

Assessment of the current on-farm welfare of Kenyan beef cattle as part of an evaluation of the potential of developing countries to access niche high-welfare beef export markets in the EU

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[Please note that this report represents an interim report on the study being prepared for publication.]



Introduction

'Kenya' is not somewhere immediately synonymous with 'animal welfare' in the general psyche; or, more specific to this study and report, not a country one would immediately hold up as somewhere that could potentially export high welfare beef products to EU markets.

However, a school of thought exists that developing countries, with their current livestock industry structure, are ideally placed to target niche high-welfare or organic export markets in the EU. These markets, in the era of increasing vociferosity of consumer demands for high welfare, traceability and 'ethically superior' products of animal origin, are potentially highly lucrative.

Several case studies, carried out mostly by or on behalf of the WPSA/RSPCA/Eurogroup looking at the successes of Namibia and Botswana in the standard EU export market, have looked at developing countries' potential to produce high-welfare animal products, and found three aspects of the countries' livestock industry that confer promise. The major factor in the developing nations'

favour is that their livestock industry is extensive in nature, thereby avoiding many of the welfare problems that come with intensive systems in the developed world; indeed, one of the EU farmers' main concerns with - and main restrictions on - producing high welfare meat is the cost of land expansion and labour that comes with extensification. Another major advantage of developing nations is the availability of cheap, voluminous labour. Thirdly, more speculatively, the marketability of exotic beef is unparalleled: imagine 'Masaaai beef fresh from the wilds of Africa' as a selling point in the local supermarket.

As a broad outline, the thinking runs that, with investments in infrastructure (especially transport, slaughtering, markets and food hygiene), developing countries can set up export businesses to export high-welfare and organic meat for prices that far outweigh those that farmers receive on the domestic market. It is thought - speculatively - that in countries where agriculture forms an important part of the economy, the extra revenue brought in by the sector can only prove helpful in the process of development, both in terms of gross capital, and the effects on other agriculture-related industries.

However, there is currently little data available regarding the *status quo* of on-farm, transport and slaughter welfare of animals in developing countries; in lacking a baseline, it is difficult to ascertain how far welfare standards must be improved in order to access such markets. In short, the feasibility of the whole idea is currently grounded in information-poor theory.

Aim of the study

The aim of the study, therefore, was to address in a small part the paucity of information available currently. Specifically, the study looked to assess the current state of on-farm welfare of beef farms in Kenya. It was restricted so because of theoretical and logistical constraints; the on-farm welfare is the most fundamental block in the whole theory of trade in high-welfare products, from which improvements down the production line are stimulated. Further, the 4-week time afforded for the study meant in order to acquire useful amounts of data, it was necessary to focus on a specific area.

Location

Kenya was selected because it met certain criteria evidenced in the case studies of Botswana and Namibia, namely:

1. Pre-existent and important livestock industry with functioning infrastructure: 24% of GDP in 2005, with an estimated 75% of the population relying on the sector directly or indirectly. Transport, markets, slaughterhouses in place from farm to fork.

2. Government with legislative control over and interest in developing livestock industry. Various government departments, agencies and projects support the livestock industry, including the Ministry for Livestock and Fisheries Development (MLFD), the Arid Lands Resource Management Project (ALRMP), the Kenya Livestock Marketing Council (KLMC) and the Kenya Meat Commission (KMC). In recent years, the Kenyan government has been courting Western companies for investment in livestock infrastructure.
3. Politically stable nation with peaceful accords with the EU. Had been met at the time of the project (August 2007), although recent events in early 2008 surrounding civil unrest at the disputed general election have obviously undermined such. However, at time of writing, mediation and calm seem to have returned to the Kenyan political arena. The country continues to enjoy cordial arrangements with EU countries, and in terms of trade, is a member of a number trading groups, most notably the European Union-African-Caribbean-Pacific (EU-ACP).

It is hard to pick an 'average' developing country, but Kenya showed promise of room for development in the livestock, and particularly beef, industry. Further, from a logistical point of view, the ability of a large section of the population to speak English was deemed an important factor in information gathering.

Methods and Materials

Holdings were selected on the prerequisite that they dealt commercially in beef animals destined for meat. It was also deemed desirable to target both the large ranches and smallholdings, with a view to building a more complete picture of on-farm animal welfare. As a result, the premises assessed range fairly widely both in size, from 100 acres to 75000, and from 50 head of cattle to 6000. Given their distribution, the premises were split conveniently according to region: in Laikipia district were assessed eight large ranches, with average acreage of 39000 and 3700 head of cattle; in Machakos were assessed eight smaller ranches of average acreage 6000 and 850 head of cattle; around Narok in the Masaai area were assessed ten smallholdings, with average acreage of 450 and 500 head of cattle. Breed of cattle on-farm was deemed unimportant as a selection criterion.

It had been the intention to carry out assessments on a number of UK beef farms in order to provide direct comparison; however, at the time of the study, the ongoing foot and mouth outbreak and the emergence of bluetongue made access to premises difficult. Instead, the animal welfare legislation currently in place in the EU, that of EU Council Directive 98/58/EC was taken as a point of reference, with further recourse to the DEFRA-published *Code of Recommendations for the Welfare of Livestock: Cattle* for good welfare practice on-farm.

The assessment was made up of animal-based outcomes and husbandry-based outcomes. Animal outcomes were gathered by means of an adapted version on the *Bristol Welfare Assessment Programme: Beef*. In brief, the system works on close observation of at least twenty individual animals, ideally in proportion to the groups on-farm combined with observations of the groups on the farm. Individual assessments are binary (1 = present, 0 = absent), and from the individuals assessed, on-farm prevalence can be calculated; these prevalences are then compared with established 'intervention scores' to identify areas of possible concern regarding animal welfare.

Assessed parameters are easy to identify and can be done so from a considerable distance, with no need for animal restraint or farmer inconvenience. The parameters are: flight distance (m), rising restriction, thin cows (<2BCS), fat cows (>3.5 BCS), dirty side, dirty hindlimb, skin lesions (non-hock), swollen hocks, claw overgrowth; to these were added other parameters (with no intervention scores) that had proved useful when a Kenya-based system had been developed in a project developed at the International Livestock Research Institute: coat condition (0=poor, 1=normal, 2=good), injuries (0=absent, 1=present), brands (0=absent, 1=present).

Group observations involved tallying any conditions seen or commenting on certain areas whilst walking around the group. Assessed here: obviously sick/dull, coughing, hair loss/scratching, abraded/ulcerated hock, rumen bloat, eye abnormalities and discharges, lameness; and, from the ILRI work, non-hock swellings, nasal discharge, oral discharge, udder mastitis, udder lesions, claw lesions. Further, a subjective comment on the herd mood was made, along with notes of normal behaviour observed (walking, lying, grazing (leaders and followers), drinking, cudding, scratching, grooming, mounting, vocalisation; calf-mother bonding, suckling, grooming; nursery groups in Boran and zebu herds), and a judgement on the likely suitability of the breed regarding the environment. Number of positive and negative interactions between stockpersons and animals were also noted.

The other major information source was participatory, involving questions about key welfare areas of husbandry. These covered nutrition (changes throughout the year, supplementation, contingencies; water supply), breeding (1st parturition age, bull:cow, dystocia management), calf management (passive transfer, mortality, pneumonia, scours and other disease), mutilations (timings and techniques of branding, ear marking, disbudding, castrating and relationship to weaning age), disease (incidence and treatment/prevention of lameness, mastitis, emaciation, metabolic disease, internal and external parasites, FMD, Rift Valley Fever (RVF), East Coast Fever (ECF), trypanosomiasis, anaplasmosis, babesiosis, heartwater, ephemeral fever, brucellosis, contagious bovine pleuropneumonia (CBPP), lumpy skin disease (LSD), and anthrax/blackquarter). Records were assessed where they existed (3 premises).

Of the farms assessed, 50% had the pure-bred Boran as its predominate breed; 28% had zebu (all Masaai, of whom 80% had zebu as the main breed); 14% had Sahiwal. The remainder had Charolais, Simmental, Red Poll or Brown Swiss. Only 7% (2 of the 28) of farms had purely cross-bred herds. 45% of farms were pure-bred only, with 48% maintaining both pure and crossed herds.

A local facilitator was used to gain access to Masaai smallholdings. A Kenyan assistant, Miss Winnie Wairumu BA, was employed to help with planning and language facilitation.

Results

Animal-based outcomes

Laikipia district

A wide range of intervention score breaches was found (1 – 6), with one ranch each showing one, two, three and four breaches, and two ranches each showing five and six breaches; average number of breaches was 4 (median 4.5). There was no appreciable distribution weighting, and one certain breach did not then predispose to others. There were 33 breaches out of a total of 80 separate assessments (41%).

The most common breach was that of branding, with 100% of ranches breaching; the second most common (75%) was skin lesions, equal third (62.5%) was dirty hindlimb and flight distance, fourth (50%) was dirty side, fifth (37.5%) claw overgrowth and sixth was fat cows (25%). Of these, skin lesion showed the highest average excess of the intervention score (193%), followed by flight distance (77%), fat cows (66%), dirty hindlimb (59%), dirty side (53%), claw overgrowth (13%).

There were no breaches of thin cows, swollen hocks or rising restrictions. Coat condition was above-average (1) at an average of 1.4 with range 1.1–2.

Of the group observations, hair loss/scratching (6 ranches), eye discharges and lameness (both 5 ranches) were the most common, with non-hock swellings (2), coughing (1), obviously six/dull (1) less common. Of these occurrences, 75% were in 50% of the ranches, the same ranches as those with the highest number of breaches (that is, the two five-breaching and two six-breaching ranches). Of these, one ranch with six individual parameter breaches had the highest occurrence of lameness (4) and ocular discharge (8); the other ranch with six individual parameter breaches showed the highest occurrence of hair loss/scratching (5) and second-highest lameness (4).

Herd mood was relaxed throughout, and very relaxed on four ranches. Normal behaviour range was observed on all ranches, and suitability was judged as good on all. Positive interactions such as stroking were observed on 50% of ranches,

and negative interactions – striking whilst herding – present only on one, during collection into bomas in the evening.

Machakos district

The widest range of intervention score breaches was found (1 – 8), with one ranch each showing one, two and three breaches; two ranches showed four breaches; one ranch each showed six, seven and eight breaches. Average number of breaches was 4.4 (median 4), and all parameters breached except fat cows were breached by 50% or more of ranches. There were 35 breaches out of a total of 80 separate assessments (44%), the highest from the three groups.

The most common breach (100% of ranches) was branding; the second most common (62.5%) were skin lesions and thin cows, third (50%) were dirty side, dirty hindlimb, flight distance, claw overgrowth, fourth (12.5%) was fat cows. Of these, skin lesion showed the highest average excess of the intervention score (228%), followed by claw overgrowth (140%), thin cows (95%), dirty hindlimb (75%), fat cows (66%), flight distance (44%), and dirty side (39%).

There were no breaches of swollen hocks or rising restrictions. Coat condition was above-average (1) at an average of 1.3 with range 1.1–1.9.

Of the group observations, every ranch showed some occurrence of conditions. Every ranch showed lameness, with range from 2 to 8 animals, and an average of 4.4 per ranch; the three ranches with the highest number of individual parameter breaches showed the highest levels of lameness (5, 7, 8). Every ranch also showed ocular discharge, with range 3-6 and average of 4 animals per ranch; all were bilateral with considerable tear staining. Hair loss/scratching was present on all but one of the ranches, with range 1–8, average 3; again the worst offending ranches in terms of individual parameters showed the three highest scores. Of other occurrences, abraded/ulcerated hock was present on 3 ranches, obviously sick/dull and claw lesions on two (highest occurrence for each (3) on worst performer for individual parameters) and non-hock swellings on one ranch.

Herd mood was relaxed throughout, and very relaxed on two ranches. Normal behaviour range was observed on all ranches, and suitability was judged as good on all but two, which had Friesian crosses present.

Narok/Masaai district

The narrowest range of intervention scores was found (3–4) with nine smallholdings showing 3 breaches, and one 4 breaches. Average number of breaches was lowest at 3.1 (median 4), and all but two parameters showed less than 50% smallholdings as breaching them. There were 22 breaches out of a total of 100 separate assessments (22%), the lowest from the three groups.

The most common breach (100% of ranches) was branding; the second most common (80%) were dirty side and skin lesions, third (30%) was claw

overgrowth, and fourth (10%) was fat cows, thin cows, and dirty hindlimb. Of these, fat cows showed the highest average excess of the intervention score (317%), followed by skin lesions (194%), dirty side (108%), thin cows (95%), dirty hindlimb (25%), and thin cows (13%).

There were no breaches of flight distance, swollen hocks or rising restrictions. Coat condition was above-average (1) at an average of 1.3 with range 1–1.8.

Of the group observations, every ranch showed some occurrence of conditions. Every ranch showed ocular discharge, with range 1–12 and average of 7.2 animals per holding; all were bilateral with considerable tear staining, and the holding with the highest number of breaches (4) showed the joint-highest occurrence of ocular discharge (12); the ocular discharge was the greatest out of all three groups. Every holding except one showed lameness, with range from 2 to 11 animals, and an average of 4.2 per holding. Hair loss/scratching was present on eight of the holdings, with range 2–9, average 3. Coughing was also present on eight of the holdings, with range 1–4, average 1.6. Nasal discharge was present on six of the holdings, with range 1–4, average 1.1, and abraded/ulcerated hocks present on five; obviously sick/dull, non-hock swellings, oral discharge, and udder lesions were present on two holdings each.

Herd mood was relaxed throughout, and very relaxed on two holdings. Normal behaviour range was observed on all ranches, and suitability was judged as good on all but two, which had Friesian crosses present. Positive interactions were seen on nine holdings, with an average of 3.9 per holding (stroking). Negative reactions were present on only three, and limited to striking when moving; average occurrence was 0.6.

Comparing groups

Number of breaches

All groups assessed showed significant breaches in branding (100%), dirty side (average 60%) and skin lesion (72.5%) parameters.

Comparing large and small ranches with smallholdings, ranches showed almost double the number of breaches of then smallholdings (42.5% for ranches compared to 22%). They also showed significant breaches of flight distance (56% of ranches breaching; 0% of smallholdings) and dirty hindlimb (56% of ranches compared to 10% of smallholdings). However, smallholdings showed greater breaching of skin lesions (80% of smallholdings compared to 69% of ranches) and dirty side (80% compared to 50%).

Comparing the three groups separately, the large ranches showed the highest number of flight distance breaches (62.5%), dirty hindlimbs (62.5%) and fat cows (25%). The small ranches showed the highest breaches in thin cows (62.5%, large ranches 0%, smallholdings 10%) and claw overgrowth (50%), and high

breach (50%) in flight distance. Smallholdings showed the highest number of breaches in dirty side (80%) and skin lesions (80%).

Severity of breaches

Judged on the average percentage of excess for each parameter, all groups showed high severity (average 205%) breach of skin lesions. Although branding did not have any intervention score, 100% of the farms visited practising such means this would be severe breach.

Comparing the three groups separately, the large ranches showed severest breach of flight distance (77%), and severe breaches of fat cows (66%) and skin lesions (228%). Small ranches showed severe breaches of thin cows (95%), dirty hindlimb (75%) and claw overgrowth (140%). The smallholdings had the severest breach of dirty side (108%), and severe breach of skin lesions (194%).

Participatory-based outcomes

From the plethora of results obtained, it is necessary to only highlight the relevant ones here:

Stocking and Management

1. Offtake is around 20% for all commercial beef ranches, but significantly lower – around 10% - for smallholdings
2. Record keeping is generally good for the commercial beef ranches, and non-existent on smallholder premises.
3. Group sizes varied widely between smallholders and ranches; ranches hovered around 100-200, whereas smallholders could be anything up to 500.
4. Groups were generally made up of:
 - a. Steers
 - b. Breeding females, including some with calf
 - c. Maternity herds (those close to/shortly after term)
 - d. Pre-breeding heifersThese generally had bulls present within the breeding herd. Only one farm, the Sahiwal stud, kept bulls together in large groups with no other animals.
5. Supervision is excellent in all cases, with at least one herdsman supervising each group for 24 hours.
6. Animals are generally very well adapted to the environment – namely mostly Boran and zebu. Some European breeds are present, but no problems were identified with these during the study.

Breeding

1. Ranches and smallholders had policies on selecting heifers for breeding based on hips and feet, and sometimes other factors such as health and growth; smallholders had no such policies in place.

2. Age of first parturition was 24 months in the large ranches; a little more variable in the small ranches, with most lying 22-27 months, but one with 22 months and one with 36 months; smallholders was 36 months.
3. Calving rates (% of calves produced to animals put to bull/AI) in the large ranches averaged 80%, 74% in small ranches and 52% in smallholders
4. Bull:cow ratios never exceeded 1:40 on all farms.
5. Two out of the 28 premises assessed used solely AI as a breeding technique.

Calving

1. Supervision is excellent, with a herdsman present throughout the 24 hours.
2. Boran cattle are reported as easy calving breed, and calving interventions are generally low (<5%) with this breed and its crosses. Occasionally, Sahiwal bulls can cause problems. Smallholder interventions approach 100% because of cultural reasons that a cow must always be helped when observed to be in labour.
3. Dystocias are almost exclusively feto-maternal disproportion; otherwise lack of dam nutrition leading to exhaustion.
4. Calves are supervised at suckling in the first 24 hours. If rejection occurs, response varies according to type of premises: ranches will generally tie up the dam's legs temporarily to allow suckling, whereas smallholders will aim for calf-mother bonding by covering the calf with mineral lick; if this fails, the calf will be allowed to suckle by temporary tying-up of dam's hindlimbs.
5. Calf (up to 6 months) mortality was high in the smallholders (average 32%) lower in the ranches (average 8%). Scours, pneumonia and tick-borne diseases were quoted as the greatest causes of the mortality.

Mutilations

1. Branding for identification was carried out on all farms.
 - a. On the ranches, this was done in 95% of cases at time of weaning
 - b. On smallholdings where weaning was natural, it was carried out from 12-24 months
 - c. Ranch branding consisted of identification number of the ranch and sire of the animal on the hindquarters. For pure-bred Boran, legislation-obeying brands were required over the withers.
 - d. Smallholder branding consisted of extensive branding, running from the brisket over the hindquarters, bilaterally, with each pattern specific to a certain farm.
 - e. Neither anaesthetic nor analgesia was used on any farm.
2. Disbudding was carried out as standard procedure on 95% of ranches, all within 8 weeks of birth using a hot iron and without anaesthetic or

analgesia except on two premises which used local corneal block anaesthesia with lignocaine. No disbudding was carried out on smallholder premises.

3. Dehorning was carried out on smallholder premises. 10% did it as standard at 5 months. 70% carried it out only on aggressive animals, and two smallholders did not carry out any. Those who did perform it used cheese wire, and no anaesthetic or analgesia.
4. Castration of bull calves or bulls was carried out on all farms.
 - a. On ranches, this varied from 1 week to 12 months. 38% were at the same time (8 months) as weaning, along with branding. The average was 5 months, median 6 months.
 - b. On smallholding, timing varied from 4 to 36 months; most lied within the 12-24 months range.
 - c. 50% of ranches used open castration with a knife; 19% used a burdizzo; 13% used a mixture of the two; 1 ranch used rubber ringing within the 1st week. Only one used anaesthetic.
 - d. Smallholder castration technique was variable, with one using exclusively open with knife, one using exclusively the 'local burdizzo' (a weighty wooden club), 6 using a combination of open and club (with open at a younger age, club at an older age), and two using a traditional burdizzo. No premises used any anaesthetic or analgesia.
5. Ear notching was carried out as an identifier of birth date on all farms.
 - a. On 95% of ranches this was carried out within the first 4 weeks of life, and within the 1st week on 63%.
 - b. On 40% of smallholdings, this was carried out within the 1st week of life, at 8 weeks on one farm, 16 weeks on another; the rest, (40%) were carried out between 6 and 12 months.
 - c. A sharp knife was used on all premises, and no anaesthetic or analgesia used.
6. Although not a mutilation, weaning was dealt with in this section because of its potentially significant relationship to other mutilations.
 - a. On 69% of ranches, this was carried out at 8 months, 82% at 8 or 9 months. One ranch weaned at 3 months, one at 4 and one at 7.
 - b. On 80% of smallholdings, weaning was 'natural', that is, carried out by the dam. On the other two, one weaned between 9 and 12 months, one at 12 months.
 - c. Method of artificial weaning was generally to pen off calves from mothers. In 80% of premises, this was done whilst maintaining tactile and visual contact, and dams generally drifted away to graze further and further as days went on. On 22% of premises, this was combined with food deprivation for the calves so that

once released onto grass concentration would be taken up with eating rather than finding the dam. On one farm, the calves were simply moved to another, distant group.

Nutrition

1. All holdings were extensive in nature, with grazing making up the staple diet; the mixed dairy herd was the only one to use total mixed rations.
 - a. Grazing varied widely throughout the year, with the best grass during and for a few months after the long rains (extended wet season) and a little after the short rains (intermittently wet season): these were generally around March-August (long rains; maximum 5 months, minimum 2 months) and November-December (short rains; maximum 3 months, minimum 1 month) in Laikipia; March-May (long rains; maximum 4 months, minimum 2 months) and August-September (short rains; maximum 2 months, minimum 1 month) in Machakos; January-April (long rains; maximum 5 months, minimum 2 months) and August-December (short rains; maximum 4 months, minimum 1 month) around Narok.
 - b. Poorest grazing was during the dry season and beyond. This lasted from January-March in Laikipia; August-October around Machakos; January-March around Narok. During this time, supplementation was often given: urea and molasses was the most common on ranches (72%), with some providing silage (2) and some hay; smallholders were far more split, with only 50% of smallholdings providing supplementation in the form of felling olive trees. Despite this, 100% of smallholdings and 70% of ranches said the animals suffered 'significant weight loss' during this time. Such was evident when comparing districts: whereas Laikipia were enjoying a season of plentiful grass when visited during the study, around Machakos, the grass was incredibly bare, with attendant thin cows.
 - c. Micronutrient supplementation was provided on 90% of farms via mineral lick in the field; these are complete mineral supplementations with adequate Ca:P ratios. One farm had a recognised phosphorus deficient soil, with animals occasionally showing pica; such empirical findings were used to inform supplementation levels required.
2. Water provision was all-year-round on all farms. Variations in method of supply seemingly proved no obstacle to adequate supply, once animals were sufficiently trained. Various systems were used: piped supply from mains, piped supply from rivers or dams, direct drinking from rivers or dams, boreholes in times of drought.
3. 60% of smallholders reported animal deaths during the dry season,

especially of the sick and old animals through emaciation.

Disease control, treatment, management and prevention

Prevalences were graded from none, low, common, high.

1. Lameness was none-low on ranches, with occasional cases treated with hoof trimming and oxytetracycline. 50% of smallholders graded it as 'common', and treatment was either non-existent (2 places; culling was elected) or limited to traditional 'forest' drugs.
2. Emaciation was common on smallholder farms during the dry season, but none-low on ranches and during the good grazing times
3. Metabolic disease was a common problem on the ranch suffering from lack of phosphorous in the soil
4. Internal parasites were low in the large ranches. 63% of small ranches dedicated it common-high status, and treatment was via targeted albendazole or nitroxynil administration. Similarly, it was a common-high problem in 70% of smallholders, who used same treatment protocols.
5. External parasites were the most common problem with 100% of farms reporting ticks and tsetse flies as high prevalence. Ranches commanded good control with dipping/spraying of animals every 7-14 days when tick numbers were relatively low, and every 5 days when they were high; amitraz was used by 90% of the ranches, with the remaining two using deltamethrin. Smallholders varied in that spraying and dipping were far less frequent – the most frequent was 14 days, the least twice a year.
6. The *tick borne diseases* proved, secondary to point 5), the greatest health risk to the animals, although prevalence was generally low:
 - a. Rift Valley Fever was of low incidence, with sporadic outbreaks around the country prompting reactive vaccination; only one ranch vaccinated every year without fail
 - b. East Coast Fever was low across all ranches, but common in smallholders. Treatment was intravenous oxytetracycline and/or penicillin-streptomycin in the smallholders, and 60% of the ranches; the remaining 40% used parvaquone.
 - c. Trypanosomiasis was low across the ranches but common-high in the smallholdings. Treatment was via intravenous oxytetracycline in 80% of farms; novidium in the remaining 20%.
 - d. Anaplasmosis was common in smallholdings. Treatment was via intravenous oxytetracycline.
 - e. Heartwater was low across ranches, but common in smallholdings. Treatment was via intravenous oxytetracycline and

- penicillin-streptomycin.
- f. Ephemeral fever of calves was none-low in ranches, but common-high in 80% of smallholdings. Treatment on 40% of the farm affected was made up of intravenous oxytetracycline and aloe vera administration.
7. Major infectious diseases notifiable in the EU were also significant:
 - a. Foot and mouth disease is rampant in Kenya, and 80% of farms practice prophylactic vaccination 2-3 times per year. Some vaccinate when an outbreak is in the area. In the ranches, it is often associated with movement of nomadic tribes onto the edge of their land. 2
 - b. Contagious Bovine Pleuropneumonia was rated as low-common
 - c. Brucellosis incidence was difficult to quantify given lack of investigation of abortions, but low-common was around the level seen – 5 farms practises S19 vaccination, and there was a higher prevalence on smallholdings
 - d. Lumpy skin disease waxes and wanes, and is associated with increased livestock movement during dry season for grazing purposes. 50% of ranches routinely vaccinated, whilst the other 50% vaccinated when it was in the area. Smallholdings generally tried to ‘treat’ the disease, and no vaccination was carried out on any farm in this group.
 - e. Anthrax/’blackquarter’ was routinely vaccinated against on all ranches, and 20% of smallholdings, and prevalence was rare-low on these. Other smallholdings recorded low prevalence.
 8. Specific calf diseases were significant:
 - a. Calf pneumonia was a ‘serious problem’ on 60% of farms and present on others. Treatment was generally antibiotics (oxytetracycline and/or penicillin-streptomycin) until cure or death; 70% of smallholdings, however, used branding as a form of ‘treatment’. Only 40% of holdings isolated the infected calves in shaded, warm areas with access to fresh water and food
 - b. Calf diarrhoea was similarly problematic, with the standard treatment on ranches and smallholdings being oxytetracycline and/or penicillin for an extended period. Little isolation was practised. Oral rehydration was practised on only 20% of farms. 20% of smallholdings practise blood-letting as a form of treatment.
 - c. Calf mortality was nevertheless fairly low on those ranches with figures (7), ranging from 3% of those born alive to 20%, with median 7%. Smallholdings fared worse, with uniformly high mortality ranging from 20% to 46%, median 25%.

Discussion

What is important to comment on in the first instance is the inestimable influence

of culture on the findings, especially where the smallholders are concerned. Whilst the ranches generally operate a profitable and well-planned business, to smallholders, and especially the Masaai, the animals are not simply an economic tool in that they are to be fattened and sold, but rather cattle in particular are tied up not only with personal wealth, but also as direct subsistence animals for communities. The exchange of cattle is involved in wedding dowries, and the number of cattle a man possesses is a direct indicator of his wealth in the wider community, and therefore his standing. Moreover, animals are regularly bled, and for herdsman distant from the homestead this mixed with milk is part of the staple diet. There is a bond between herdsman and animal, and whilst it would be wrong to liken this to a Western human-pet bond, it is nevertheless one based on respect and to some extent affection; perhaps this is borne out best by the minimal flight distance associated with the smallholder animals. Certainly, the low percentage take-off from herds is indicative of this group's different attitude towards cattle.

In comparison, the philosophy of the ranch farmers visited is far more business-minded, and although, like the Masaai, they rely on the cattle for income (or 'wealth'), theirs is a model based largely on throughput. It would be wrong to summarise however that these farms treat their animals as commodities, and therefore their welfare suffers – indeed, simply because there is affection for one's animals does not in any way guarantee, or even make more likely, good welfare. Simply because one relies on fattening and selling does not mean that cheap husbandry is embraced – indeed, because one is so reliant on the 'product', and therefore the health of the animal, it is often the case that opposite is true.

It is prudent to make this distinction in approaches early as the context it provides informs the on-farm welfare provisions of the different groups studied, and whilst it is not meant to condone or excuse areas of poor welfare, it is important to understand why what is done *is* done, and in doing so appreciate the problems of changing that practice.

Welfare as used in this discussion is defined, after Broom, as 'the state of an animal regarding its coping with its environment', where 'coping' is having full control of physical and mental faculties, and 'environment' refers to everything around, including physical (housing, bedding, weather etc) and biological (disease, health, nutrition) factors. Under this definition, it can never be said if an animal will definitely have poor or good welfare because of a certain factor, but, with knowledge of that animal's normal biology, it can be said what state of welfare will be *most likely* given the known effect of the factor.

Considering all 28 farms as a whole, there are two main areas where poor or very poor welfare is likely.

Nutrition, specifically the vastly changing level throughout the year, is the first

major area of concern. Looking across the board at the animal-based outcomes seems to highlight the fast-famine approach, and its differing effects. Smallholdings had minimal thin cow breaches and large ranches none – whilst in or just after prime grazing during and after the long rains season – whereas the small ranches, most of which were in the middle or towards the end of the dry season, with poor grazing, had a high number of ranches breaching the intervention score, on average almost being double the acceptable levels for thin cows. What this handily exemplifies is the different states of the cattle throughout the year, with the large ranches and smallholdings showing the admirable body conditions achievable on mineral-supplemented grazing, with some of the smaller ranches showing how desperate the conditions become at the height of the dry season. To allow animals to reach conditions such as the latter is a direct contravention of the first Freedom (namely ‘freedom from hunger and thirst’): animals are likely to undergo significant feelings of hunger, associated with negative emotions, and are certain not to be able to maintain full vigour – they will be struggling, severely, to cope, and it highly likely that some will fail to cope. In these instances, welfare will be very poor. Although it may seem presumptive to assign the groups to different times of year, it is a conclusion supported by farmers’ own admissions that animals lose condition – and in some cases die – during poor grazing, sometimes despite supplementation.

Nutrition is problematic largely because it is so fundamental, and consequently, rapid deterioration of welfare is manifest upon extended malnutrition: the malnourished animal is less able to mount immune responses, and so is at increased risk of disease (Freedom Three); the malnourished will walk further and stand for longer, thereby disrupting normal behaviour patterns, including oestrus, and predisposing to lameness (Freedom Four and Three respectively).

Another aspect of nutrition is water provision. Whilst the boran, zebu and sahiwal breeds predominate throughout the herds – breeds with inherent ability thrive in times of water restriction – there were a few herds with exclusively, or at least some genetic input from, *Bos taurus* breeds, such as the Red Poll, Friesian, Charolais and Simmental. These animals originally bred in temperate regions are distinctly less able to cope with heat stress, and as watering of the animals occurs only once per day throughout the year, it is likely these breeds will undergo poor welfare in comparison to indigenous breeds especially during the dry season when grazing is scarce. It is important to point out, however, that no particular problems were recognised in this study, although no pure bred *Bos Taurus* were seen in areas undergoing poor grazing.

The other major area of welfare concern is the techniques, timings and extent of mutilations. Only one farm from the 28 uses anaesthesia during disbudding and castration, and this is only because the treatments are done through the University of Nairobi rather than any welfare concerns. This is obviously in contravention to EU law in all cases of disbudding, and where castration is carried out after 2 months,(which it was on 24 out of 28 farms). Further, the

practice of routine dehorning without any disbudding as calves is can never be recommended, especially because of the tenderness of the structures involves, and the non-use of anaesthetic (Freedom Three). Moreover, the smallholding practice of 'club' castration by repeated clubbing of the spermatic vessels and cords is a severe welfare breach (Freedom Three).

Perhaps the greatest, avoidable welfare problem regarding mutilations is that of branding, especially the extensivity of that practised by the Masaai smallholders. No anaesthesia or analgesia is provided, and in the case of smallholders, the branding for identification is extensive; further, it is a common 'treatment' for pneumonia, lameness and scours. All branding makes poor welfare very likely, not only at the time of the branding, but the pain felt afterwards; moreover, the smallholder cattle showed several discharging skin lesions (80% of farms breached the intervention scores, by almost triple the score) associated with these brands, thereby constituting a second, prolonged breach of Freedom Three. Branding as a means of identification is defended in part by both the legal requirements for such (boran pure bred) and the high incidence of cattle rustling necessitating a permanent marker system as opposed to deformable ones such as ear tags. Freeze branding could be a viable, more welfare-friendly alternative.

Certainly ear notching represents a significant, and entirely avoidable husbandry practice that entails likely poor welfare. The ears of cattle are sensitive, well-vascularised structures, and significant bleeding occurs upon notching, some of which (the practice is used to identify month and year of birth using both ears) is extensive with up to nine notches on each ear, is likely to cause immediate, intense pain, that decreases only slowly over time (Freedom Three).

Mutilations may well be considered a necessary breach of welfare in that they disallow or make less likely a range of behaviours that are not conducive to efficient, safe or productive handling – fighting, aggression and injuries amongst entire males being the justification for disbudding/dehorning and castration. Whether these then contravene Freedom Four – the freedom to express natural behaviour – is certainly arguable. Regardless, certain practices cannot be justified on welfare grounds when welfare-friendlier means are available. It is at this point, however, that cultural considerations may become important – the branding that the Masaai carry out is a manually skilful procedure, and the clubs used for castration are much revered and treasured. Further, branding as a treatment has been used for many years. In the ranches, the attitude generally encountered was that cattle have a much higher pain threshold than other animals such as dogs; this is hard to refute directly, but is highly likely that such perception stems from the stoic-in-the-midst of pain behaviour shown by many prey species. As for cultural traditions, from a welfare perspective, much like the argument made for fox hunting continuing that it is a 'tradition', these cultural influences cannot in any way be used to counteract the welfare breaches that are incredibly likely when these procedures are performed.

Mutilations are important to consider in terms of weaning age. Artificial weaning is perhaps the most stressful extended period in a young animal's life; whilst it may be considered unavoidable in terms of herd health and productivity, it unavoidably breaches Freedom Five (freedom from fear and distress). However, the extent of such a breach is increased considerably if one or more mutilations are performed at the same time, as they were on a significant number of farms in the study.

Ranches and smallholders vary somewhat in the extent of the welfare problems caused by disease management. Although generalisations do cover some sins, it is fair to say in broad appraisal that disease management, treatment and prevention, is a topic given far more rational thought on the ranches than the smallholdings. The ranches have vaccination programs, treatment protocols, worming programs (where applicable), and try – as far as economics allow – to use the correct drugs (e.g. parvaquone for the treatment of East Coast Fever). Perhaps most importantly, the ranches are vigilant about tick borne disease, with all ranches dipping or spraying at least once a week, and more in times of high tick numbers. Indeed, it is this frequency of dipping that goes some way to explaining the high prevalence of dirty sides and dirty hindlimbs in the ranches – it is highly conceivable that the dipping each week allows dust to settle on the wet hide. Although dirt sides and hindlimbs are associated with increase chance of skin disease, it is a price worth paying in welfare terms to prevent contraction of the often-devastating tick borne diseases present.

The smallholders are far more scattered in their approach. Certainly oxytetracycline is somewhat of a standard blanket treatment from lameness to ephemeral fever. There is far more reliance on 'forest drugs', 'traditional healing oil', kerosene dosing and traditional remedies such as branding and blood letting; these range from the questionable benefits of plant medicine to the obvious quackery of branding and blood letting. Tick borne disease is not tackled aggressively, with two holdings rather uselessly dipping only twice a year; none dipped or sprayed as often as the ranches. Indeed, the crude incidence of disease garnered from the questionnaires indicates that disease load in the smallholders is much higher than the ranches – this is likely to be due to a number of factors, including lack of vaccination programme (only 1 holding vaccinated regularly against foot and mouth disease), incorrect treatments, and inadequate prevention of tick infestations. Certainly such a high disease load is likely to negatively impact of welfare.

There is a general lack of organised disease management in the calf. Whilst mortality rates in the smallholders far outweighed those in the ranches, all suffer from a lack of basic approach to the diarrhoeic (only 22% use oral rehydration as 1st line treatment) and pneumonic calf.

However, not all welfare comments about beef cattle in Kenya are negative; quite

the opposite.

The major advantage that Kenyan cattle enjoy over their EU counterparts is the extensive system in which they are farmed. At no time are any of the animals housed, perhaps the greatest single negative impact on the welfare of beef animals in the EU. Instead, they spend all day of all year grazing fields, and are only confined during the nighttime in bomas. This reduces the major welfare problems of beef cattle encountered in housing: behaviour restriction, disease transmission and contraction (lameness, dirtiness, bloat from inactivity and concentrate feeding), bullying, cubicle discomfort. Whilst it may lose out in other areas such as nutrition, it is undeniable that the welfare of Kenyan beef cattle grazed all year round is likely to be very good in comparison to intensive/semi-intensive beef farms in the EU: they provide an excellent example of cattle farmed in their 'natural' surroundings, and would all comfortably fit into the category of free-range.

The nutrition of animals largely on grass fits with this theme somewhat given that major reliance is on grass for nutrition, with only recourse to concentrate supplements during the dry season. This is as close to the cow's natural diet as possible, and one to which its biology is adapted. In contrast to concentrate feed, it avoids the metabolic or production diseases associated with such, namely bloat and ruminal acidosis, both serious and often painful conditions.

Further, supervision of animals is excellent. A group of herdsmen will generally stay with or rotate through a certain group within a herd, and will know each animal within that group. Supervision is continual throughout day and night, largely due to the affordability of labour. This is in sharp contrast to the infrequency of cattle observation when at grass in the EU, and is borne out by generally low flight distances; it also aids in rapid disease identification, aid with dystocia and other such management-requiring aspects.

To produce a full analysis of the potential for Kenya and other similar countries to export high-welfare products to the EU is outside the scope of this report, and indeed study, save to point out the on-farm challenges and positive points. Certainly, developing countries are blessed with large tracts of grazing land and cheap, available labour, and, as described above these make very good welfare likely. However, developing tropical countries are blighted by disease loads far higher and more serious than those in the EU, and some current management practices (e.g. vaccinating against foot and mouth disease) are incompatible with legislation in the EU presently, whilst the very presence of certain diseases in a herd (e.g. Rift Valley Fever, CBPP) are an absolute barrier to export. Moreover, nutrition throughout the year, and the fact animals enter periods of virtual starvation makes poor welfare likely, and would not sit well with the conscience of the EU consumer; on the other hand, allowing weight loss in the dry season is arguably allowing natural behaviour, and therefore making good welfare more likely. Mutilations are a significant negative factor for welfare in

Kenya; whilst EU laws surrounding such are by no means perfect, they are nevertheless more rigorous than the practices allowed in Kenya presently.

The question perhaps to ask from the study is was the optimal holding seen of a high enough standard to theoretically export soon, and if not, would the costs or inconvenience of making it so prove restrictive? It is a hard question to answer with any certainty. One cannot overlook the considerable welfare advantages of well-supervised, extensive, grass-fed cattle especially when compared to financial restrictions on farmers looking to access niche high-welfare markets in the EU.

However, there are negatives. Mutilations and nutritional problems can be solved relatively easily, if with added expense. Disease problems are much harder to solve, and certainly internal nomadic cattle movement in Kenya and on its borders make this a potentially restrictive measure; Botswana, whilst generally an export success story, have nevertheless seen lapses in biosecurity with border infiltration. Secure borders may therefore be a far-off dream, but there seems little reason why disease-free zones, based on or around the large ranches, could not be set up, with communal/district abattoirs and export businesses. Certainly disease treatment can be improved, and on initial impression a lot of the errors made are through a lack of sufficient disease education – farmers were more than willing to listen to suggestions for treatments, and several of them, especially smallholders, were incredibly eager to learn techniques for oral rehydration of diarrhoeic calves.

Regarding the problems with smallholdings, although they represent a unique welfare picture, they are of reduced significance overall in this study because of their cultural standing. Their trade in cattle and their possession of it is not a business inasmuch as it is a status symbol and traditional way of life – they are a cattle-herding tribe, and have been for time immemorial. It is unlikely that they would undergo cultural upheaval to reordinate their cattle rearing for export to the EU.

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References

Bowles D., Paskin R., Gutiérrez M. & Kasterine A. (2005). – *Animal welfare and developing countries: opportunities for trade in high-welfare products from developing countries*. Rev. sci.

tech. Off. int. Epiz., **24** (2), 783-790.

Fisher & Bowles (2002). – *Hard-Boiled Reality: Animal Welfare-Friendly Egg Production in a Global Market*. RSPCA, Horsham.

RSPCA & Eurogroup for Animal Welfare (2005) – *Developing Animal Welfare: The Opportunities for Trade in High Welfare Products from Developing Countries*. RSPCA, Horsham.

Broom D. (2004). – *Animal Welfare In Etología Aplicada* (F. Galindo Maldonado & A. Orihuela Trujillo eds.), 51-87.

Eurobarometer (2005). – *Attitudes of consumers towards the welfare of farmed animals*. European Commission, Brussels.

Department for the Environment, Food and Rural Affairs (DEFRA) (2006). – *Animal Health and Welfare Strategy indicators: core indicator 5.2 Farm Assurance Schemes*. www.defra.gov.uk/animalh/ahws/eig/indicators/5-2.htm

McInerney (1998) – *The economics of welfare*. In, *Ethics, Welfare, Law and Market Forces: The Veterinary Interface* (Michell & Ewbank, eds). Universities Federation for Animal Welfare, Wheathampstead.

National Beef Association (2006). – National Beef Association analysis of beef farm income figures for 2005-2006. National Beef Association, Malvern, UK

<http://www.rspca.org.uk>

RSPCA, Eurogroup for Animal Welfare, WSPA (2005). – *Animals and People First: Why good animal welfare is important for feeding people, for trade and for the future*. RSPCA, Horsham.

Aklilu Y., Irungu P. & Reda A. (2002). – *An Audit of the Livestock Marketing Status in Kenya, Ethiopia and Sudan (Volume I)*. Community-Based Animal Health and Participatory Epidemiology Unit, Nairobi, Kenya.

Export Processing Zones Authority (2005). – *Meat Production In Kenya*. Export Processing Zones Authority, Nairobi, Kenya.

RSPCA & Eurogroup for Animal Welfare (2005). – *Getting Animal Welfare into the Green Box*. RSPCA, Horsham.

Marabelli R. (2003). – *The role of official Veterinary Services in dealing with new social challenges: animal health and protection, food safety, and the environment*. In *Veterinary Services: organisation, quality assurance, evaluation* (E. Correa Melo & F. Gerster, eds). Rev. sci. tech. Off. int. Epiz., **22** (2), 363-371.

Ministry of Livestock and Fisheries Development (2003). – *Animal Production Annual Report 2003*. Nairobi, Kenya.

Republic of Kenya (2003). – *National Export Strategy 2003-2007*. Nairobi, Kenya.

International Livestock Research Institute (ILRI) (2005) – *Objective Assessment of Animal Health Parameters in Community-based Animal Health (CAH) Programmes*. ILRI, Nairobi, Kenya.

Leeb C., Main D.C.J., Whay H.R, Webster, A.J.F. (2004). – *Bristol Welfare Assurance Program: Cattle Assessment*. University of Bristol, UK

