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The role of animal welfare in improving the future of farming

Rebecca E. Doyle¹,²*, Angus J. D. Campbell³, Michel Dione⁴, Madeleine Woodruff⁵, Carolina Munoz⁵, Gezahegn Alemayehu², Tsega Berhe², Theo Knight-Jones²

1 The Jeanne Marchig International Centre for Animal Welfare Education, Royal (Dick) School of Veterinary Studies, University of Edinburgh
2 International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia
3 Nossal Institute for Global Health, Melbourne School of Population and Global Health, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne
4 Animal Welfare Science Centre, Faculty of Veterinary and Agricultural Sciences, University of Melbourne
5 ILRI, Dakar, Senegal
6 *Previous: Animal Welfare Science Centre, Faculty of Veterinary and Agricultural Sciences, University of Melbourne

Summary text

Global challenges around sustainability are putting different pressures on the welfare of livestock. This paper highlights ‘win-win’ improvements for both animal welfare and other aspects of sustainability, but even in these win-win situations, the adoption of improved practices is not a guarantee for a myriad of external factors. By having a better understanding of the system in which animals are raised, a broader understanding of an animal's welfare, and acknowledging the emotional states that animals experience, progress towards improving welfare and ultimately addressing some of these global challenges can be made.

Abstract
**Context:** Animal production plays a critical role in many global challenges around sustainability, including climate change and resilience, One Health and food security. With this role comes pressures on livestock welfare.

**Aims:** This paper outlines the key contributions animal welfare makes to global sustainability challenges.

**Methods:** This paper highlights ‘win-win’ improvements for both animal welfare and other aspects of sustainability by using four case studies: tail docking Australian sheep, agroforestry systems in Ethiopia, the Australian dairy-beef industry, and strategic feeding of goats in Pakistan.

**Key results:** These case studies show how animal welfare can be improved alongside livelihoods. Even in these win-win situations however, the adoption of improved practices is not guaranteed.

**Conclusions:** Long-term, sustained change in animal welfare can simultaneously make in roads to other challenges around sustainability. To do this we must have a broader understanding of the system in which the animals are raised so barriers to change can be identified. We also need an improved understanding of different aspects of an animal’s welfare that includes attributing relevant emotions to their experiences.

**Implications:** Lessons from these case studies can be applied to other production contexts and challenges, highlighting the universal value of understanding and addressing animal welfare.

**Keywords**

Affective state; Agroforestry; Dairy; Goat; Sheep; Sustainable development goals; Sustainable intensification

**Introduction**

Livestock production plays a critical role in many global challenges under the umbrella of sustainability, including climate change and resilience, One Health and food security. The Food and Agriculture Organization has linked livestock systems to all the United Nations’ 17 Sustainable Development Goals (SDGs) (Food and Agricultural Organization of the United Nations 2016), demonstrating the contributions that livestock can make to these global goals. With these connections, the pressures on
livestock have never been more intense. Globally, livestock systems have had an adverse impact on climate, water use and quality and land use and degradation, with livestock contributing substantially to pressures on a number of planetary boundaries (Van Zanten et al. 2019). The impacts that livestock production have on the environment has led to calls for reduction in the consumption of animal sourced foods (ASF) (Willett et al. 2019). At the same time, most of the world’s population need to increase the consumption of ASFs to reduce under-nutrition, and the demand for livestock products is dramatically increasing. It is estimated that demands for animal products are set to more than double in the next 20 years, a result of urbanization, economic growth, and increased consumption in low- and middle-income countries (LMICs) (Alders et al. 2021). Livestock can be both a source of zoonotic disease, as well as a channel for good human health, and therefore one of the three key entities in the One Health paradigm too.

In the middle of this push and pull of external factors are the needs of the animals themselves. To meet demands, the number of animals produced may need to increase. Global livestock numbers suggest this is the case, with numbers of key livestock species of cattle, chickens, goats and sheep having a net increase from 2010 to 2020 (FAO 2022) (Table 1). To do this within the confines of current footprints, or even to reduce resource use and impact, there is a need to ‘make more’ out of each animal. This has led to a focus on sustainable intensification, or even just intensification (Garnett et al. 2013). The former means that there are more animals whose welfare is at risk of compromise. The latter means that there are new and exacerbated challenges facing animals. The role of animal welfare in these global challenges, and the impact of these pressures on the welfare of animals, needs to be understood and addressed. Not doing so jeopardises progress towards these global challenges as well as the quality of the lives of the animals we rely on to make this progress.

Every production setting has its own set of challenges and pressures for animal welfare and production. Interventions within a system to address an animal welfare issue can create expected trade-offs. For example, conventional pig production systems in Europe and Australia have moved from stall-housing pregnant sows to group housing them to increase behavioural freedom and social interaction for sows. This shift from gestation stalls to loose housing for sows has come with an economic cost however; requiring the restructure and redesign of infrastructure (Baxter et al. 2012). Not all methods to improve...
animal welfare come at a cost. In fact, some come with clear production, livelihood and economic benefits. This paper draws on real-world examples of these ‘win-win’ situations where animal welfare improvements can be made alongside improvements to production and livelihoods. However, as the case studies will demonstrate, even in the face of these ‘win-win’ situations, adoption is not straightforward. As a part of this conference paper, common lessons learnt from these case studies are presented. Applying these lessons to other interventions and production systems will increase the likelihood of making steps towards improving animal welfare, and ultimately better managing some of the global pressures facing livestock.

Case studies

Tail docking ewes: small adjustments in practices for meaningful welfare gains

The refinement of surgical husbandry practices, while the search for alternatives for their replacement are underway, is an important way that the welfare of animals can be improved. Tail docking of sheep is a necessary surgical husbandry practice, primarily to reduce the risk of fly strike. Docking tails too short can create its own welfare issues, however.

In Australia, the industry guideline recommends docking tails equivalent to the length of the vulva (ETV; (Gill and Graham 1939)). While docking aims to reduce flystrike, docking too short can increase the risk of flystrike too. Docking at ETV promotes optimal healing of the docking wound (Johnstone 1944), so the initial pain may be less and the subsequent recovery is faster. Faster healing wounds also reduces the risk of chronic, painful conditions. This includes reducing the risk of bacterial arthritis (the risk of which is increased with a prolonged open wound) that can also lead to wastage from carcass trimming (Lloyd et al. 2016). ETV is also optimal for maintaining rectococcygeal muscle integrity, that reduces the risk of rectal prolapse during feedlotting of young sheep (Thomas et al. 2003), and it covers the vulva to reduce the risk of ewes developing vulva cancer (Vandegraaff 1976). Along with the pain associated with docking itself, these risks to welfare are associated with compromised mental states, including pain and distress when they occur.
An independent assessment of ewes on 32 farms in Victoria, Australia identified 86% of adult ewes as having tails docked shorter than the recommended length (Munoz et al. 2018). Short docking is attributed to a lack of awareness of issues associated with short tails, the belief that it reduces dags, and breed aesthetics. The economic costs of docking tails too short is estimated to be $1.50 for a mulesed merino ewe and $1.60 for an unmulesed crossbred ewe (Doyle 2018). At a national flock level, this amounts to a sizeable loss. Docking tails at the correct length is effectively free to solve and it reduces the risks of negative welfare outcomes for ewes, so the arguments for this welfare refinement are clear.

When studying the influencing factors around the process and decision making of tail docking, it became clear that the impact of sheep tail length on shearing influenced farmers’ management (Woodruff et al. 2020). While farmers do not describe shearers as a source of advice, comments from shearers on tail length is a factor contributing to the continuation of short tail docking (Woodruff et al. 2020). Shearer comments had even been reported to make farmers revert to short tail docking after docking at ETV (Woodruff et al. 2021).

When looking at the practice of tail docking in isolation, shearers are not obvious stakeholders in this management practice, but they are a key influence in promoting, or preventing, behaviour or practice change. This is a good example of how important understanding the wider system in which a practice exists is essential if animal welfare improvements are to be made.

Agroforestry systems: production systems benefitting animal, human and environmental wellbeing

Agroforestry, described as “a new name for an old practice” (Nair 1991), is the inclusion of trees in agricultural production systems. Silvopastoral systems, a specific type of agroforestry, integrate trees in animal production systems, and are described as having benefits for animal welfare, the environment and farmer livelihoods. While agroforestry and silvopastoral concepts are old practices, they are not the dominant production system in many parts of the world. As a result, understanding the synergies and tradeoffs that silvopastoral systems have for farmers, their animals and the environment is important if the benefits of silvopastoral systems are to be achieved at scale. Comparing tree-based production
systems with traditional mixed crop-livestock systems in different parts of Ethiopia provided the opportunity to study how animals, people and the environment fare. In two different districts of Ethiopia, Dugda and Humbo, 20 households each in areas with good tree access (GTA) and limited tree access (LTA) were interviewed to collect information on livelihoods, food security, agroforestry practices and the welfare of their cattle was assessed. The different tree access areas have been identified by our project partner World Agroforestry (ICRAF) identified as having distinctly different tree coverage/usage.

Households with GTA had cattle with better welfare and more livelihood opportunities than those with LTA. Insufficient nutrition, discomfort and pain were common issues experienced by cattle, and these were all more common in areas of LTA. Across all sites, one quarter (25%) of all cattle were classed as ‘skinny’ with a body condition score of 1 or 2 (Berhe et al. 2021a). There were nearly twice as many skinny cattle in areas with limited tree access in both Humbo and Dugda, compared to areas with good tree access (Table 2). Cows with patches of hair loss, an indicator of discomfort from prolonged rubbing, laying on hard surfaces or tethering, were more common in LTA areas as well. Painful management actions (branding, mutilations or hobbling) were also more common in LTA areas compared to areas of good tree access.

Households in areas with GTA had at least one more source of income (usually from trees) compared to LTA households, and this seemed to translate into a reduced reliance on livestock as an income source too. Diversification of income sources is a key strategy for farmers to have resilience to cope with the changing climate and natural disasters, so there may be long-term livelihood benefits too (Berhe et al. 2021b). There was no relationship between tree access and food insecurity. Looking across sites, tree access did not clearly coincide with a better food security, but in the region that was more insecure (Humbo), families with limited tree access also experienced more food insecurity. Moderate to severe food insecurity was less common in Humbo when households had access to trees, whereas higher degrees of food insecurity were reported in GTA areas of Meki compared to LTA areas.

During community conversations in all four kebeles (villages), LTA and GTA communities described the benefits of agroforestry to animal welfare and livelihoods (Alemayehu et al. 2021), and there was a strong consensus between all groups on the connection between good animal welfare and improved...
household food security. Alongside these benefits of agroforestry, barriers to the adoption or expansion of agroforestry were mentioned. Challenges described included a skills gap around managing young trees with grazing stock, not knowing which tree/plant species were appropriate, and the high initial investment cost for seedlings that is made more difficult with a long wait until there was an income return. A combination of these issues was attributed to a reluctance of some farmers to implement agroforestry practices on their farms or in their kebele. These barriers to adoption fall into two categories: skills and resources. Theoretically, skills can be gained from activities like training through community conversations and other extension activities, obtaining adequate resources can be a more difficult challenge to overcome.

**Dairy-beef: new market opportunities to address a critical welfare issue**

Increasing the value of animals can be an important step in improving their welfare, and so developing and refining markets for animal products can create opportunities for welfare improvement (Bolton and von Keyserlingk 2021). To produce milk efficiently, dairy cows must give birth to a calf every year. The number of female calves born far outweighs the number of replacement cows needed in the herd, and these together with male calves are described as non-replacement dairy animals (NRDCs). Growing NRDCs for meat is an established practice in many parts of the world, but in Australia the majority of NRDCs are slaughtered within the first weeks of life as “bobby” calves (Bolton and von Keyserlingk 2021). These bobby calves are often poorly managed in the lead up to slaughter, risking their health before and on their way to slaughter, which itself is a fearful experience. The killing of bobby calves has been identified as the primary welfare concern for the Australian dairy industry (Verdon 2021).

Recent activity in Australia has started to focus on the production of quality beef from NRDCs. NRDCs that are grown for beef can be equal to or better eating quality than traditional beef breeds (Pfuhl et al. 2007). This creates the opportunity for NRDCs to be a high value product. Rearing NRDCs for beef addresses the significant animal welfare challenges of slaughtering young calves, while also reducing the ‘wastage’ of animals that this represents and addresses society’s ethical objection to killing animals very early in their natural life-span. While not acting as a ‘panacea’ for this issue (Bolton and von Keyserlingk 2021), it has the potential to create economic value for a previously very ‘low value’ animal, and so encourages investment in welfare. It can also successfully address the four pillars of
sustainability (described by Makkar and Beever (2012)): ethics, profits, planet and people. Current barriers to the growth of this industry include a coordinated supply chain that enables the producer to get appropriate returns for investments and quality of beef, the current sub-optimal management of dairy calves and the selection of suitable beef bulls for cross breeding with dairy cows, which both create welfare issues and stifle productivity/profitability (Verdon 2021).

**Feeding young goats: strategic small investments to improve welfare**

Kid goat mortality in Pakistani small holder production systems, like in many other parts of the world, is extremely high. Small, strategic supplementation of high-quality feed (commercial total mixed ration provided at 200 g/animal/day) was trialled to reduce the mortality of these young goats (< 6 months age) in a village setting in Sindh, Pakistan. This age was chosen so the intervention can be small in terms of investment, with little feed needed to make a substantive impact on a young animal’s growth, and due to it being a vulnerable age group where the risk of mortality is high. In conjunction with this additional feeding, owners were encouraged to provide their young goats with free access to water and time spent untethered, two actions that are not routinely practiced in Sindhi villages. These actions in the intervention addressed animal welfare limitations in the system including poor feed, disease, and restricted movement from tethering, all of which are associated with negative mental states including hunger, distress, pain and frustration from restricted movement.

Young goat mortality was 12% in the intervention village compared to 29% in the control village. With an average herd size of 8.4 goats per farm, this 17% reduction in mortality equates to an average 1.4 extra goats for each intervention household. This ‘extra animal’ (and a bit) represents a significant opportunity to improve household livelihoods because it can be either sold or retained as breeding stock, thus growing household income, potentially exponentially over time. In addition to the improved survival, goat owners and their neighbours reported that the supplement-reared kids also looked healthier and fetched a higher price when sold.

While all farming families repeatedly described the benefits of the intervention, 39% of respondents expressed a reluctance to continue with the practice. For many interviewed farmers, investing in young animals, regardless of the cost vs. the return, is a risky investment. When veterinary health services
are limited, and disease outbreaks are common, high mortalities can occur frequently regardless of how well the herd is managed. This makes investing in young animals, which have a delayed return, risky to some. Another barrier to adoption was around embedding these practices into day-to-day life. One hundred percent of male farmers, and 78% of female farmers, described the intervention as easy to implement. For many participants, implementing the intervention either reduced, or did not change, their daily workloads either. A limited number however, who had limited access to water in the village, reported that providing free access to water increased their workloads. While the intervention was successful at addressing its aim to reduce mortality, the cost of investment and the impact on some workloads created substantial barriers to adoption to some. This is a good example of how, despite interventions being successful for many, changes are often never taken up by all participants in a system, and that the reasons for this are variable.

Lessons learnt

The case studies above are specific to their production system and regional challenges, but there is universal value in the lessons that can be learnt. A thorough understanding of the farming system to implement change; understanding what an animal needs, beyond ‘just’ health; and, addressing the presence of affective states in animals are all important needs to be addressed, regardless of the welfare challenges, opportunities or production systems that require change.

Understand the broader context to make change

All the case studies above provide examples of clear opportunities or successful interventions to improve animal welfare (summarised in Table 3). Despite these animal welfare improvements, that simultaneously provide production opportunities, there are clear barriers to adoption of these improved practices that need to be addressed if changes are to be made. Many of these barriers are not directly associated with the intervention itself, but the broader production context.

Many animal welfare issues do not require complex technical solutions. It is the barriers to the adoption of solutions that prevents tangible improvements to animal welfare from occurring. The case studies described all include social research aspects, wider assessments of impacts and needs beyond animal welfare and activities to generate an in-depth understanding of the production system. This approach
allowed the identification of the barriers to adoption, despite the welfare and production successes.

Taking multi- and inter-disciplinary approaches to animal welfare interventions would increase the chances of making meaningful improvements. It is important to remember however, that this means voluntary improvements to animal welfare will take substantial time to be implemented and may never be wholly adopted, regardless of how valuable they are for welfare.

Animal welfare encompasses, but is more than, health

The World Organisation for Animal Health, or OIE, has a definition of animal welfare that describes animals that are healthy, comfortable, well nourished, safe, able to express innate behaviour, and not suffering (OIE 2004). As described by the OIE, good health is necessary, but not sufficient, for good animal welfare. Focusing on animal health in the absence of animal welfare fails to understand the needs of animals beyond basic biological functioning, or the importance of other aspects of animal management that are important to addressing global challenges. While this is understood conceptually by most stakeholders, from farmers to the general public, many indicators of animal welfare are often focused on indicators of biological functioning, including many of those in our case studies. Broadening welfare indicators to include those that can track behavioural opportunities/activity and affective states is meaningful for the welfare of the animals involved and can act as early indicators of emerging issues (Doyle and Alders 2021). The other important lesson to be learnt here is that initially addressing welfare issues that also have important production effects are a way to raise producers’ awareness of welfare without creating conflict with livelihood goals. With these ‘entry point issues’, if the link between productivity is clearly demonstrated and livelihoods are improving, farmers are more likely to incorporate other pro-welfare actions into their farming because they believe in the benefits of welfare and they can ‘afford’ to invest in it. Taking an example from the Agroforestry case study, hair loss patches on a cow does not affect her health or function, but it suggests that she has been exposed to discomfort and inadequacies in her housing. Addressing this issue when it is noticed prevents the area of hair loss turning into a lesion that does start to threaten biological functioning.

Beyond the value of assessing welfare for welfare’s sake, using welfare indicators and welfare assessment can act as early warnings about situations where animals are not coping, but while the issue is still fixable. Hence, incorporating a balanced range of welfare indicators into other types of
research and production system interventions can ensure that animal production, health and welfare is improving with the intervention without unidentified negative impacts.

Function goes hand in hand with feelings

There is often a link that can be made between an animal’s biological functioning and its affective state, or how it is feeling. For example, a cow in an emaciated body condition because it does not have enough quality feed will be hungry (Roche et al. 2009). When an animal is in a diseased state, it is suffering (Nielsen et al. 2021). But identifying the feelings component that relates to a biological state is not often done. Ascribing emotion to welfare has been associated with fear of anthropomorphism, challenges around a lack of direct evidence, and is also simply not part of current methods of practice. In some ways, this cautious approach is understandable and even useful for animal welfare because anthropomorphising an animal’s welfare could underestimate or miss genuine welfare issues. Animal welfare science has moved beyond this, generating evidence of mental states in a wide variety of species. Sheep modifying their cognitive processing following stress (Doyle et al. 2010), piglets playing in anticipation of receiving enrichment (Dudink et al. 2006), and lame chickens self-selecting pain relief (Danbury et al. 2000) are all examples of measuring mental states in animals.

Failing to attribute relevant feelings to biological states perpetuates the issue of animal welfare being focused on function, not feeling. Throughout the four case studies above, reference to the relevant feelings animals may be experiencing have been included. For more details on how nutritional, environmental, health and behavioural interaction aspects of animal welfare connect to the mental component of animal welfare, see Mellor et al (2020). Using the hair loss example from above, it is not important to intervene immediately when hair loss itself is detected from a biological perspective, but making animals feel more comfortable by adding clean bedding to their stall is a needed intervention from a welfare perspective. Describing feelings alongside biological function can give meaning to the experiences of the animal and reveal the welfare-need for intervention.

Conclusions
Across the globe, the role and welfare of livestock is being put under intense pressure for different reasons. As outlined by the case studies in this paper, there are clear opportunities to improve animal welfare and make positive progress on other aspects of sustainability. The pathway to address these issues is not usually a technical one, rather it relies on implementation. For animal welfare to improve, and positive progress towards these broader issues to be made, we must have a broader understanding of both the system in which the animals are raised, so barriers to change can be identified, and of different aspects of an animal’s welfare that includes attributing relevant emotions to their experiences.

Declaration of Funding

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Declaration of conflicts of interest

The authors declare no conflicts of interest.

Data Availability Statement

Data presented in this review paper are available elsewhere.
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FAO, S (2022) FAOSTAT database. Food and Agriculture Organization of the United Nations, Rome, Italy 1,


Woodruff, ME, Doyle, R, Coleman, G, Hemsworth, L, Munoz, C (2020) Knowledge and attitudes are important factors in farmers’ choice of lamb tail docking length. Veterinary Record 186, 319-319.
Table 1 Changes in global livestock numbers from 2010 to 2020

<table>
<thead>
<tr>
<th>Species</th>
<th>2010</th>
<th>2022</th>
<th>Change from 2010 to 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>1,369,822,223</td>
<td>1,525,939,479</td>
<td>156,117,256</td>
</tr>
<tr>
<td>Chickens</td>
<td>26,852,313</td>
<td>33,097,116</td>
<td>6,244,803</td>
</tr>
<tr>
<td>Goats</td>
<td>874,457,191</td>
<td>1,128,106,236</td>
<td>253,649,045</td>
</tr>
<tr>
<td>Pigs</td>
<td>971,728,711</td>
<td>952,632,025</td>
<td>-19,096,686</td>
</tr>
<tr>
<td>Sheep</td>
<td>1,046,140,329</td>
<td>1,263,136,644</td>
<td>216,996,315</td>
</tr>
</tbody>
</table>

1 Data from FAOSTAT database (2022); flagged description from FAO about data: aggregate, may include official, semi-official, estimated or calculated data
2 Numbers of chickens are 1,000 head
3 Global pig numbers fell from 2010 to 2020, but likely reflects the impact of the African Swine Fever outbreak in China and Vietnam; pig numbers in 2017 – before the outbreak started – were 977,622,520 head.
Table 2 Farmer livelihood and cattle welfare indicators in four kebeles, across two districts of Ethiopia, with within-district comparisons between limited tree access (LTA) and good tree access (GTA) areas

<table>
<thead>
<tr>
<th>Kebele</th>
<th>District</th>
<th>Tree access</th>
<th>Mean number of income sources</th>
<th>Mean income from livestock (US$)*</th>
<th>Mean income from agroforestry (US$)</th>
<th>Percentage (count) of households experiencing moderate/severe food insecurity</th>
<th>Percentage (count) of skinny cattle</th>
<th>Percentage (count) of cattle with evidence of branding, mutilation and/or hobbling</th>
<th>Percentage (count) of cattle with hair loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girba Koree Addi</td>
<td>Dugda</td>
<td>LTA</td>
<td>4.6</td>
<td>237</td>
<td>39</td>
<td>25 (5)</td>
<td>33 (13)</td>
<td>30 (12)</td>
<td>10 (4)</td>
</tr>
<tr>
<td>Shubi Gamo</td>
<td>GTA</td>
<td>5.6</td>
<td>202</td>
<td>793</td>
<td>40 (8)</td>
<td>18 (6)</td>
<td>9 (3)</td>
<td>3 (1)</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>5.1</td>
<td>219</td>
<td>416</td>
<td>3 (13)</td>
<td>26 (73)</td>
<td>9 (15)</td>
<td>3 (5)</td>
<td></td>
</tr>
<tr>
<td>Anch Wocha</td>
<td>Humbo</td>
<td>LTA</td>
<td>3.4</td>
<td>471</td>
<td>1</td>
<td>95 (19)</td>
<td>32 (17)</td>
<td>8 (4)</td>
<td>15 (8)</td>
</tr>
<tr>
<td>Bossa Wanche</td>
<td>GTA</td>
<td>5.9</td>
<td>197</td>
<td>121</td>
<td>70 (14)</td>
<td>16 (7)</td>
<td>4 (2)</td>
<td>4 (2)</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>4.6</td>
<td>334</td>
<td>61</td>
<td>83 (33)</td>
<td>24 (98)</td>
<td>4 (6)</td>
<td>6 (10)</td>
<td></td>
</tr>
</tbody>
</table>

* Average exchange rate of Ethiopian Birr to United States Dollars in March 2021 was 40.4899; used to calculate US$ figure
Table 3 Proven benefits of the case studies and the described barriers potentially preventing the sustained implementation and expansion of interventions

<table>
<thead>
<tr>
<th>Case study</th>
<th>Proven benefits</th>
<th>Described barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tail docking ewes</td>
<td>Reduced risk of flystrike, faster wound healing at docking, reduced risk of future welfare complications</td>
<td>Knowledge of recommended tail length, impact of longer tails on shearing and subsequent feedback from shearers</td>
</tr>
<tr>
<td>Agroforestry systems</td>
<td>Evidence of improved animal welfare, livelihood opportunities and food security</td>
<td>Skills and knowledge gap, investment for planting seedlings, management of animals in conjunction with trees</td>
</tr>
<tr>
<td>Dairy-beef</td>
<td>Addresses the social outrage associated with the slaughter of young calves, promotes better management of NRDCs</td>
<td>Current calf management practices, knowledge of crossbreeding, coordinated supply chain</td>
</tr>
<tr>
<td>Feeding young goats</td>
<td>Reduced mortality, better access to other essential resources for young goats, improved prices, easier to implement</td>
<td>Risk of financial investment, increased workload for some households</td>
</tr>
</tbody>
</table>