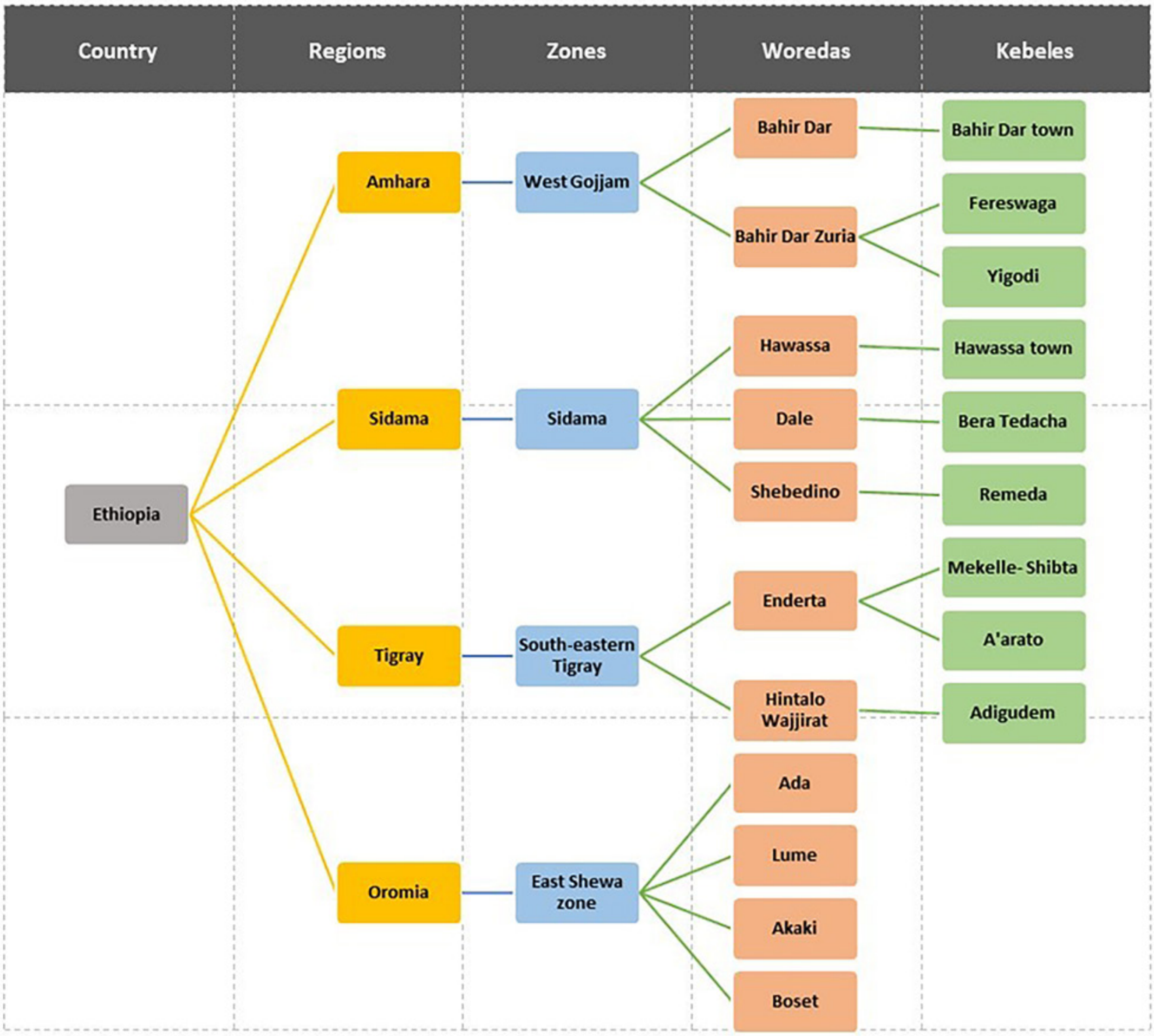

Fig. 1. Multistage sampling of regions, Zones, Woredas, and Kebeles for the programme intervention.

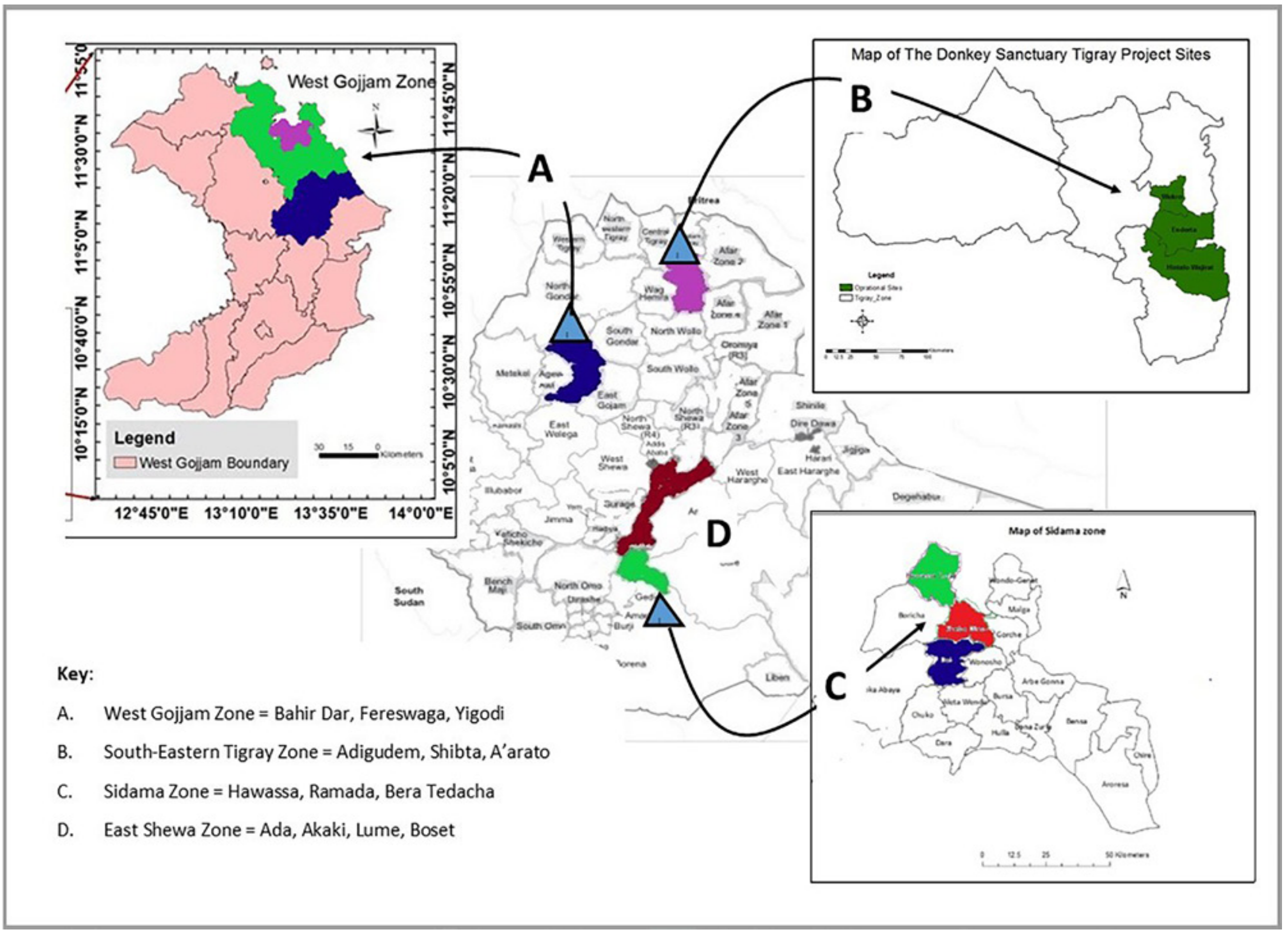

Fig. 2. Map of integrated community-based intervention.

Table 1. Target Kebeles, donkey population, and households.

Region	Kebeles	Target donkey population	Households (donkey/mule owners)
Amhara (west Gojam zone)	Fereswaga	2,460	848
	Yigodi	2,441	861
	Bahir Dar and its suburbs	1,000	1,300
Tigray (South-estern Tigray zone)	Adigudem	661	630
	Shibta	1,176	1,047
	A'arato	1,157	862
Sidama (Sidama zone)	Bera Tedacho	369	310
	Hawassa and its suburbs	3,120	3,100
	Ramada	319	197
	Total	12,703	8,958

Each regional project was linked with three government sectors, Agriculture, Education, and Transport, which worked together to develop a common language of transformation for donkey-owning communities.

Each project integrated community partnership, education, health care extension, improvement in equine harnessing technology, increased traffic awareness, and promotion of equine (animal) welfare through school clubs and local media outlets.

The Theory of Change was that while any one element implemented independently might have a small impact on donkey welfare, implementing them together would have a multiplier effect, accelerating behaviour change, institutional transformation, and policy adoption, and leading to more sustainable improvements in both animal welfare and community practices.

The programme study framework took a participatory, whole community development, education, and empowerment approach

(Chambers, 1989; Catley *et al*., 2002; Dijk, 2011; Freire, 2017; IIED, 2024) and drew on animal welfare philosophy (Singer and Harari, 2024) and environmental awareness (Carson *et al*., 2000).

The social science approaches outlined in Box 1 below formed the foundation of the programme including technical interventions. Each project followed a participatory programme cycle from community engagement, stakeholder analysis, and needs assessment through planning, implementation, monitoring, and evaluation (Griffith *et al*., 2024; Osman *et al*., 2023). Reflection and review were central to all activities. Separate exit strategies, based on stages of self-sufficiency instead of fixed timelines, were designed for each segment of the model.

Education and learning worked on Knowledge, Attitudes, Behaviour and Practice (KAP), engaging with people on multiple levels to bring change (Dilts, 1990). Understanding the root causes of community beliefs about donkeys was crucial to effecting behaviour change. PLA tools facilitated engagement and included observations and demonstrations of donkey behaviour and handling, examination, and treatment.

Short video clips of different emotional 'body language' expressions collected as a library during Qualitative Behaviour Assessment (QBA) training (Wemelsfelder, 2007; Minero *et aXl*., 2016) helped donkey communities discuss and understand their donkeys' experience better, giving donkeys a voice.

Whole community engagement was a core theme. Stakeholder analysis and needs assessment focused on what partners needed to know from and about each other. Implementation focused on working together to share and develop knowledge and skills.

Stakeholder analysis

Stakeholder groups and key informants (including gatekeepers and local experts) were identified through consultation and stakeholder mapping (see Box 2). Engaging stakeholder interests, understanding their roles in relation to donkey welfare, and having their input, were central to finding lasting solutions.

Project/donkey welfare needs assessment

PLA tools and KAP analysis were used to establish donkey welfare needs in the community (see Table 3). Retrospective assessment of clinical data and recurring epidemics in target public veterinary clinics deepened understanding of local welfare problems and diseases (see Table 4).

Problem and solution tree exercises (Pretty and Guijt, 2002) helped communities, local subject experts and service providers

Box 1. Summary of social science concepts and themes that provided the foundation for the programme.

Integrated community-based approach

- All stakeholders, everyone in the community with an interest in or influence over donkey welfare or efficient donkey power, analysing the situation together and working towards the same ends with common language and messaging.

Knowledge, attitudes and practice/behaviour:

- A conceptual model based on the idea that knowledge affects attitudes and can lead to change in behaviour (Schwartz, 1976).

Life skills:

- 'Personal, interpersonal, cognitive and physical skills that enable people to control and direct their lives, and to develop the capacity to live with and produce change in their environment to make it conducive to health' (WHO, 2021). Life Skills include: problem solving, critical and creative thinking, effective communication, decision making, building self-awareness and interpersonal relationships, empathy, and coping with stress and emotions, and managing life in a healthy and productive manner (Singh, 2003).

Beliefs:

- Beliefs lie at the heart of much of our behaviour, can be formed by interactions including with our environment, family, friends, culture, religion, and schools, and are held at different depths in our psychological identities including spirituality (a sense of belonging collectively and collective agency) (Dilts, 1990). Understanding beliefs about donkeys is essential to understanding why people behave towards donkeys as they do. Confronting beliefs that are harmful to donkeys and the relationships we have with them is essential to improving the welfare of donkeys and people who work with them.

Participatory learning and action tools (PLA):

- PLA tools (Catley and Leyland, 2001; International Institute for Environment and Development (IIED), 2024) are multi-purpose engagement exercises that can be used flexibly depending on need and preference by experienced facilitators. They include brainstorming, ranking, proportional piling; mapping; key-informant, semi-structured, formal and informal interviews; focus-group discussions; reflection and discussion; case stories; observation, transect walks, and demonstrations including donkey behaviour and handling, examination and treatment.

Empowerment:

- 'The process of becoming stronger and more confident, especially in controlling one's life and claiming one's rights' (High Speed Training, 2024).
- Hennink reports 'how empowerment is defined and operationalised in community initiatives' … 'showing a conceptual framework' … 'comprising six mechanisms that foster empowerment (knowledge; agency; opportunity; capacity-building; resources; and sustainability), five domains of empowerment (health; economic; political; resource; and spiritual), and three levels (individual; community; and organisational)' … with 'interdependence between components, indicating important programmatic implications for development initiatives' (Hennink *et al*., 2012).

Human behaviour change:

- Put simply, all development interventions presume behaviour change. The programme drew on the growing body of experience in changing human behaviour towards animals. Interventions that acknowledge individuals' decision making processes and the implicit trade-offs required of individuals to change behaviour are likely to be more successful (Pollitt, 2013; Birke and Hockenhull, 2012; Price, 2012; Price, 2010).

analyse the root causes of welfare problems affecting donkeys and find ways to address these problems. A consolidated summary of problem and solution tree exercises from across the programme is presented in Fig. 4.

Suggested solutions included training: animal health professionals in equine health and welfare and community facilitation skills; local agricultural development agents in harness and packsaddle making; and donkey owners in donkey behaviour and welfare.

Box 2. Project stakeholder analysis by affiliation.

Local community
- Men, women, and children
- Donkey owners
- Idir (social institutions used for mutual aid within a specific community (Pankhurst and Mariam, 2000))
- Community-based institutions (CBI)
- Faith-based Institutions (FBI)

Service providers
- Animal health professionals
- Livestock extension agents
- Trained harness makers

Project signatories and regional-level actors
- Regional Bureau of Agriculture (Amhara, Tigray and Sidama)
- Regional Bureau of Education (Amhara, Tigray and Sidama)
- Veterinary Colleges (Hawassa and Mekelle)
- Regional NGO facilitation desks (Amhara, Tigray and Sidama)
- Regional mass media (Amhara, Tigray, Sidama)

Implementing organization (local and international experts)
- Trained equine health and welfare experts
- Trained community development and education experts
- Harness designers and trainers

Suggestions for addressing policy gaps included animal welfare education in schools (together with the social contribution of animals more generally); better equine education in veterinary colleges; improving access to services; and lobbying policy makers for animal welfare legislation at regional and national levels.

Education and training objectives were based on identified needs and set within the five animal welfare freedoms/domains framework (Farm Animal Welfare Council, 1993; Mellor *et al*., 2020).

Animal-based welfare assessment

A five-point qualitative animal-based welfare assessment tool (the 'Hand') was used for scoping, benchmarking, and monitoring progress throughout the project (Blakeway, 2014). The Hand was also used for owner education as a simple routine procedure owners/handlers could use to assess the welfare of their donkeys (Galindo *et al*., 2018). The Hand looks at (i) relationships and behaviour, (ii) body condition score, (iii) wounds, (iv) lameness, and (v) other signs of ill health. Each of these was assessed against a five-point scale (1 near perfect, 5 the worst welfare; except for body condition which followed the commonly used body condition scale where 1 is skeletal, 3 ideal, 5 obese) (Evans *et al*., 2018).

In 2013 and 2016, simultaneous with Hand assessment, wound surveys were carried out using body-mapping tools (Pretty and Guijt, 2002). Assessed and surveyed donkeys were drawn from the target population gathered for strategic deworming at public veterinary clinics, water points, or public places (see Tables 7 and 8). Sampling was carried out using systematic random sampling, with every other donkey sampled.

Table 2. Explanation of integration rationale with corresponding numbers from 1 to 5 in Fig. 3.

Elements integrated	Rationale
1. Primary health care × Community partnership and education	• A fundamental welfare challenge for working donkeys is poor management, either due to a lack of knowledge or an ingrained negative attitude among owners. • Owners tend not to take sick donkeys to vet clinics, instead using traditional practices (drenching, branding,) that may exacerbate the underlying health condition. • Engaging communities, who have the greatest impact on donkey welfare, can bring lasting change, protecting animals and preventing harm
2. Primary health care × Harness improvement	• Over 30% of donkeys suffer from harness-inflicted back sores in Ethiopia (Getinet *et al*., 2014) • Improving harnesses will reduce the incidence of harness-inflicted wounds, and prevent associated diseases
3. Community partnership and education × Harness technology improvement	• Poor harnessing practice of working animals, an obvious welfare concern, is common throughout Ethiopia. • Transferring knowledge and skills for making improved harness to communities of donkey owners will help reduce harness inflicted wounds.
4. Health × education × technology	• Health care alone is never enough. Raising community awareness about animal health and welfare in general supported with technology helps mitigate donkey welfare risks sustainably
5. Animal welfare clubs × the rest of the elements	• Schools are highly valued as community institutions that provide knowledge and skills to effect change. Many donkey-reliant communities have primary schools. Many schoolchildren spend time outside of school caring for animals. Introducing fun, creative educational tools based on good donkey welfare practice into the primary school curriculum can help children engage with education in general while also improving donkey welfare. • Schoolchildren can use role-playing and drama to compare a donkey in need to a child in need, emphasizing that animals are sentient beings while also providing a safe space for children to learn about their own needs. • School animal kindness clubs can help combat animal cruelty and neglect, limiting traditional malpractices, and providing access to modern veterinary practice. • Involving schools and school clubs can help accelerate lasting social behaviour change.

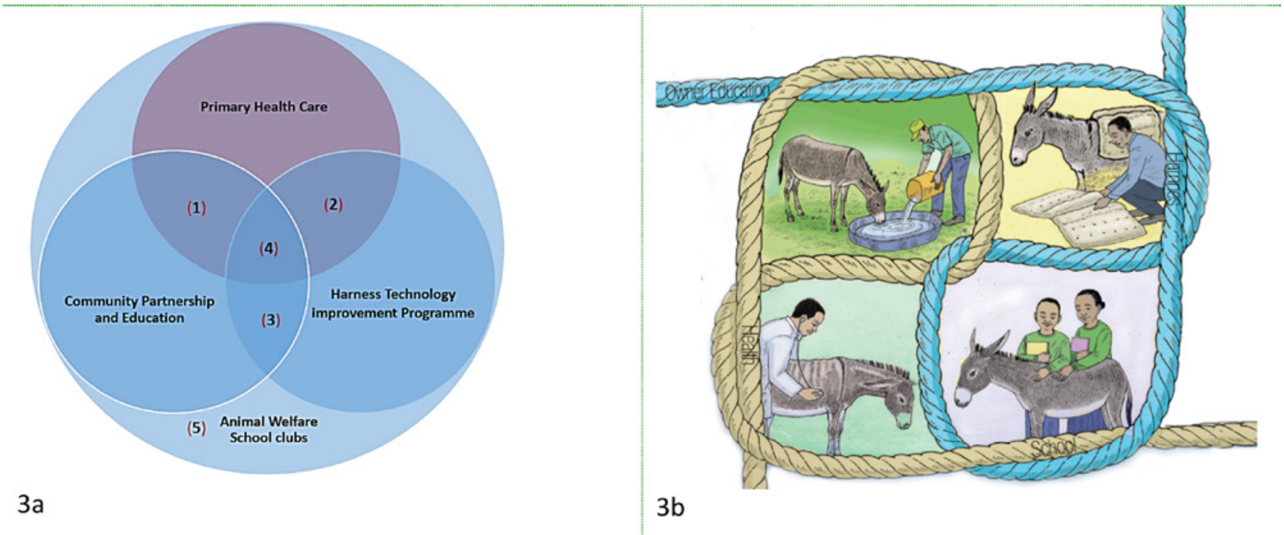

Fig. 3. (a) It presents the integrating elements of ICBI; (b) It shows a project community education poster.

PROJECT INTERVENTION MODEL

Each project integrated (i) community partnership and social behaviour-change education; (ii) donkey primary health care; (iii) harness technology improvement; (iv) animal welfare school clubs; and (v) engaging institutions and policy makers to promote animal welfare. Figure 3a and b presents the integrating elements of ICBI, while Table 2 explains the rationale for integrating each component.

PROJECT IMPLEMENTATION PLANS

Project implementation focused on communication, learning, sharing knowledge and skills, and changing behaviour. Detailed implementation plans were developed with local stakeholders in each community following the approach detailed below.

Donkey primary health care

While focused on three target kebeles, the programme aimed to transform equine health care delivery across the whole woreda by engaging with staff in all public veterinary clinics and animal health posts. Woredas contain an average of 20 kebeles. Each woreda has at least one main public veterinary clinic staffed by senior veterinarians and smaller clinics and/or animal health posts staffed by junior veterinarians or animal health assistants. One clinic or health post is expected to serve three or more kebeles. The main clinic oversees and provides training and resources for the other clinics or animal health posts.

The programme aimed to transform the main clinics into model clinics while providing training and support to all woreda animal health professionals in all the clinics and health posts. Local donkey primary health care intervention plans were developed together with main clinic staff (details in Box 3).

Community partnership and education

Building empowering partnerships with donkey-owning communities was key to programme success, and to this end the project used the approaches and concepts described in Box 1.

Based on these concepts, projects followed the steps outlined in Box 4 to develop empowering partnerships with local communities.

Owner education was delivered through formal and informal events. Formal events were delivered by project education professionals using PLA tools followed by a calendar of modules related to seasonal changes in work, working conditions, and disease epidemiology. For example, education on wound prevention took

Box 3. Primary health care activity summary.

- Retrospective analysis of clinical data and recurring epidemics
- Animal health professionals training based on welfare assessment and findings of clinical data:
  - Develop a competence framework and training log from 'beginner' to 'trainee', 'independent practitioner', and 'trainer', to assess competence level and monitor progress of trainees (Duguma *et al*., 2021)
  - Assess training needs against competence framework
  - Develop five training modules: donkey behaviour, handling and welfare assessment; equine clinical case management; equine lameness and hoof care; equine disease prevention and control; and community facilitation skills
  - At least 6 months of real-time follow-up training using cases presenting to clinic
- Transform the culture of the public veterinary clinic to education- and welfare-friendly
- Develop recording and reporting formats that disaggregate equines cases into donkeys, mules and horses
- Introduce welfare extension and disease prevention calendars

Box 4. Community partnership and education activity summary.

- Identify and work with key informants to analyse the socio-economic value of donkeys and their role in livelihoods
- Explore knowledge, attitude, and practice gaps of donkey owners regarding donkey welfare
- Analyse traditional practices, identifying good and poor practices, and positive and negative beliefs
- Recognize general donkey welfare needs: handling, nutrition, harness, hoof-care, health care, shelter and safety
- Design and integrate community education strategies with other elements of the project
- Develop behaviour change and communication (BCC) tools (e.g. billboards, posters, flyers, radio shows)
- Use farmer training centres, public spaces, water points, and vet clinics as educational and demonstration sites
- Engage community-based institutions (CBIs) and mass media as agents of social behaviour change
- Establish community animal welfare bylaws based around local welfare problems and framing with the Five Animal Welfare Domains

place at harvest time and dry season when donkeys are most used for carrying agricultural produce and water, while education on deworming took place before and immediately after the rainy season when parasites present the greatest challenge.

Informal training at veterinary clinics was based around cases presented. Animal health and welfare extension units were established at the model veterinary clinics with equine welfare resources for owner education. Project extension teams engaged with owners at water points, grinding mills, and donkey parking lots at markets. Specific campaigns targeted public events such as World Animal Day, Food Day, Environment Day, and Women's Day. And all three regional mass media outlets ran programmes on donkey welfare.

Clinical cases, vaccination and deworming calendars, posters showing before and after scenarios, physical items such as improved versus un-improved packsaddles, student drama shows, and donkey behaviour video clips were all used to support community education.

Packsaddle and harness improvement programme

Poorly-made and poorly-designed harness and packsaddles wound donkeys. Harness and packsaddle improvement was therefore essential to each project.

Project staff and owners examined donkeys together with their packsaddles and harness, discussed how they work and saw how poor design, manufacture and maintenance cause discomfort and wounds for the donkey and waste draft power.

Improvement involved the following activities (see Box 5).

Animal welfare school clubs

Rural primary schools were identified as a central component of the programme because they are trusted public institutions embedded within the rural community with a mandate for long-term behaviour change and social transformation, and they play a central part in helping children develop life skills.

In each kebele, target schools were identified where pupils came from local donkey-owning communities and spent their free time looking after donkeys and other livestock.

Animal welfare was introduced as an extra-curricular activity, with animal welfare clubs to nurture empathy. Education resources, including an Animal Welfare Handbook, were developed and translated into the local languages of each region. Teachers were trained on how to teach animal welfare.

The project activity summary is presented in Box 6.

Box 5. Packsaddle technology transfer activity summary.

- Donkey-side situation analyses of the problems associated with traditional packsaddle technology including harness-inflicted wounds
- Help harness makers and owners understand the cause-and-effect relationship between poor harnessing and wound incidence
- Develop and test a local packsaddle prototype within the community with these criteria: science and art, purpose, affordability, access to raw materials
- Identify and provide practical training for artisan trainers on the developed prototypes who, in turn, train owners (or specialist local packsaddle makers)
- Promote improved packsaddles (making and use) at public places, markets, farmer training centres, schools, and veterinary clinics.

Box 6. Activity summary of animal welfare school clubs.

- Identify partner schools in each region and consult with school principals and education experts on the relevance of animal welfare education to enhance children's life skills and promote animal welfare
- Develop learning resources for school animal welfare education, including an Animal Welfare Handbook to guide teachers and students
- Train teachers in animal welfare concepts and principles, and use of school Animal Welfare Handbook
- Establish and support animal welfare clubs to promote animal welfare in each school
- Develop animal welfare resource centres to facilitate club activities and adult education
- Lobby policy makers for the introduction of animal welfare education into the school curriculum.

PROJECT MONITORING, EVALUATION, ACCOUNTABILITY

Project monitoring, evaluation, and accountability involved the following:

a. Establish Animal Welfare Committees (AWC) drawn from Bureaus of Agriculture, Education, Transport, Kebele administration, community-based organizations, and TDS meeting quarterly to review project progress.
b. Routine use of the 'Hand' throughout the project as a training and monitoring tool.
c. Donkey welfare assessment and wound surveys (see Section "Animal-based welfare assessment").
d. External mid-term and final evaluations by project signatories including the respective Regional Bureaus of Agriculture, Education, and Transport.

PROJECT EXIT STRATEGY

The project exit strategy was designed to ensure sustainable improvements in donkey welfare by integrating primary health care, community partnership and education, harness improvement, school animal welfare clubs, and institutional support, and by embedding new competences within local institutions. Each component worked through a series of stages without fixed timelines as some needed more staff support time than others, with some processes taking longer than others.

a) Primary health care: Efforts focused on establishing trust between donkey owners and government vet clinics, improving the competence of Animal Health Professionals (AHPs) in equine health and welfare, upgrading clinics to be equine-friendly, and advocating for the inclusion of equine-specific drugs and equipment in routine vet supplies.
b) Community partnership and education: The strategy worked to transform donkey owners' knowledge, attitudes, and practices (KAP). Through education based on welfare principles, owners analysed the roles played by donkeys and hence the need to protect their welfare. Animal welfare committees were established to integrate welfare practices into health, education, and harnessing programmes. Community bylaws were institutionalized to ensure long-term adoption of welfare practices.
c) Harness improvement programme: Working with local communities and locally available resources, prototypes of improved packsaddles and carts were developed for testing in each community. Training was provided to local harness makers, owners, and artisans, together with partnerships when possible with relevant local technology firms. Public veterinary clinics and livestock extension systems incorporated harness education into equine health extension programmes to encourage engagement and adoption.
d) School animal welfare clubs (AWCs): AWCs were institutionalized as co-curricular activities in schools, with resource centres established to support animal welfare education. Animal welfare handbooks in the local language

were developed in each of the four regions to integrate animal welfare education into school curricula.

e) Institutional support: The programme built close working relationships with all relevant local administrative, service providers, and university departments, including education, veterinary, livestock and agriculture, roads and transport, police, water, and sanitation. Officers and staff from these departments played a central role in monitoring and evaluating the programme to enable them to take ownership of the progress made.

STATISTICAL ANALYSIS

Both descriptive and inferential statistical methods were used. A qualitative analysis of focus group discussions with key informants was presented with analysis against three themes: health, education, and harness technology. Wound prevalence differences at the beginning and end of the intervention were evaluated using Chi-Square test and 95% confidence intervals. Median scores were used to evaluate each of the welfare criteria. The welfare criterion scores from 2013 across various regions were compared with the corresponding 2016 scores by analysing each of the welfare criteria at a time using the Pearson Chi-Square test. Project outputs and trends in the clinical data were presented in tables and figures. STATA 11 was used to analyse data. The significance test was set at $P < 0.05$.

Results

Results of the programme are presented below with boxes, tables and graphs as in the order described in Methods.

PROJECT INTERVENTION AREAS

The selection of kebeles provided representative results and case studies for policy work (Figs. 1 and 2; Table 1).

TARGET POPULATION

Engagement with the target populations (Table 1) convinced policy makers of the value of the approach used.

STUDY FRAMEWORK

Stakeholder analysis

Results of stakeholder analysis, with core stakeholder groups by affiliation, are presented in Box 2.

Project/donkey welfare needs assessment

Stakeholders provided insight into the health and welfare of donkeys, who and where donkey owners go for help, the knowledge and skills of local service providers, and the lack of an enabling policy environment for donkeys. Results of donkey needs analysis are presented in Tables 3 and 4; and Fig. 4.

Consolidated results of problem and solution tree exercises across all three regions are presented in Fig. 4. The exercise was highly praised by local communities, service providers, and policy makers for helping them understand the complexities of donkey welfare issues and design practical solutions for long-term change. The donkey welfare problem was represented by a century-old tree bearing fruits against a donkey's quality of life, and the solution was to uproot the century-old tree. Figure 4 shows a consolidated summary of problem and solution tree analysis of working donkey welfare (Fig. 4a and b, respectively).

Retrospective analysis of equine clinical records in each region between 2010 and 2012 indicated a mix of management-related and infectious problems across horses, mules, and donkeys (Note: prior to the programme, equine clinic data was aggregated). Results are presented in Table 4.

Animal welfare assessment

Hand welfare assessments were used routinely to monitor the impact of the programme on donkey welfare. In 2013 and 2016, a structured assessment was conducted across all regions collecting Hand data and more detailed wound surveys (see Table 5).

INTERVENTION

Results from the intervention provided evidence of improvement in overall donkey welfare and the success of the approach.

PROJECT IMPLEMENTATION

Primary donkey health care intervention outcomes

Trained animal health professionals

Numbers of AHP trainees attending the five equine training modules, and numbers reaching overall independent and trainer level competency (Duguma *et al*., 2021) in each region are presented in Table 6.

Table 3. Donkey Welfare needs analysis by key informants (KI).

Stakeholder's group	Methods	Donkey welfare needs
KI drawn from the local community		
Donkey owners (men and women)	Brainstorming	Improve knowledge, attitude, and practice (KAP) in donkey management and care
Community leaders, elders	Simple ranking	
Religious leaders	Scoring	
KI drawn from service providers		
Animal Health professionals Livestock extension agents Harness makers	Semi-structured interviews, direct assessment	Training needs: donkey handling, management, health care, harness, and packsaddle
KI signatories and regional-level actors		
Regional Bureau of Agriculture Regional Bureau of Education Veterinary Colleges Regional NGO facilitation desks Regional mass media	Consultative workshops	Public awareness on the socioeconomic value equids; the need to include in formal development packages, training needs; development of animal health infrastructure to accommodate equine care; equine education in veterinary colleges and schools; animal welfare legislation.

Table 4. Retrospective analysis of equine cases.

Case type	Amhara	Tigray	Sidama	Means of diagnosis
Infectious diseases				
Internal parasites	√	√	√	Microscopic exam
External parasites	√	√	NA	Microscopic exam
Tetanus	√	√	√	Clinical exam
Strangles	√	√	√	Microscopic exam
Ulcerative lymphangitis	NA	NA	√	Microscopic exam
African Horse Sickness	√	√	NA	Recurrent outbreaks
Equine Herpes virus 1	√	NA	NA	Recurrent outbreaks
Rabies	NA	√	NA	Immunofluorescence test
Epizootic lymphangitis	√	√	NA	Microscopic exam
Dermatophilosis	√	√	√	Microscopic exam
Respiratory syndrome	√	√ (“Asso”)	√	Clinical exam
Drenching pneumonia	√	√	√	Clinical exam
Non-infectious diseases				
Colic	√	√	√	Clinical exam
Dystocia	√	√	√	Clinical exam
Paraphimosis, phimosis	√	√	√	Clinical exam
Urinary tract problems	NA	√	√	Clinical exam
Rain scold	√	√	NA	Clinical exam
Castration	√	√	√	Owner’s request
Ocular problems	√	√	√	Clinical exam
Lameness				
Hoof associated problems (overgrowth, wear, cracks)	√	√	√	Clinical exam
Other musculoskeletal (fracture, car accident, joint problems, cellulitis)	√	√	√	Clinical exam
Harness related wound and injuries				
Back sore, tail sore and chest sore	√	√	√	Clinical exam
Other injuries (beating, branding)	√	√	√	Clinical exam

“Asso” is a local name for a respiratory syndrome of donkeys in Tigray.

Dropouts, job changes, and a lack of interest in equine health, particularly hoof care, all contributed to the failure of some AHPs to achieve an overall independent competence level in equine health and welfare.

Trend analysis of all cases admitted to the public vet clinic

Each case presented to the public veterinary clinics was used as a training opportunity for local AHPs. Cases included treatment of sick donkeys in each clinic, strategic deworming twice a year before and after the rainy season, vaccination, and euthanasia of terminally sick donkeys and mules. Collectively the programme provided health care to a multitude of donkeys in each region (see Fig. 5).

Reduction in wound prevalence

The results of the cross-sectional wound surveys conducted in 2013 and 2016 to assess the impact of the project and corroborate Hand results on the most visible animal-based measure are reported in Table 7.

Programme impact was most evident in the threefold reduction of wound prevalence of working donkeys from 49.8% to 16.2%. There is stronger evidence (P < 0.001) in the variation of wound prevalence between regions before intervention compared to the evidence after the programme (P < 0.026), demonstrating the positive impact of the programme.

Community partnership and education

Identified community KAPs and education ob jectives (outcomes)

Donkey owners and key informants identified gaps in community KAP and from these, educational objectives were developed as shown in Table 8.

The number of donkey owners who attended formal project designed education is presented in Table 9.

Harness technology improvement programme

Packsaddle prototypes were developed in each region, adapted from current design and using locally available materials: a Bahir Dar

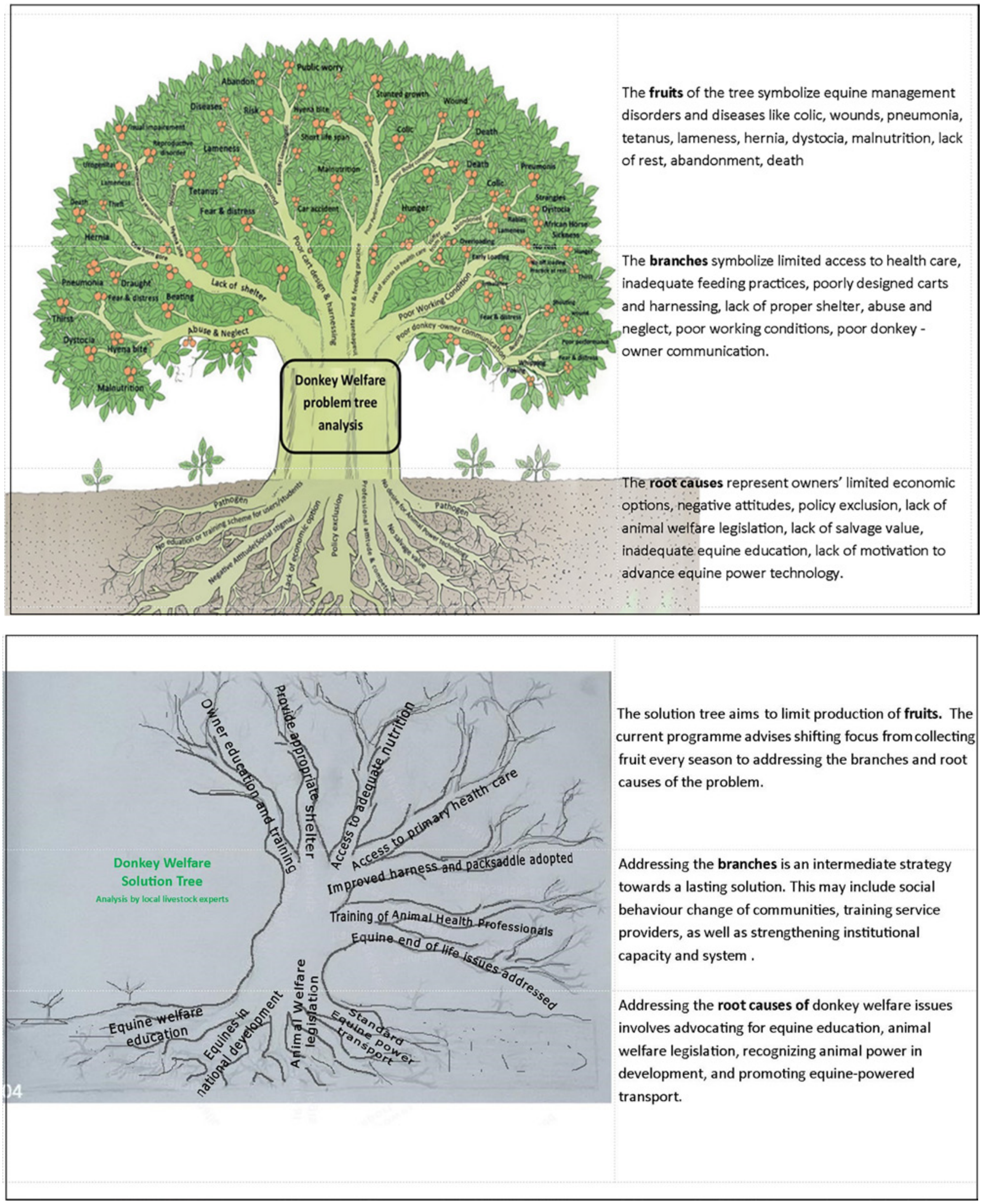

Fig. 4. (a) Donkey Welfare Problems as symbolized by a Century-old Tree (problem ≈ tree); (b) A consolidated solution tree analysis representing a withering tree that no longer bears fruit.

prototype for working donkeys in Amhara (Fig. 6c), an Adigudem prototype for pack donkeys in Tigray (Fig. 6b) and a Bishoftu (Debre Zeit) prototype (Fig.6a) which was originally developed for pack donkeys in Oromia and later adopted for Sidama.

Except for the Adigudem prototype, which has wool on its lower side, all prototypes were made of fertilizer sacks on top and sisal sacks (a natural breathable fibre) on the lower, donkey side.

The project trained local packsaddle makers and owners and successfully transferred the technology into communities through training of trainers, volunteers trained to train others in their communities. Attempts to commercialize packsaddle making and sale as a standalone business were not successful in all the regions.

Table 10 presents the number of owners, harness makers, and agricultural development agents trained in harness making.

Table 5. Donkey welfare assessment compared between the years 2013 and 2016.

Region	Year	Number of samples	Median score and standard error, 1 to 5 scale with 1 perfect, 5 worst (apart from body condition scores)				
			Behaviour	Condition score	Wound	Lameness	Other illness
Sidama	2013	822	3±0.27	2±0.19	4±0.32	3±0.12	3±0.38
	2016	232	3±0.26	2.5±0.16	2±0.06	2±0.25	2±0.16
Amhara	2013	899	3±0.37	2± 0.15	3.5±0.20	3±0.23	3±0.27
	2016	394	2±0.13	2.5±0.20	2±.08	2±0.13	2±0.30
Tigray	2013	735	3±0.29	2±0.18	3.5±0.17	3±0.08	3± 0.30
	2016	533	3±0.31	2±0.24	2±0.09	2±0.12	2±0.17
Comparing overall scores for each of the welfare criteria in 2013 and 2016.			$P = 0.686$	$P < 0.001$	$P < 0.001$	$P < 0.001$	$P = 0.353$

The intervention resulted in a significant reduction in wound and lameness scores and an increase in condition scores across all regions ($P < 0.001$).

Table 6. Training provided to animal health professionals and number of attendees in each region.

Training modules	Animal health professionals trained in TDS modules and competency levels by region		
	Amhara	Tigray	Sidama
Donkey handling and behaviour and welfare assessment tools	24	27	34
Equine clinical case management	26	33	43
Equine lameness and hoof care	20	24	26
Equine disease prevention and control	28	26	23
Community facilitation skills	22	24	24
Average person modules	24	27	30
Competence level at the end of the project period (2012–2016)			
Independent	6	14	11
Trainer	14	8	12
Total competent AHP in each region	20 (83%)	22 (81%)	23 (77%)

Animal welfare school clubs

Through the animal welfare clubs, children became involved in promoting animal welfare creatively within their communities. Activities included role plays, dramas portraying various life challenges of a donkey as well as the behaviours of owners, production of songs that praises the value of working animals, story-writing and storytelling, painting of murals on school walls, campaigns, and conveying messages through Q&A platforms. Figure 7 shows photographs from animal welfare club activities and Table 11 presents data on school activities.

These educational activities raised children's knowledge and understanding of animal welfare, awareness that working animals are sentient beings and provided opportunities to exercise and develop life skills including empathy for animals and nature, communication, problem solving, and self-confidence. Regional education and curriculum experts recommended the inclusion of animal welfare education in the national education curriculum and co-curriculum.

Donkey club members persuaded owners and millers to stop loading donkeys with freshly milled flour which can get so hot it can burn a donkey's back, and mill owners to provide shade and water to donkeys waiting to collect flour.

School donkey welfare clubs used the UN recognized Life Skills approach to engaging children in educational activities, giving children opportunities to develop their life skills. Success was grouped with other activities and assessed against the collective change in donkey welfare parameters. Table 12 shows the life skills, tools used and change outcomes, and how they are interconnected.

PROJECT PROGRESS MONITORING AND EXIT STRATEGY

An Ad-hoc Animal Welfare Committee (AWC) comprised of delegates from the Government Bureaux of Education, Livestock, and the Animal Health and Transport/Traffic units played a critical role in overseeing the programme. The AWC conducted consultations and field visits to monitor the progress of various

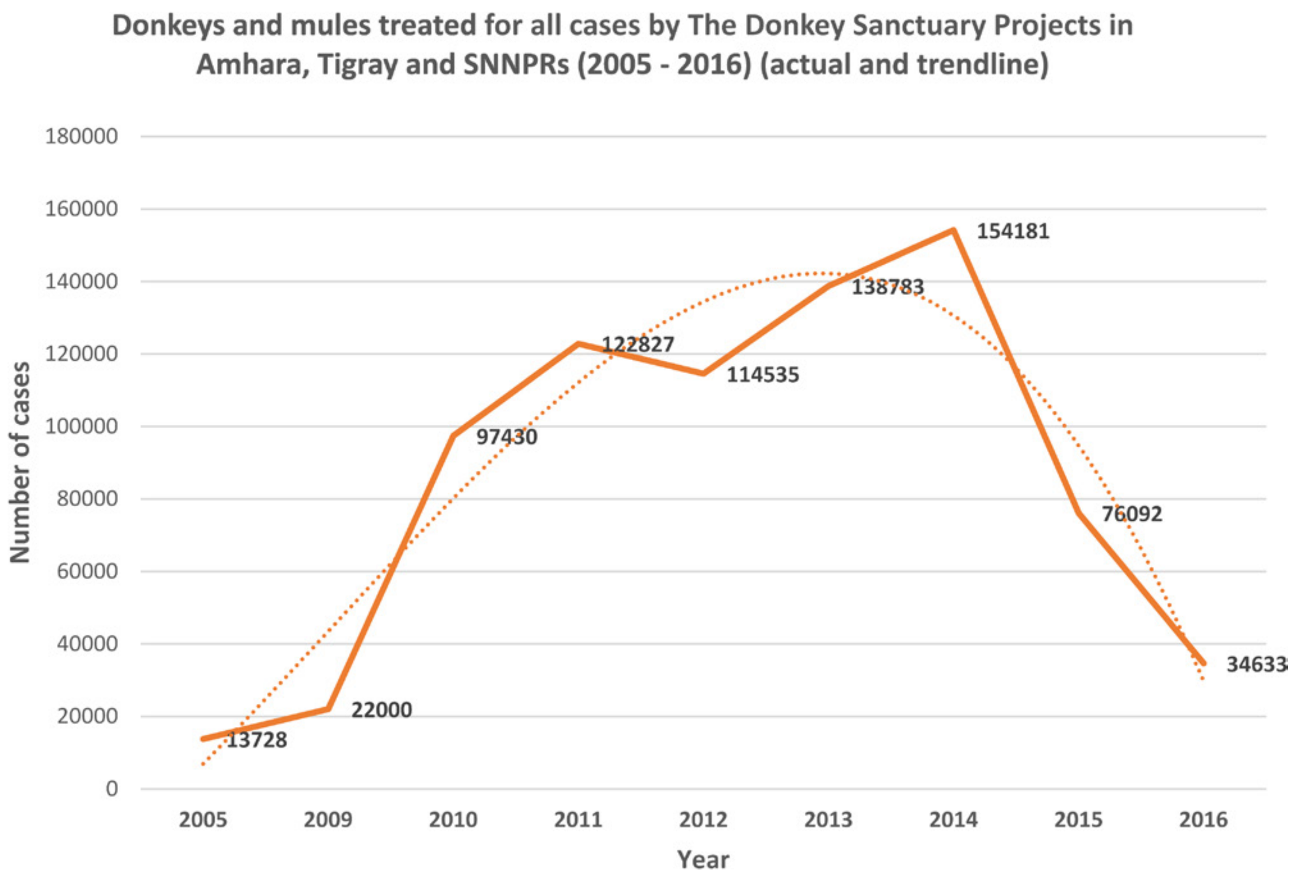

Fig. 5. Trend of all donkeys treated by local public veterinary clinics in three regions (2005–2016).

Table 7. Wound prevalence in 2013 (early stage of intervention) compared with 2016.

Year	Regions			Overall all
	Amhara	Tigray	Sidama	
		2013		
Mean prevalence (%) and 95% confidence Interval	30.1% (27.1–33.1%)	49.0% (45.4–52.6%)	72.1.% (69.1–75.2%)	49.8% (47.8–51.8%)
	(n = 899)	(n = 735)	(n = 822)	(n = 2456)
	Overall prevalence variation between regions			*P* < 0.001
		2016		
Mean prevalence (%) and 95% confidence interval	16.3% (12.6–20.0%)	11.6% (7.5–15.7%)	20.9% (15.5–26.3%)	16.2% (13.7–18.7%)
	(n = 386)	(n = 241)	(n = 220)	(n = 847)
	Overall prevalence variation between regions.			*P* < 0.026

n = stands for total number of donkeys sampled in each region.

aspects of the programme including donkey welfare. As the programme advanced, they observed many positive changes. Donkey owners were increasingly engaging with public veterinary clinics, vaccination centres, and deworming facilities. Owners adopted improved practices, including: using better packsaddles; offloading at market sites instead of leaving donkeys all day with heavy loads on their backs often in direct sunshine; communicating positively with their donkeys; and providing food, water, and shelter at market locations. The AWC recognized these improvements led to a significant reduction in donkey cases and fewer abandoned working animals.

Public veterinary clinics were upgraded with equine diagnostics, drugs, equipment, and waste management systems, making them more equine-friendly. Clinics also introduced standard operating procedures for owner handling, case management, vaccination, and reporting systems. Animal welfare clubs were established in schools, motivating students to promote animal welfare in their communities.

Assessments, including the Hand assessment and wound survey, confirmed the programme's lasting impact on donkey welfare. Following mid-term and final reviews, the AWC recommended that the programme be scaled up to other regions.

Table 8. Identified gaps in community KAPs, and education objectives developed.

Identified gaps in community KAPs	Education objectives
Donkeys are taken for granted and do not receive the care they deserve	Recognize donkeys' socio-economic value and contribution to their communities, and understand that donkeys deserve care.
Donkey health and welfare are often neglected, leading to poor practices that shorten their working lifespan.	Understand that improving donkey welfare enhances both their working lifespan and contribution to household livelihoods.
Owners lack knowledge of donkey nutrition and feeding behaviour	Donkeys are monogasters and need to be fed more frequently than ruminants. Impaction colic is due to poor feeding practice. A working animal requires more feed and water to maintain good body condition and build immunity.
Many owners believe that donkeys are naturally stubborn and cannot be trained, leading to poor communication between donkey and its owner	Donkeys have species-specific behaviours including for socialization and defence, and owners were trained on how to shape donkey's behaviours.
Donkey owners were not taking sick donkeys to vet clinics believing that either sick donkeys never recover, or vets are not trained in donkey clinical practice. As a result there was no link between donkeys and local vet clinic	Donkeys are sentient beings. Donkeys mask pain and ill-health well and possibly have a higher pain threshold, so signs of illness appear at a later stage. If taken to clinic late they are less likely to recover. Owners observed such practice for years and concluded that sick donkeys do not heal. Donkeys recover just like other animals when treated properly. Owners were trained on welfare assessment using 'the Hand', hoof care, eye care while also identifying signs of ill-health.
Donkeys inappropriately housed with cattle leading to horn injuries including hernias; on wet muddy floors leading to lameness; or left outside to scavenge leading to hyena bites, or ingestion of plastic bags leading to impaction colic or complete obstruction and death.	Donkeys require housing separate from horned animals; they also need to graze in clean, safe environments. Owners were trained on model donkey shelters.
Donkey owners use synthetic materials (such as nylon bags and strips of worn-out tyres) to load and secure loads to the animal. Majority of wounds and injuries to working donkeys are associated with poor harness and loading practice.	Overloading, loading at early edge, loading sick, lame and pregnant donkeys, and overwork limit donkeys' working lives. Harness and packsaddle-making need to follow appropriate technology to prevent back sore and injuries. Any harness that comes in contact with the donkeys needs be made of natural materials. Owners were trained on making harnesses, loading and offloading practices, cooling flours before loading.

Table 9. Number of donkey owners/users who attended equine education during the project period.

	Owners educated in equine husbandry and management		
Years of Intervention	Amhara	Tigray	Sidama
2012	1898	1600	2600
2013	2345	2980	3210
2014	2820	3040	2652
2015	1680	2460	2109
2016	1368	1712	1329
Average number of owners attended	2022	2358	2380

This sustainability and exit strategy aimed to ensure lasting positive change by gradually withdrawing direct support over years. It focused on awareness raising, skills transfer, and shifting responsibilities to communities and local institutions while integrating complementary programmes to reinforce progress.

Discussion

OVERVIEW

This article describes an integrated community-based donkey welfare programme in Ethiopia that ran from 2012 to 2017, engaging and empowering target communities with positive impacts on donkey welfare, service providers, government institutions, and community knowledge, attitudes and practice. The different elements of the programme – primary health care, community education, behaviour change, harness improvement, and school animal welfare education – complemented each other to accelerate change.

UNDERSTANDING DONKEY WELFARE IN CONTEXT

The programme conducted a desk review, used animal-based assessments, key informant interviews, problem tree analysis, and worked practically alongside owners to build an understanding of the welfare challenges facing donkeys, to change social behaviour and make public vet clinics more effective, dependable, and accessible to donkey owners.

Health and management problems identified from retrospective analysis of the equine case records of local veterinary clinics (Table 5) aligned with published data from other researchers working in the same regions (Mekuria *et al*., 2013; Getinet *et al*., 2014; Niraj *et al*., 2014). Of zoonotic importance, a donkey with

Fig. 6. Photographs of the improved packsaddles developed in each area.

rabies was reported in the Tigray project, with a similar case reported in Addis Ababa, Oromia Region by a partner project nested in Addis Ababa University (Samson *et al*., 2019).

Donkey-based assessment helped benchmark welfare problems in each project. Hand tool results were backed up by problem-specific studies. Wounds and lameness were the most serious

Table 10. Number of owners and harness makers trained in harness making.

Trainees type	Regions		
	Amhara	Tigray	Sidama
Donkey owners/users	1592	950	1200
Harness makers	213	96	27
Agricultural development agents	58	94	119

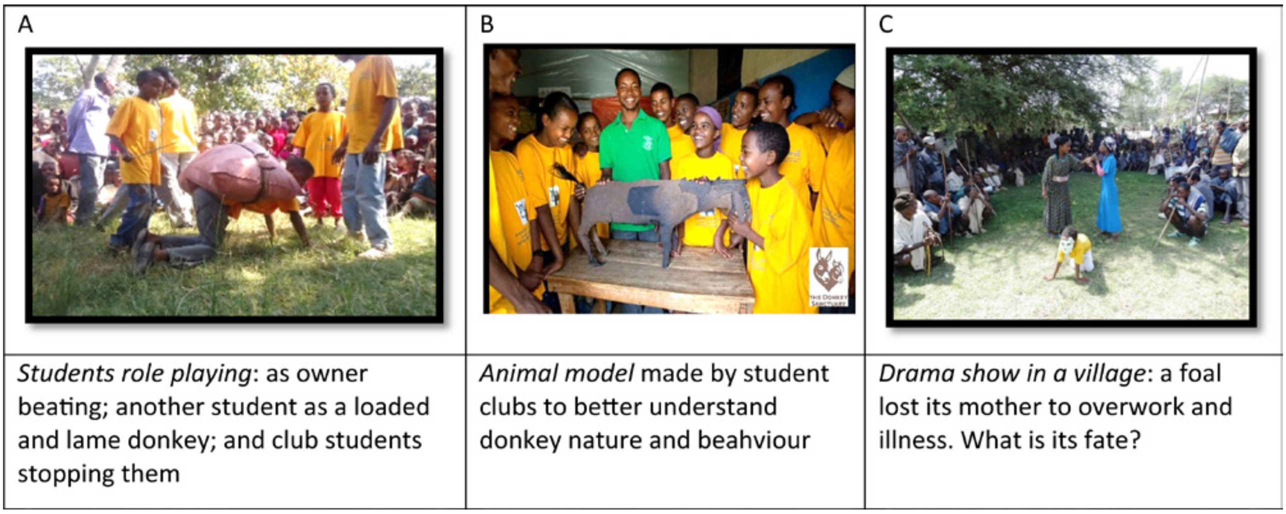

Fig. 7. Photographs from school education activities. (A) *Students role playing*: as owner beating; another student as a loaded and lame donkey; and club students stopping them; (B) *Animal model* made by student clubs to better understand donkey nature and behaviour; (C) *Drama show in a village*: a foal lost its mother to overwork and illness. What is its fate?.

Table 11. Data on animal welfare education in schools.

Activities	Regions		
	Amhara	Tigray	Sidama
Students attended education	10,320	5,714	6,000
Teachers trained	120 & (21 Training of trainers)	335	258
Number of clubs (average number of members in each school)	8(45)	6(60)	5(50)

problems. In 2013, Sidama had the worst Hand wound scores (4.38±0.74 on a 1 to 5 scale) and donkeys in Hawassa, Sidama had the highest wound prevalence across all regions: 72.1% (95%CI, 69.1–75.2%). High wound prevalence in Hawassa was associated with all donkeys pulling carts every day to generate household income. Hawassa wound prevalences at the start of the programme were comparable to partner surveys in Egyptian brick kilns where donkeys also pull carts (Farhat *et al.*, 2020). Donkeys in Tigray had the lowest body condition scores, attributed to poor nutrition, overwork carrying firewood and quarried stone, and chronic underlying respiratory problems (Niraj *et al.*, 2014).

Community key informants provided insight into the problems of working donkeys, barriers faced in accessing services including public vet clinics, and highlighted the ways welfare problems relate to poverty, lack of resources, poor management and a poor understanding of how to communicate and work with donkeys.

Local animal health professionals, agriculture and livestock experts, and other service providers also helped identify problems and find ways forward. Learning to understand and use participatory tools helped them think beyond disease entities, identify root causes, establish effective communication with livestock owners, and work with them in designing long-term solutions, empowering them to protect and look after animals better

COMMUNITY PARTNERSHIP AND EDUCATION

At the start of the programme, animal welfare and donkey health and welfare were not community priorities, so bringing animal (donkey) welfare to the attention of owners, service providers, policy makers and the wider community was a challenge.

Previous experience has shown that charity programmes primarily delivering treatments do not empower communities or change behaviour towards donkeys. The programme, therefore, prioritized community engagement, education, and empowerment. Building community partnerships was essential to the programme's success in bringing long-lasting change.

Table 12. Life skills, tools used, and change outcomes.

Life skill cluster	Tools used	Change outcomes
1. Communication 2. Empathy 3. Advocacy 4. Problem solving 5. Decision making 6. Critical thinking 7. Creativity 8. Interpersonal relationships 9. Self-awareness 10. Coping with stress and emotion 11. Self-esteem	Drawing donkeys, body mapping exercises to show wounds or disease problems on a donkey Peer-to-peer and group discussions Group work Storytelling, sharing individual stories Story writing Poem writing Question and answer Presentations, reporting Dialogue Role modelling Drama shows Role plays Presenting Songs Campaigns Field observations (at markets, clinics, mill houses) to see how donkeys are managed	Children learned to appreciate donkey's nature and behaviour as social, intelligent, and friendly animals. Children realized that donkeys are sentient beings and need care. They need feed, water, and proper shelter. Children learned to identify maltreated donkeys in their community and explore the cause and effect of these problems. For instance, poor harnessing causes wound Children persuaded parents to take sick donkeys to veterinary clinics, and not to drench them. Children were vehicles for mobilizing communities for vaccination and deworming Children learned to practice humane handling of donkeys, positive attitudes interacted with donkeys – grooming donkeys, playing with donkey foals, increasing their self-esteems Children role-modelling the poor welfare of donkeys at community gatherings. Such activities include drama shows, songs, role models, storytelling, Q&A. They developed the communication skills Children challenged the ingrained negative perception of communities for donkeys by dramatizing, role-playing, and through songs at various platforms in communities Children actively and collectively advocated for animal welfare at various public occasions – World Animal Day, World Rabies Day

Participatory tools helped donkey owners, users and other community members visualize, examine and analyse problems they and their donkeys faced; helped them see that improving the welfare of their donkeys, making them fitter and happier, would help realize their full socio-economic potential; and led them to change their behaviours, and become enthusiastic champions of the process. As farmers in Tigray said, 'We are no longer just farmers, we are educators!' Harry and Elly (Eckman and Hiby, 2024) working with communities in Portugal on cat and dog welfare similarly demonstrated how human behaviour change processes can lead to improved animal welfare.

The focus of the programme was developing the life skills of the community, supporting the community to become more cohesive, to discuss and analyse problems together and collectively agree on outcomes, and to work together to implement the project cycle. Those that usually did not have a voice were listened to including women, children, and donkeys. Networking among trained local service providers was also strengthened. Women in a Mexican community working through the same process explained that before the programme they kept their problems to themselves but now share and discuss their challenges beyond just donkey welfare more freely and how that has helped the community more generally (personal communication, Price S.).

Community education was based on locally identified welfare problems, also referencing the Five Freedoms and Five Domains animal welfare frameworks which link the mental state of donkeys to their behavioural interactions, nutrition, health, and physical environment (Farm Animal Welfare Council, 1993; Mellor *et al*., 2020).

PRIMARY DONKEY HEALTH CARE

The traditional picture of donkey health is complex. Donkeys tend to be owned by resource-poor people. Some of these may have no previous donkey experience. Because donkeys are hardy, signs of illness may not be spotted until sickness is advanced. Most owners are self-reliant and use local remedies first. Drenches, for example, frequently lead to inhalation pneumonia because of functional anatomical differences in the pharynx between donkeys and ruminants. There may be limited knowledge about the nature and behaviour of donkeys and what constitutes good health. Pre-project, donkeys were rarely taken to local government veterinary clinics, and when they were, outcomes tended to be poor for a further combination of reasons including late presentation, lack of training in donkey medicine for Animal Health Professionals and Para-professionals (AHPs), and lack of donkey-specific equipment and pharmaceuticals (Getinet *et al*., 2014). Owners, therefore, tended to take a fatalistic approach to donkey ill-health.

The programme worked to bridge the gap between communities and health clinics, raising awareness and providing training to community members and AHPs based on local equine health problems (Table 4). All AHPs working in public veterinary clinics in project kebeles were given practical, competence-based training, with every clinical case considered a training/learning opportunity. The target was one AHP in each kebele vet clinic trained to independent level (on a scale that moves from beginner to trainee to independent practitioner to trainer level) but most trainees achieved this in the majority of modules and the target was exceeded. A few trainees dropped out, some due to a change of role, promotion to another field or region, and some failed to engage with particular aspects of the training, particularly hoof trimming. Most AHPs noticeably increased their passion for their work. Once the programme was established, owners took sick donkeys to the veterinary clinic at their own cost in the absence of the project staff; and donkey, mule and horse cases were disaggregated in monthly reports to the regional regulatory authority.

The programme relieved the suffering from diseases and poor working conditions of thousands of donkeys. Figure 4, a graph of treatments per year, shows an initial increase in the number of cases presented to each clinic followed by a steady reduction at the later stage of the programme. The early increase was attributed to increased awareness about donkey health care, growing trust between vet clinics and owners, and the increased number of trained AHPs in each clinic. Later reductions in treatment rate mirrored the reduction in the prevalence of wounds (see Table 7) as well as a change in deworming strategy in 2012 from mass deworming to strategic deworming twice a year, in line with evolving best practice (CTA, 1990; Elsener *et al*., 2001). AHPs learned to handle deworming requests outside strategic seasons on the basis of clinical signs and microscopic faecal worm egg counts (with the treatment threshold set at 300 eggs per gram) (Purnell, 1990).

HARNESS AND PACKSADDLE IMPROVEMENT

Adoption of improved harness and packsaddles was facilitated through participatory design and development, testing prototypes with owners, and using locally available materials. The design was tailored to local work and conformed to basic principles: protection of spines, ribs, and shoulders (Dittmann *et al*., 2021; Garrett, 2017); making parts that come into contact with the donkey from smooth natural materials and wide enough to prevent pressure injuries. Locally made, improved packsaddles contributed to a threefold reduction in the overall prevalence of wounds across all three regions between 2013 and 2016.

Transfer and adoption of harness and packsaddle-making technology would not have worked without community engagement and access to health care to treat existing wounds. To sustain change, the programme engaged and trained as many owners as possible, trained agricultural livestock development agents, and mainstreamed packsaddle-making skills within livestock and animal health education and extension (see Table 10). Attempts to commercialize packsaddle production as a standalone business did not work out, as many owners realized they had access to alternative materials and it was cheaper to make them themselves, but there was some success when businesses already made and sold similar commodities such as ropes and mattresses.

SCHOOL ANIMAL WELFARE CLUBS

Animal welfare education introduced into local primary schools was the initiative most praised by programme stakeholders including community members who recognized the need to shape the attitude of the next generation for lasting change (Niloofar *et al*., 2022; Herzog *et al*., 2015; Paul, 2000). Children from donkey owning communities learned that donkeys are sentient beings and started to challenge their parents about negative perceptions, insist that working donkeys be watered more regularly, provided with better nutrition, rested, and when sick taken to the animal health clinic like any other animal. Campaigns by school children against loading donkeys with hot flour demonstrated their growing empathy and closer relationships.

School education was designed around UN recognized life skills, challenged negative attitudes and perceptions about donkeys while providing children, teachers, and the wider community with the skills and confidence to bring change. School clubs accelerated human behaviour change around donkey welfare by creatively and humorously dramatizing harmful local practices and suggesting alternatives, using art, song and theatre, and presenting at all possible platforms, including school-parent meetings and animal welfare conferences. The success of the programme led regional education and curriculum experts to recommend inclusion of animal welfare education in the national education curriculum and co-curriculum. This is evidenced in the revised science textbooks of school education in Ethiopia, where most of the provisions of animal welfare including nutrition, water, shelter (protection from predators), access to health, suitable habitat (environment) were included (personal communication with curriculum expert). The work of the African Animal Welfare Network (ANAW) also demonstrates the role of schoolchildren in promoting animal welfare (ANAW, 2024).

INNOVATION, CHALLENGES OVERCOME, LESSONS LEARNT

Full community participation requires patience. Donkeys had such low status and had been taken for granted for so long that the word donkey was an obstacle to winning interest and engagement, particularly in the early stages of the programme. Animal welfare had been considered a western notion with confusion about the difference between animal rights and animal welfare. It took time to overcome these challenges, knocking on doors, explaining the value of the project, and persuading stakeholders to engage.

The programme demonstrated the value of bringing together all stakeholders, including education, animal health, harness-makers, social scientists, traffic police, transport authorities, and policy makers. The simplicity of the Hand helped demystify the concept of animal welfare (Galindo *et al*., 2018). Taking time to understand community beliefs and practices allowed the programme to progress and ultimately change behaviour towards donkeys. Owners learned to trust the participatory process after seeing tangible benefits to the health, welfare, and productivity of their donkeys.

The absence of a national animal welfare policy and supplementary legislation to promote equine health and welfare remains a challenge to improving animal/equine welfare in Ethiopia. In the absence of animal welfare legislation at a national level, the project worked with local government structures to establish animal welfare bylaws which proved locally effective and provided a first step towards national legislative change.

Challenges in Ethiopia were mirrored in other partner countries. Cousquer has published on work with mules and muleteers in Morocco, and their relationships to their communities and to tourists (Cousquer *et al*., 2023; Cousquer and Haounti, 2022); and internal reports from the National Council for Societies for the Prevention of Cruelty to Animals (NSPCA) in South Africa illustrate how demographic differences affect outcomes, contrasting appetite for new skills and knowledge among young people in rural villages with resistance to engagement from disenfranchised men in peri-urban settings (internal reports and pers comm).

SUSTAINABILITY

The programme made significant progress in giving owners broader options in caring for their donkeys. A recent paper from Sidama which compared donkey welfare in ex-TDS programme communities with communities that had not received any donkey welfare inputs showed measurable residual benefit to donkeys after more than 7 years (Yalew *et al*., 2024); and a similar paper from Mexico (Haddy *et al*., 2021) showed similar residual benefit from the TDS programme there.

The programme aimed for long-term sustainability by engaging and empowering communities, building life-skills, and supporting local service providers and local government staff; by gradually reducing direct inputs; by working with Regional Bureaus of Agriculture and Education and with police and traffic departments; by working with Mekele, and Hawassa Vet Schools and Alage Technical and Vocational Training College; and by campaigning for recognition of donkeys at national and international levels.

It reduced inputs into different components of the programme at different rates depending on progress.

It addressed the predictable high turnover of government AHPs through competency-based training aimed at producing trainer level practitioners able to pass on their skills. Some of the best trainers chose to stay within programme areas despite offers of work elsewhere, partly because they enjoyed training new staff.

It took a relationship focused One Welfare approach in considering the health and welfare of donkeys alongside people, other animals, and the natural environment. Preventive health care reduced the need for antibiotics in treating wounds, and the use of environmentally harmful anthelmintics through more strategic and tactical de-worming. These, in turn, slow the development of drug resistance, a topic central to One Health. More efficient donkey transport for waste management helped reduce environmental pollution. Griffith *et al*. (2024) highlighted the value of looking at animal and human factors together in the context of participatory epidemiology; and Osman *et al*. (2023) conclude that ‘engaging communities and other relevant sectors using a participatory process is an important contribution’ in the context of sustainable One Health Surveillance and Response systems.

The programme ended unexpectedly due to a change in the charity's strategy. If continued beyond 2017, the programme anticipated continued learning, strengthening project kebeles as a model for training and replication, scaling up to influence policy, and unfolding best practice nationally, including donkey health care into public and private veterinary services; equine welfare into livestock extension; harness and packsaddle technology into transport systems; and animal welfare education into the school education system. Sustainability and continuity are common challenges for many development projects and organizations. Participatory community-based programmes are a serious commitment, requiring time and resources to re-model teams, build staff capacity with ongoing training and support, engage communities, and establish the components and timing required to create sustainability within the programme. This programme had years more learning ahead of it. Building relationships with communities and government departments takes time and trust. Building evidence to influence processes of change also takes time.

NEW CHALLENGES AFFECTING DONKEYS

Some emerging social changes affect donkeys and their place in society. Particularly in towns, tuk-tuks are making inroads into what was a donkey-dominated local transport space, though paradoxically, increased urbanization in Ethiopia relies on donkeys where road/transport infrastructure is yet to be developed.

During the period of this programme, two donkey slaughterhouses were built in Ethiopia, part of a growing global market for donkey skins.

Nevertheless, while there are donkeys, mules and other transport animals, their health and welfare will remain important. Integrated community-based programmes offer an effective and respectful way to improve services and improve the lives of people and animals.

LOOKING FORWARD, ONE HEALTH AND ONE WELFARE

Future programmes would benefit from wider collaboration with other development partners in the area, including social and economic development and environmental programmes, and public-private partnerships. Environmental scientists, for example, would be able to help monitor the survival rates of dung beetles and other invertebrates in the face of anthelmintic use.

Building linkages and engaging more actively with other organizations around the Sustainable Development Goals would result in more effective, more integrated community-based programmes. To this end, development organizations need to be encouraged to open their management parameters to allow more opportunities for cross-sectoral collaboration. Sebo noted that sustainable development matters for animal welfare but is often neglected or left out (Sebo *et al*., 2022), and Braam highlighted challenges in operationalizing the One Health approach at national and subnational levels (Braam *et al*, 2023).

CONCLUSION

This community-based programme integrated primary health care, harness and packsaddle improvement, community partnership and education, and animal welfare education in schools and was effective in bringing a long-lasting improvement in donkey welfare. It challenged ingrained negative perceptions and beliefs about donkeys, raised awareness about donkey care and management, raised professional competence in equine health and welfare, introduced improved harness and packsaddle technology, established school clubs, and involved all relevant stakeholders from agriculture, education, transport and local government departments, which were signatories of the project and witnessed the positive impact.

Visible impacts included a threefold reduction in prevalence of donkey wounds over a period of 4 years, improved body condition and reduction in lameness. Changes in behaviour and practice of owners included taking sick donkeys to the veterinary clinic at their own expense and making and using improved packsaddles. Donkeys had access to health care provided by AHPs trained in donkey medicine, with monthly equine case reports submitted to the regional regulatory authority disaggregated between donkeys, mules, and horses. Experts delegated from the signatory bodies to conduct project reviews reported better treatment of donkeys in the programme areas together with improvements in local donkey-powered transport systems including water delivery, market access, and waste clearance.

A whole community approach, extending education to school children and adults was central to long-term changes in owners' attitudes and practices. Unlocking their empathy helped them see they could make affordable change; and calculating the value of their donkeys to household livelihoods showed that short-term gains such as renting out your donkey to a neighbour can come with long-term costs. As they grew to understand and appreciate the work, community elders, Idir leaders and priests became increasingly involved as change agents.

The programme showed that learning more about donkey behaviour and emotional states facilitates better two-way communication between donkeys and people and leads to improved donkey welfare.

Outside the programme, other social changes have been taking place and may affect the role of donkeys and their welfare in the future, but while there are donkeys, mules and other transport animals, their health and welfare will remain important and integrated community-based programmes offer an effective and respectful way to improve services.

The authors believe that this is an effective model for improving donkey welfare in smallholder livestock-keeping communities throughout Ethiopia and beyond.

We recommend that organizations adopting this programme model to enhance working equine welfare collaborate with diverse partners including those in public-private partnerships, livelihoods, climate and environment, and gender to optimize impact and sustainability. This work was part of a worldwide programme for improving donkey welfare. The approach was adaptable to local factors and left long-lasting change in widely different communities and human-donkey-environment contexts.

This programme demonstrated how this approach can create sustainability and is scalable and transferrable to other communities, projects and countries. External agencies are vital in driving change and empowering local communities, but without agility and a deep understanding of local dynamics, they risk undermining their investment and long-term success.

CONFLICT OF INTEREST

During the period of the reported work, Bojia E Duguma was The Donkey Sanctuary's Country Representative in Ethiopia, Stephen Blakeway was the Director of International Operations, and Sally J Price was the Community Partnership and Education Coordinator at TDS. The authors declare no conflict of interest.

ETHICS STATEMENT

This action research project aimed to pilot a scalable and sustainable model to improve equine welfare in Ethiopia. Prior to the intervention, the project's purpose was communicated, and a project agreement was signed with all parties involved, including the Regional Bureaus of Agriculture, Education, Economics and Finance, and adjacent Universities. The research followed the five animal welfare provisions outlined by the Farm Animal Welfare Council and WOAH Welfare of Working Equids. Mekelle University provided the ethical clearance. Animal (donkey) owners, community elders, livestock experts, animal health professionals, harness makers, and school teachers all consented to participate in the study at all stages of the project cycle. Students participated in animal welfare club activities on a voluntary basis and with the consent of their parents and their respective schools. Before taking any photographs involving individuals, we obtained their consent.

FUNDING STATEMENT

The programme was funded by The Donkey Sanctuary, a UK donkey welfare charity, and this paper's publication cost was supported by Vetwork UK, a UK One Welfare charity.

ACKNOWLEDGEMENTS

The authors thank The Donkey Sanctuary, a UK donkey welfare charity, for its financial and material support throughout the project. The authors acknowledge the generosity of the late Dr Svendsen, founder of TDS, to expand the work of TDS to Ethiopia and internationally to reach more needy donkeys and mules, the leadership of Mal Squance in the UK who supported the legal registration of the charity as INGO in Ethiopia, and the vision of the late Professor Fesseha who introduced the concept of working equid welfare into Ethiopia.

We are grateful to the leadership of the Amhara, Tigray, and Sidama Regional Bureaus of Agriculture, Education, and Transport, the traffic police departments, as well as Mekelle and Hawassa Universities, for their collaboration and support throughout the project. We are thankful to regional animal health professionals, school principals, club coordinators, and teachers in the respective project areas for their commitment and collaboration in executing the project.

The success of this pilot program was the result of the dedication of all TDS staff in Ethiopia: project managers, animal health and education officers, harness makers/trainers, and admin and support staff, who worked together to ensure its success.

We would like to acknowledge the contribution of the reviewers and editors of this article who guided us to improve the quality of the article.

AUTHOR CONTRIBUTIONS

The authors developed the programme strategy, provided training, and oversaw programme design, implementation, and evaluation processes. In the writing of this article, data management and analysis were done by Bojia Duguma (BD); Stephen Blakeway (SB) and BD co-wrote the manuscript; and SP shaped the social behaviour-change and life skills content. All authors agreed on the final version of the manuscript. In addition, during the course of writing this article, Bekele Hailu Mekonnen contributed his knowledge and experience of the life skills work with school clubs.

DATA AVAILABILITY

All data generated and analysed during the pilot programme are included in this article.

References

Admassu, B. and Shiferaw, Y. (2011) Donkey's, horses and mules: Their contribution to people's livelihoods in Ethiopia. *The Brooke*. https://www.brooke.org/data/assets/pdf%20%20file/0004/54409/The-Brooke-Ethiopia-Report-AW-L-o-Res-Web.pdf.

ANAW (2024) Promoting Animal Welfare in Schools (PAWS) Programme. Available at: https://www.anaw.org/ (accessed 10 November 2024).

Arnott, S. (2012) Susi Arnott/Walking Pictures Ltd. Available at: https://www.susiarnott.co.uk/home/archive/donkeys/ (accessed 19 February 2025).

Biffa, D. and Woldemeskel, M. (2006) *Causes and Factors Associated With Occurrence of External Injuries in Working Equines in Ethiopia*. Vol. Vol. 4(No. 1), Department of Veterinary Medicine Awassa College of Agriculture Debub University Awassa, Ethiopia 1 College of Veterinary Medicine University of Georgia Veterinary Diagnostic Laboratory Tifton, Georgia, pp. 1–7.

Birke, L.I.A. and Hockenhull, J. (2012) *Crossing Boundaries: Investigating Human-Animal Relationships*. Brill, London.

Blakeway, S. (1994) *The Welfare of Donkeys: MSc Dissertation*. University of Edinburgh. Available at: http://www.vetwork.org.uk/gallery/1994%20Blakeway%20The%20Welfare%20of%20Donkeys.pdf (accessed 16 November 2024).

Blakeway, S. (2014) The multi-dimensional donkey in landscapes of donkey-human interaction. *Relations* 2(*1*), 59–77. DOI: 10.7358/rela-2014-001-blak.

Braam, D.H., Tasker, A., Parravani, E. and Saville, K. (2023) A fair share? Animal health actors and resources in One Health initiatives: A multisite case study in Ethiopia and Pakistan. *CABI One Health*, ohcs202300015. DOI: 10.1079/cabionehealth.2023.0015.

Carson, R., Shackleton, Huxley, J. and Lear, L. (2000) *Silent Spring (Reprinted)*. Penguin.

Catley, A. and Leyland, T. (2001) Community participation and the delivery of veterinary services in Africa. *Preventive Veterinary Medicine* 49(1), 95–113. DOI: 10.1016/S0167-5877(01)00171-4.

Catley, A., Blakeway, S. and Leyland, T. (eds.) (2002) *Community-Based Animal Healthcare: A Practical Guide to Improving Primary Veterinary Services*. ITDG Pub.

Chala, C., Bojia, E., Feleke, G., Alemayehu, F., Zerihun, A. and Kassaye, A. (2019) Health and welfare problems of pack donkeys and cart horses in and around Holeta town, Walmara district, Central Ethiopia. *Journal of Veterinary Medicine and Animal Health* 11(1), 17–25. DOI: 10.5897/JVMAH2017.0647.

Chambers, R. (1989) *Farmer First Farmer Innovation and Agricultural Research*. Practical Action Publishing.

Clancy, C., Watson, T. and Raw, Z. (2022) Resilience and the role of equids in humanitarian crises. *Disasters* 46(4), 1075–1097. DOI: 10.1111/disa.12501.

Cousquer, G. and Haounti, A. (2022) Action research with and for pack mules: Transforming the welfare of working equines in international mountain tourism. *Journal of Awareness-Based Systems Change* 2(2), 109–139. DOI: 10.47061/jasc.v2i2.4621.

Cousquer, G., Alyakine, H. and Lindsay-McGee, V. (2023) The history and welfare of working mules in the valleys of the Toubkal massif, in the High Atlas of Morocco. *Frontiers in Veterinary Science* 10, 1256501. DOI: 10.3389/fvets.2023.1256501.

CSS (2021) *Report On Livestock And Livestock Characteristics; Ethiopia Central Statistics Services* (No. Volume II).

CTA (1990) *CTA Publishes a Manual on Tropical Veterinary Parasitology. Spore 25*. CTA, Wageningen, The Netherlands.

Curran, M.M., Feseha, G. and Smith, D.G. (2005) The impact of access to animal health services on donkey health and livelihoods in Ethiopia. *Tropical Animal Health and Production* 37(1), 47–65. DOI: 10.1007/s11250-005-9008-z.

Dijk van, L. (2011) *Sharing the Load: A Guide to Improving the Welfare of Working Animals through Collective Action*. Practical Action Pub.

Dilts, R. (1990) *Changing Belief Systems with NLP*. Meta Publications, Capitola, CA.

Dittmann, M.T., Arpagaus, S., Hungerbühler, V., Weishaupt, M.A. and Latif, S.N. (2021) "Feel the Force"—Prevalence of subjectively assessed saddle fit problems in swiss riding horses and their association with saddle pressure measurements and back pain. *Journal of Equine Veterinary Science* 99, 103388. DOI: 10.1016/j.jevs.2021.103388.

Duguma, B.E., Tesfaye, T., Kassaye, A., Kassa, A. and Blakeway, S.J. (2021) Control and prevention of epizootic lymphangitis in mules: An integrated community-based intervention, Bahir Dar, Ethiopia. *Frontiers in Veterinary Science* 8, 648267. DOI: 10.3389/fvets.2021.648267.

Eckman, H. and Hiby, E. (2024) The role of human behaviour change in companion animal management: A case study of Praia de Faro, Portugal. *Human-Animal Interactions*. DOI: https://doi.org/10.1079/hai.2024.0029.

Elsener, J., Villeneuve, A. and DesCôteaux, L. (2001) Evaluation of a strategic deworming program in dairy heifers in Quebec based on the use of moxidectin, an endectocide with a long persistency. *The Canadian Veterinary Journal = La Revue Veterinaire Canadienne* 42(1), 38–44.

Endebu, B. and Roger, F. (2003) Comparative studies on the occurrence and distribution of epizootic lymphangitis and ulcerative lymphangitis in Ethiopia. *The International Journal of Applied Research in Veterinary Medicine* 1, 1–6.

Evans, L., Crane, M., Duncan, J. and Sanctuary, D. (eds.) (2018) *The Clinical Companion of the Donkey*. 1st edn, Matador.

FAOSTAT (2022) *Food and Agricultural Organization Annual Statistical Bulletin* [Dataset].

Farhat, S.F., McLean, A.K. and Mahmoud, H.F.F. (2020) Welfare assessment and identification of the associated risk factors compromising the welfare of working donkeys (*Equus asinus*) in Egyptian Brick Kilns. *Animals* 10(9), 1611. DOI: 10.3390/ani10091611.

Farm Animal Welfare Council (1993) *The Five Animal Welfare Freedom*.

Freire, P. (2017) *Pedagogy of the Oppressed* (M. Bergman Ramos (Trans); Published in Penguin Classics 2017). Penguin Books.

Galindo, F., de Aluja, A., Cagigas, R., Huerta, L.A. and Tadich, T.A. (2018) Application of the hands-on donkey tool for assessing the welfare of working equids at Tuliman, Mexico. *Journal of Applied Animal Welfare Science* 21(1), 93–100. DOI: 10.1080/10888705.2017.1351365.

Garrett, C. (2017) The Good Harness Guide. Available at: https://www.thedonkeysanctuary.org.uk/for-owners/ownersresources/the-good-harness-guide (accessed 19 February 2025).

Getachew, M., Alemayehu, F., Chala, C., Amare, B., Kassa, D. *et al.* (2014) A cross-sectional sero-survey of some infectious diseases of working equids in Central Ethiopia. *Journal of Veterinary Medicine and Animal Health* 6(9), 231–238.

Getinet, F., Fayera, T., Alemu, F., Nigusie, A. and Abera, T. (2014) Injuries in donkeys and mules: Causes. *Welfare Problems and Management Practices in Amhara Region, Northern Ethiopia.* 4(9), 98–104. DOI: 10.5829/idosi.aejsr.2014.9.4.21802.

Goulder, J. (2022) Draught animals in ancient Mesopotamia and today: The invaluable donkey. In: *Draft Animals in the Past, Present and Future*. Propylaeum. DOI: 10.11588/PROPYLAEUM.1120.C15603.

Griffith, E.F., Kipkemoi, J.R., Mariner, J.C., Coffin-Schmitt, J. and Whittier, C.A. (2024) A pilot study expanding participatory epidemiology to explore community perceptions of human and livestock diseases among pastoralists in Turkana County, Kenya. *CABI One Health*. DOI: 10.1079/cabionehealth.2024.0018.

Haddy, E., Burden, F., Fernando-Martínez, J.A., Legaria-Ramírez, D., Raw, Z. *et al.* (2021) Evaluation of long-term welfare initiatives on working equid welfare and social transmission of knowledge in Mexico. *Plos One* 16(5), e0251002. DOI: 10.1371/journal.pone.0251002.

Hennink, M., Kiiti, N., Pillinger, M. and Jayakaran, R. (2012) Defining empowerment: Perspectives from international development organisations. *Development in Practice* 22(2), 202–215. DOI: 10.1080/09614524.2012.640987.

Herzog, H., Grayson, S. and McCord, D. (2015) Brief measures of the animal attitude scale. *Anthrozoös* 28(1), 145–152. DOI: 10.2752/089279315X14129350721894.

High Speed Training (2024). Available at: https://www.highspeedtraining.co.uk/ (accessed 09 November 2024).

Hughes, C. (2012) Donkeys and 'Resilience.' Available at: https://www.crispinhughes.co.uk/2012/04/donkeys-and-resilience/ (accessed 16 November 2024).

IIED (2024) Participatory Learning and Action. Available at: https://www.iied.org/collection/participatory-learning-action (accessed 16 November 2024).

International Institute for Environment and Development (IIED) (2024) Available at: https://www.iied.org/collection/participatory-learning-action#overview (accessed 16 November 2024).

Mekuria, S., Mulachew, M. and Abebe, R. (2013) Management practice and welfare problems encountered on working eqiuds in Hawassa town, Southern Ethiopia. *Journal of Veterinary Medicine and Animal Health* 9(5), 243–250.

Mellor, D.J., Beausoleil, N.J., Littlewood, K.E., McLean, A.N., McGreevy, P.D., Jones, B. and Wilkins, C. (2020) The 2020 five domains model: Including human–animal interactions in assessments of animal welfare. *Animals* 10(10), 1870. DOI: 10.3390/ani10101870.

Meseret, B., Chanie, M., Mekonnen, B. and Wagaw, N. (2014) Lameness and associated risk factors in cart mules in northwestern Ethiopia. *Glob Vet* 6(12), 869–877. DOI: 10.5829/idosi.gv.2014.12.06.84289.

Minero, M., Dalla Costa, E., Dai, F., Murray, L.A.M., Canali, E. and Wemelsfelder, F. (2016) Use of qualitative behaviour assessment as an indicator of welfare in donkeys. *Applied Animal Behaviour Science* 174, 147–153. DOI: 10.1016/j.applanim.2015.10.010.

MOU (1995) *Memorandum of Understaing: Addis Ababa University and International Donkey Protection Trust (Incorporated to The Donkey Sanctuary in 2007)*. Addis Ababa University, The Donkey Sanctuary UK.

Niloofar, P., Zein, K., Lourdes, R., Antonio, V., María, M. *et al.* (2022) Should animal welfare be included in educational programs? Attitudes of secondary and university students from eight EU countries. *XIII Congreso de Economía Agroalimentaria*. DOI: 10.31428/10317/10439.

Niraj, K., Fisseha, K., Shishay, N. and Hagos, Y. (2014) Welfare assessment of working donkeys in Mekelle City, Ethiopia 3(12), 314–319. DOI: 10.5829/idosi.gv.2014.12.03.82120.

Osman, Y., Zinsstag, J., Abtidon, R., Hattendorf, J., Crump, L. *et al.* (2023) Operationalizing a community-based One Health surveillance and response in Adadle district of Ethiopia. *CABI One Health* ohcs202300014. DOI: 10.1079/cabionehealth.2023.0014.

Pankhurst, A. and Mariam, D.H. (2000) The Iddir in Ethiopia: Historical development, social function, and potential role in HIV/AIDS prevention and control. *Northeast African Studies* 7(2), 35–57. DOI: 10.1353/nas.2004.0018.

Paul, E.S. (2000) Empathy with animals and with humans: Are they linked? *Anthrozoös* 13(4), 194–202. DOI: 10.2752/089279300786999699.

Pickering, P. and Hockenhull, J. (2019) Optimising the efficacy of equine welfare communications: Do equine stakeholders differ in their information-seeking behaviour and communication preferences? *Animals* 10(1), 21. DOI: 10.3390/ani10010021.

Pollitt, C. (2013) Ray Pawson (2013) The science of evaluation: A realist manifesto. *International Review of Administrative Sciences* 79(3), 580–582. DOI: 10.1177/0020852313497455.

Pretty, J., & Guijt, I. (eds) (2002) *A Trainer's Guide for Participatory Learning and Action* (Reprint).

Price, S. (2010) Working at deeper levels to enable change. In: *The 6th International Colloquium on Working Equids*.

Price, S. (2012) *Human Behaviour Change: Finding the Key. What Works, What Doesn't and Why. The First Human Behaviour Change for Animal Protection Conference*. The First Human Behaviour Change for Animal Protection Conference, London UK.

Purnell, R.E. (1990) Manual of tropical veterinary parasitology. *Veterinary Parasitology* 37(1), 84–86. DOI: 10.1016/0304-4017(90)90029-B.

Samson, T., Asnakech, A. and Getachew, M. (2019) Common health and welfare problems of working donkeys in Addis Ababa and its surrounding area: Retrospective and questionnaire survey. *Journal of Veterinary Medicine and Animal Health* 11(2), 37–44. DOI: 10.5897/JVMAH2018.0733.

Schumacher, E.F. (1973) *Small is Beautiful, Economics as If People Mattered*. Blond & Briggs, London.

Schwartz, N.E. (1976) Nutrition knowledge, attitudes and practices of Canadian public health nurses. *Journal of Nutrition Education* 8(1), 28–31. DOI: 10.1016/S0022-3182(76)80113-6.

Sebo, J., Verkuijl, C., José Hötzel, M., Achakulwisut, P., Bastos Lima, M. and Green, J. (2022) Sustainable development matters for animals too: Governments have a responsibility to recognize that. *CABI One Health*. DOI: 10.1079/cabionehealth.2022.0002.

Singer, P. and Harari, Y.N. (2024) *Animal Liberation Now: The Definitive Classic Renewed*. Vintage UK.

Singh, M. (2003) *Background Paper for the Education for All Global Monitoring Report 2003/4: Gender and Education for All: The Leap to Equality [90]* [Programme and Meeting Document].

The Conversation (2024) *Donkeys are Unsung Heroes in Ethiopia's Humanitarian Crisis – And They Could Do Even More with Better Support*.

Valette, D. (2014) Invisible helpers: Women's views on the contributions of working donkeys, horses and mules to their lives. *The Brooke*, 1–25. https://www.thebrooke.org/sites/default/files/Advocacy-and-policy/Invisible-helpers-voices-from-women.pdf (accessed 26 August 2024).

Wemelsfelder, F. (2007) How animals communicate quality of life: The qualitative assessment of animal behaviour. *Animal Welfare* 16(S), 25–31.

WHO (2021) Available at: https://www.who.int/publications/i/item/9789240038349 (accessed 27 October 2024).

Yalew, A., Darge, D. and Melake, B.M. (2024) Assessment of community-based intervention approaches to improve the health and welfare of working donkeys in selected areas of Sidama region, Southern Ethiopia. *Frontiers in Veterinary Science* 10, 1253448. DOI: 10.3389/fvets.2023.1253448.

Yilma, J., Gebreab, F. and Mohammed, A. (1990) *Health Problems of working donkeys in Debre Zeit and Mengesha regions pf Ethiopia*. (Donkey's, Mules and Horses in Tropical Agricultural Development). CVTM.