



Humane Farm Animal Care
Welfare Standards

DAIRY WATER BUFFALOES

Edition 2021v2

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HUMANE FARM ANIMAL CARE

Humane Farm Animal Care is a 501(c)3 non-profit organization whose mission is to improve the lives of farm animals being raised for food and to assure consumers that certified products meet our welfare standards.

Initially, the standards were adapted from the RSPCA Assured program published by Royal Society for the Prevention of Cruelty to Animals in the UK. Since then, the Humane Farm Animal Care standards have been refined to provide standards for the rearing, handling, transport, and slaughter of food animals under the Certified Humane® program, applicable worldwide. These dynamic documents are always informed by scientific research, veterinary advice, and the practical experience of farmers.

Animal welfare is improved when livestock managers adhere to the following:

- Access to wholesome and nutritious feed;
- Appropriate environmental design;
- Caring and responsible planning and management;
- Skilled, knowledgeable, and conscientious animal care;
- Considerate handling, transport, and slaughter.

HUMANE FARM ANIMAL CARE'S SCIENTIFIC COMMITTEE

Since the beginning of the Certified Humane Raised and Handled® Program, leading animal scientists, veterinarians, and producers work with Humane Farm Animal Care to develop the Animal Care Standards for humane farming, continually reviewing them and adding new information pertaining to improving the lives of farm animals. An updated list of these committee members is always available on our website, <https://certifiedhumane.org/scientific-committee/>.

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TABLE OF CONTENTS

PART 1: INTRODUCTION	7
A. The Certified Humane® Logo	7
B. Guide to the Use of the Welfare Standards	7
PART 2: NUTRITION – FEED AND WATER	8
A. Feed	8
FW 6: Avoiding changes in feed	9
FW 9: Easy availability of feed	9
FW 10: Providing suitable feedstuffs	10
FW 11: Clean feeding equipment	10
FW 13: Avoiding unsuitable feedstuffs	10
B. Food: specific provisions for calves	10
FW 14: Diet requirements for calves	10
FW 15: Colostrum	11
FW 16: Orphan calves	11
FW 17: First feeds: fiber and water	11
FW 18: Weaning	11
C. Water	12
FW 22: Water supply	12
FW 23: Watering equipment	12
FW 24: Water for cattle on pasture or at grass	12
D. Grass-Fed Systems	13
FW 26: Diet requirements	13
FW 27: Prohibited feedstuffs	13
FW 28: Feed and dietary supplementation	13
FW 29: Pasture access	13
FW 30: Mixed herds	14
PART 3: ENVIRONMENT	15
A. Buildings	15
E 1: Facility design and environment for buffaloes	15
E 2: Building design and maintenance	15
E 3: Preventing injuries from environmental causes	15
E 4: Handling Pens	15
E 5: Maintenance of passageways	16
E 6: Limiting the use of toxic substances in buildings	16
E 7: Electrical instalations	16
E 8: Design of passageways	16
E 9: Cleaning and disinfection	16
B. Thermal environment and ventilation	16
E 10: Pasture conditions	16
E 11: Pens and feedlots	17
E 12: Extreme climate	17
E 13: Indoor air quality	17
E 14: Partially roofed shelters	17
C. Windbreaks – Sunshade – Sprinklers	17
E 15: Thermoregulation	17
E 16: Windbreaks	18
E 17: Shade	18
E 18: Feedyards	18
D. Lying area/space Allowances	19

E 19: Freedom of movement	19
E 20: Lying area	19
E 21: Hard floors	19
E 22: Freestalls	19
E 23: Housing	20
E 24: External space allowance	20
E 25: Confinement is prohibited	20
E. Housing for buffaloes.....	21
E 26: Housing design	21
E 27: Management of housing.....	21
E 28: Design of freestalls	21
E 29: Step design.....	22
E 30: Preparation for calving and milking	22
E 31: Monitoring introduced animals.....	22
F. Lighting.....	22
E 32: Sufficient light in buildings	22
G. Calving Environment	22
E 33: Monitoring of calving	22
E 34: Calving areas.....	22
E 35: Environmental conditions	23
H. Milking Parlor	23
E 36: Milking parlor hygiene	23
E 37: Milking machines	24
I. Bull Pens.....	24
E 38: Bull pen management	24
E 39: Bull pen design	24
J. Handling facilities	24
E 40: Passageways.....	24
E 41: Maintenance of restraint equipment	25
K. Specific Provisions for Calves.....	25
E 42: Dairy calves	25
E 43: Facilities for stressed calves	25
E 44: Quarantining calves	25
E 45: Locating calf pens for quarantine	25
E 46: Light requirements for calves	25
E 47: Outdoor access	25
L. Calf hutches	26
E 48: Space for calves - See E21 and E24	26
E 49: Calf hutches or individual pens	26
M. Fencing.....	26
E 50: Design and maintenance of fences.....	26
PART 4: MANAGEMENT	27
A. Managers	27
M 1: Farm Plan.....	27
M 2: Understanding the Standards	27
M 3: Management and record keeping activities	27
M 4: Mitigating problems.....	27
M 5: Awareness of the welfare implications of management practices	28
M 6: Training.....	28
M 7: Compassionate treatment.....	28
M 8: Complaints to Operators	28

B. Handling.....	29
M 9: Quiet handling	29
M 10: Anticipating animal stress factors.....	29
M 11: Handling in passageways.....	29
M 12: Benign handling.....	29
M 13: Equipment.....	30
M 14: Calving aids	30
M 15: Dipping Navels	30
M 16: Rapid diagnosis and treatment.....	30
M 17: Non-ambulatory Animals	30
C. Managing replacement animals.....	30
M 18: Brought-in calves.....	30
D. Identification	31
M 19: Identification equipment.....	31
M 20: Marking.....	31
M 21: Temporary marking	31
E. Equipment	31
M 22: Using equipment.....	31
M 23: Automatic equipment.....	31
M 24: Automatic ventilation equipment	31
F. Inspection	32
M 25: Monitoring	32
G. Farm dogs and natural predators	32
M 26: Managing stock dogs	32
M 27: Managing predators	32
H. Watering holes, showers and pools	32
M 28: Managing watering holes, showers and pools	32
PART 5: HERD HEALTH	33
A. Health Care Practices.....	33
H 1: Animal Health Plan	33
H 2: Mitigating health problems	33
H 3: Health monitoring.....	33
H 4: Segregation pens.....	34
H 5: Managing brought-in animals	34
H 6: Grouping cattle.....	34
H 7: Mitigating behavioral problems	34
H 8: Controlling parasites and predators.....	35
H 9: Hoof care	35
H 10: Drying off period.....	36
H 11: Physical alterations.....	36
H 12: Medicines	37
H 13: Induction of parturition	37
H 14: Ultrasound for pregnancy detection	37
H 15: Genetically modified or cloned animals.....	37
B. Casualty Animals	37
H 16: Euthanasia	37
H 17: Carcass Disposal.....	37
PART 6: TRANSPORTATION	38
A. Conditions of transportation	38
T 1: Loading facilities	38
T 2: Passageways.....	38

T 3: Transport personnel	38
T 4: Handling in passageways.....	38
T 5: Benign handling.....	38
T 6: Pre-transport feed and water	39
T 7: Transport time.....	39
T 8: Records of transport.....	39
T 9: Casualty animal transport	39
PART 7: SLAUGHTER.....	40
A: Slaughter procedures	40
S 1: Minimizing pre-slaughter handling.....	40
S 2: Trained employees	40
S 3: Slaughter systems.....	40
S 4: For dairies that are not marketing their buffaloes as Certified Humane® Dairy meat, milk and milk products are the only products that carry the certification.....	40
PART 8: PROCESSING	41
A. Traceability	41
P 1: Processing systems.....	41
PART 9: APPENDICES	42
REFERENCES	10

PART 1: INTRODUCTION

A. The Certified Humane® Logo

The Certified Humane® program was developed to certify products from animals of farms that adhere to these standards. Upon satisfactory application and inspection, producers will be certified and may use the Certified Humane Raised and Handled® logo. Program participants are inspected and monitored by Humane Farm Animal Care annually. Charges levied are to cover inspections and program costs which include promotional materials which help promote the products of the producers that are Certified Humane®.

B. Guide to the Use of the Welfare Standards

- The broad objectives of the standard are described at the beginning of each section.
- The numbered requirements are the standards, all of which must be complied with.
- These standards are written to cover facilities in varying geographic and temperature regions and facilities utilizing different systems. Therefore, not all sections in these standards will apply to each facility and farm.
- Boxed sections provide additional information or may highlight areas where the standards will be reviewed in the future.
- Farmers must also comply with any local, state, or federal requirements for dairy buffalo production that affect the environment or safety of their product as well as their State Veterinary Practices Act.
- The Certified Humane® program is voluntary. The Welfare Standards of Humane Farm Animal Care don't substitute any local, state, or federal legislations.

PART 2: NUTRITION – FEED AND WATER

OBJECTIVES: *Animals must have access to fresh water and a diet formulated or assessed to maintain full health and promote a positive state of well-being. Feed and water must be distributed in such a way that animals can eat and drink without undue competition.*

A. Feed

FW 1: Wholesome, nutritious feed

Buffaloes must be fed a wholesome diet, which is:

- Appropriate for their age and species;
- Fed to them in sufficient quantity to maintain them in good health; and
- Formulated or assessed to satisfy their nutritional needs as established by the National Research Council (NRC) Nutritional Requirements for Dairy Cattle, which can be used to determine the nutritional requirements and components in buffaloes' feed, as recommended for the geographic area.

Examples of references on nutritional requirements for buffaloes are:

- Paul, S.S.; Lal, D. 2010. *Nutrient requirements of buffaloes*. Delhi: Satish Serial Publishing House. 137p. <https://www.abebooks.com/9788189304768/Nutrient-Requirements-Buffaloes-Paul-8189304763/plp>.
- Paul, S.S. 211. *Nutrient requirements of buffaloes*. R. Bras. Zootec., v.40, p.93-97. <http://sbz.org.br/revista/artigos/66264.pdf>.
- Kearl, Leonard C. 1982. *Nutrient Requirements of Ruminants in Developing Countries*. 150p. <https://digitalcommons.usu.edu/etd/4183>.

FW 2: Free access to feed

Buffaloes must have free access to nutritious food each day, except when directed by an attending veterinarian.

FW 3: Feed records

- Producers must have written records and/or labels of the feed constituents, the inclusion rate and constituents of compound feeds, and feed supplements, including those records from the feed mill or supplier; and
- Make these available to the Humane Farm Animal Care Inspector during the inspection and at other times upon request.

FW 4: Substances prohibited in feed

- No feedstuffs containing mammalian or avian-derived protein sources are permitted, with the exception of milk and milk products.
- Dairy buffaloes must not be treated with rBST.
- Buffaloes must not be fed antibiotics, including ionophores, coccidiostats or other substances deliberately to boost growth, feed efficiency or milk production.
- Antibiotics can be used in individual animals only therapeutically (i.e., disease treatment) as directed by a licensed veterinarian.

FW 5: Body condition

- Cattle must be fed so that they sustain full health and normal reproduction capacity over their maximum foreseeable lifespan.
- Body condition change in cattle must be carefully planned, monitored, and maintained according to the stage of production.

- c. A body condition score (BCS) of 3 to 4 (on a 1-5 scale) is considered best for maintaining productivity and health. A BCS of less than 2.5 requires immediate corrective action. No animal with a BCS of less than 2 may be transported or leave the farm unless for veterinary treatment. (See Appendix 1).
- d. Body condition score must be regularly monitored with particular attention to weaning (30 days after weaning), pre-calving (90 days before calving), calving, and the beginning of the breeding season.

See Appendix 1 for Body Condition Scoring Guide for Buffaloes. It is recommended that buffaloes are fed to reach the following BCS:

- Growing heifers: 2.5 – 3.0
- Dry period buffaloes and heifers at calving: 3.0 – 4.0
- Early lactation (1-120 days): 2.5 – 3.0
- Mid lactation (120-304 days): 2.5 – 3.5
- Late lactation (305+ days): 3.0 – 3.5

FW 6: Avoiding changes in feed

Efforts must be made to avoid sudden changes in the type and quantity of feed, except under the direction of a veterinarian or nutritionist, to avoid possible metabolic disorders that affect animal health.

FW 7: Providing fiber

- a. Adult cattle and calves over 30 days of age must be provided with feed or forage containing sufficient fiber to allow rumination.
- b. The fiber must be of such quality and length as to stimulate rumination and prevent acidosis.

FW 8: Pasture

- a. Where climate allows for quality grazing, dairy buffaloes may be able to obtain a large proportion of their nutritional requirements by grazing pasture. In these situations, regular assessment of animal body condition is mandatory.

Care must be taken to ensure that pastured animals have an adequate, well-balanced, complete diet, through pasture nutrient analysis and estimation of average dry matter intake when necessary.

- b. When pasture quality is poor, nutritional maintenance through feeding of quality forage and concentrate is appropriate.
- c. Dairy systems which house animals year-round without access to the outdoors (pasture or exercise lot) are prohibited.
- d. All buffaloes, regardless of location, should have access to exercise areas for 4 hours per day, weather permitting.

FW 9: Easy availability of feed

- a. Buffaloes should be fed at or above floor level.
- b. Adequate bunk space shall be provided so that cattle do not need to compete for feed.
- c. If feed is restricted in a dietary protocol, extra trough space must be provided to reduce feed competition.
- d. Trough space must be adequate to allow most animals in a pen to feed simultaneously. The required bunk space should have:
 - 1. Adult animal: minimum of 2.6 ft (0.8 m) lineal space per animal, 1.97 ft (0.6 m) width, 1.31 ft (0.4 m) depth and 1.64 ft (0.5 m) inner wall height.
 - 2. Calves: minimum of 1.31-1.64 ft (0.4-0.6 m) lineal space per animal, 1.31 ft (0.4 m) width, 0.5 ft (0.15 m) depth and 0.66 ft (0.2 m) inner wall height.

- e. Feed must be pushed up regularly to ensure buffaloes have access to the feed provided.

FW 10: Providing suitable feedstuffs

- a. Buffaloes must not be maintained on pasture or at grass that is likely to predispose them to nutrient deficiency.
- b. Managers must be aware of mineral deficiencies and excesses on the farm and correct these as appropriate.

FW 11: Clean feeding equipment

- a. Feed troughs/bunks must be kept clean, and stale or moldy feed must be removed.
- b. Automatic feed delivery systems (e.g., grain delivery systems in barns or in corrals) must be:
 - 1. Kept clean;
 - 2. Free of stale feed; and
 - 3. Maintained in good working order.
- c. Floors surrounding the eating area should be free of mud so that buffaloes do not lie down. They like to wallow, which may prevent other buffaloes from approaching the feeders.
- d. The feeding area (e.g., feeders) must be protected to prevent the animals from entering fully or falling into them, hurting themselves.

FW 12: Minimizing contamination of water and feed

Feeding and watering equipment must be designed, constructed, placed, and maintained so that contamination of the animals' feed and water is minimized.

The footing surrounding the eating area should be free of mud in depths greater than fetlock (ankle) height.

FW 13: Avoiding unsuitable feedstuffs

Control practices must be in place to minimize:

- a. Buffaloes access to poisonous plants and unsuitable feedstuffs.
- b. Spreading of invasive species in pasture (e.g., weeding) that are not eaten by buffaloes to the detriment of other species more appreciated by animals.
- c. Contamination of stored feeds by birds and vermin.

B. Food: specific provisions for calves

FW 14: Diet requirements for calves

- a. Calves must be fed a wholesome diet which meets or exceeds the National Research Council requirements appropriate for their age, weight, behavioral and physiological needs.
- b. Antibiotics cannot be used except therapeutically (i.e., disease treatment) in individual animals as directed by a licensed veterinarian.
- c. All calves must always have access to fresh water.

When the dam is not around, it is recommended that all calves aged 3-28 days of age be offered a daily ration of at least 15% of their body weight in whole milk or equivalent milk replacer. Milk should be between 60°F (15.5°C) and 104°F (40°C). Milk rations should be increased by 25% when the ambient temperature drops below 50°F (10°C) or rises above 80°F (26.7°C).

FW 15: Colostrum

- a. Every newborn calf, including males, must receive adequate, quality colostrum from its dam, from another fresh cow, or from a powdered or frozen colostrum source, as soon as possible after it is born and within the first 6 hours of life. A minimum of 2-4 quarts (2.27-4.5 liters) of colostrum must be administered.

As a precaution to prevent the transmission of Johne's Disease, the pooling of fresh or frozen colostrum from multiple buffaloes is strongly discouraged.

- b. Calves must be allowed to suckle for the first 24 hours after birth. When suckling the female is not possible, sufficient colostrum should be provided manually, with a colostrum volume of approximately 10% of their live weight being administered by esophageal stomach tube, bottle or bucket divided into at least three feedings over the first 24 hours.
- c. Over the next 48 hours, calves should receive at least an additional 6 quarts of colostrum/whole milk daily divided into at least two feedings.

If colostrum is cold or frozen, it must be carefully warmed up not higher than 102° F/38.9°C before feeding the calves.

FW 16: Orphan calves

- a. Orphan calves before 3 months of age must be fed with a bottle, bucket and/or a lactating dam (2-3 calves per dam), besides an adequate quantity of solid food.
- b. "Nurse buffaloes" must be a last feeding alternative. When a dam of the same species is not available, "nurse cows" can be a replacement.
- c. If necessary, newly calved dams must be restrained so that orphan calves can feed. When there are no "nurse cows" or farm staff available, calves must be kept with a one-year-old buffalo or older (never alone) and receive adequate food.

FW 17: First feeds: fiber and water

- a. All orphan calves or those unable to nurse must receive liquid food twice daily through the first 60 days of life, until they are eating adequate quantities of solid food (at least 1.5 lbs (0.68 kg)/calf/day of a calf starter ration).
- b. If calves are bucket fed, each calf must have access to an individual bucket.
- c. Milk replacer must be mixed according to the manufacturer's instructions, and used as means of last resort.
- d. Orphan calves must have access to palatable calf starter after 8 days of age.
- e. When a calf is more than 30 days old, it must have daily access to feed or forage material containing sufficient digestible fiber to stimulate the development of its rumen.
- f. Calves must be offered mineral supplements after 30 days of age.

FW 18: Weaning

- a. Calves must not be weaned before 60 days of age, except when otherwise directed by a veterinarian. Nutritional weaning (ceasing to feed milk or milk replacer) must be accomplished gradually by either diluting the milk with water or reducing the milk volume over a period of at least 5 days. A low stress weaning method is recommended. See Appendix 2 for recommended weaning methods.
- b. Removal of calves from individual pens into social groups should not coincide with weaning. Both practices are stressful to the animals and should be carried out separately.

FW 19: Social groupings

- a. Individual stalls for suckling calves are acceptable from a health standpoint.
- b. When suckling calves are housed in group pens, appropriate devices, such as artificial nipples, should be available to reduce inappropriate suckling behavior.
- c. The group socialization of calves should be completed by 8 weeks of age.

FW 20: Teat system of feeding

If a teat system of calf feeding is used, teats must be arranged so that a calf's neck is positioned at least horizontally or with a slight upward tilt.

FW 21: Preventing inappropriate suckling

- a. Calves must not be muzzled or physically altered to prevent suckling. Weaning nose rings and nose-tabs are prohibited.
- b. Alternative devices such as artificial nipples are encouraged.

C. Water

FW 22: Water supply

All buffaloes, including calves, must always be provided with free access to an adequate supply of clean, fresh drinking water, except when otherwise directed by the attending veterinarian.

Buffaloes must have access to an adequate supply of fresh drinking water, which corresponds to approximately 25 to 30% more than what bovines require under the same climatic conditions. However, water consumption may vary depending on weather conditions and water content in feedstuff. Approximate water consumption rate recommendations for bovines can be found in Appendix 3. Providing water to calves promotes cooling in hot weather and helps prevent dehydration due to diarrheal diseases.

FW 23: Watering equipment

- a. Water troughs must be kept clean and protected to prevent buffaloes from entering fully or step into them.
- b. When using automatic systems, they must be checked daily to ensure that they are dispensing water if no other source of ad lib water is available.
- c. In confinement or in pens, water troughs must not result in wetting/fouling of the bedded areas and must be accessed from concrete, or other non-slip footing, when possible.
- d. At pasture, the area around water troughs should be managed to avoid excessive accumulation of mud/moisture around the trough and, if necessary, troughs should be placed on concrete aprons.

Troughs should be at a height comfortable for the buffaloes to drink from (24-30 inches/61-76.2 cm). Ideally, water temperature should be between 62°F (16.7°C) and 82°F (28.8°C).

FW 24: Water for cattle on pasture or at grass

- a. When buffaloes are kept primarily on pasture, clean fresh water must always be available.
- b. Natural surface water sources are not recommended but, if used, care must be taken to avoid potential disease risk.
- c. Potential contamination of rivers, ponds or streams with animal feces must be considered when planning water supply for buffaloes.

FW 25: Emergency water supply

Provisions must be in place to ensure an emergency supply of suitable drinking water in case normal supplies fail (e.g., in cases of freezing or drought).

D. Grass-Fed Systems

OBJECTIVES: *Following the Animal Care Standards for Grass-Fed Systems is optional. Where buffaloes are grass-fed, the following animal welfare standards must be met in order to make a grass-fed claim.*

Grass-fed programs must be designed intricately to ensure animal welfare while meeting consumer expectations. Certified Humane® is a welfare-oriented program with science-based standards. Therefore, all standards, including the standards for grass-fed systems, are written with dedication to scientific information and animal welfare.

FW 26: Diet requirements

- Diet for buffaloes must consist exclusively of grass and forage, with permitted feed supplements as described in FW 28.
- Ingestion of seeds naturally attached to herbage, forage, and browse is considered incidental and therefore acceptable. Records of any potential ingestion of incidental ingredients must be kept and made available to the Humane Farm Animal Care inspector and at other times, upon request.
- Records (e.g., feed tags or invoices) must be kept of all feed, including nutritional supplements, given to buffaloes. These records must list all ingredients and be available for at least one year.

FW 27: Prohibited feedstuffs

- Providing grain, grain by-products, or any other form of feed concentrate is prohibited. This includes barley, corn, oats, rye, rice, triticale, wheat, millet, and sorghum.
- Urea as a feedstuff is prohibited.

FW 28: Feed and dietary supplementation

- If additional specific nutrients are needed to maintain the health and body condition of the animal, the producer must formulate a supplementation plan with the guidance of their dairy nutritionist and/or veterinarian. The supplementation plan must be submitted to HFAC for approval if the animals are to maintain the grass-fed claim.
 - Supplementation must consider:
 - Nutritional value of the grass (ME, protein, etc.), with forage or grass analyses conducted as needed (e.g., seasonally) to ensure accurate supplementation; and
 - Age, life stage, and breed of animals.
- If prohibited substances other than carriers for vitamin and mineral supplements are provided to restore the health of the animal, the animal must be removed from the grass-fed herd, with this relocation documented. However, grain or other prohibited substances must not be withheld from a sick or low-body-condition animal (see FW 5) to preserve the animal's grass-fed status.

Molasses, kelp, and apple cider vinegar are acceptable vitamin and mineral supplements.

FW 29: Pasture access

- Buffaloes must have continuous access to pasture by the time they are weaned.

- b. Introduction to forage is crucial for establishing the correct ruminal pH to facilitate rumen development in young calves. Therefore, calves require access to forage prior to weaning and by 30 days old at the latest in accordance with FW 17, in order to be ready to transition to the grass-fed diet.
- c. Animals must only be removed from pasture due to risk of animal health or safety, or if there is damage to pasture due to wet or drought conditions. Lack of access to pasture must be documented with reasons specified.

FW 30: Mixed herds

Grass-fed buffaloes intended for meat or dairy production may be managed on the same farm as non-grass-fed animals, except for non-grass-fed lactating animals, as long as there is an identification system in place to prevent commingling and ensure traceability of buffaloes and any food coming from them.

PART 3: ENVIRONMENT

OBJECTIVES: *The environment in which buffaloes are kept must consider their welfare needs, be designed to protect them from physical and thermal discomfort, fear, and distress, and allow them to perform natural behaviors. Buffaloes naturally adapt to temperature variations and weather conditions, although they may be subject to heat distress during periods of extreme heat.*

A. Buildings

E 1: Facility design and environment for buffaloes

- Where management systems, designs or layout of facilities not covered in the HFAC Animal Care Standards are being employed or considered, these must be referred to, and discussed with the HFAC staff before they can be considered for certification.
- Dairy buffaloes must always have access to an outdoor area, on range or pasture. These animals may be raised anywhere with access to solid ground and flooded areas, as well as shade and dry (drained) areas.

E 2: Building design and maintenance

For all buildings, key points relating to welfare must be recorded in the farm logbook or on the farm site plan and, if practical, this information should be displayed at or near the entrance to each building. These must include:

- Total floor area (in sq. ft or m²)
- Total bedded area (in sq. ft or m²)
- Maximum capacity of buffaloes in relation to age and weight, as well as feeding, drinking, and bedding space.

E 3: Preventing injuries from environmental causes

In both indoor and outdoor systems, there must be no recurrent injuries on buffaloes that could be attributed to physical features of their environment (injury is defined as damage severe enough for the formation of granular scar tissue and to an extent significantly greater than would be caused by accidental bumps and scratches).

Excessive occurrence of the following may be indicators of environmental problems:

<i>Neck calluses</i>	<i>Knee, hock, swellings/callus</i>
<i>Teat/udder injuries</i>	<i>Bruised or swollen chest</i>
<i>Broken tails</i>	<i>Hematomas, abscesses, chronic scar tissue</i>
<i>Horn layer loss</i>	<i>Recurrent hair loss in specific areas</i>
<i>Lameness due to laminitis, interdigital infections, bruised soles, soft feet</i>	

E 4: Handling Pens

Particular attention must be paid to handling pens.

- Floors must be made of non-slip material or be maintained to reduce the risk of slipping (sand, mats or other material applied when necessary).
- Floors must never be so rough as to cause hoof damage or so smooth as to result in slipping.
- Smooth concrete floors should be grooved approximately 1/3 - 1/2 inches (0.8 - 1.27 cm) or treated with a non-slip coating/belting.
- Handling pens must be well maintained and free of broken parts and sharp edges.

E 5: Maintenance of passageways

- a. Building alleyways, passages and gateways must be maintained to prevent damage to the animals' hooves.
- b. Natural passageways for regular animal circulation, with native grass or forage to protect the ground against erosion, may be narrower (13.1-16.4 ft/4 - 5 m). Passageways must be 26.2 ft (8 m) wide in regions with a predominance of brachiaria or similar forage.

E 6: Limiting the use of toxic substances in buildings

- a. Buffaloes must not come into contact with toxic fumes from surfaces with paints, wood preservatives, or disinfectants, either natural or artificial.
- b. Creosote must not be used in areas where the animals have direct contact with the material.

E 7: Electrical installations

All electrical installations must be:

- a. Inaccessible to animals;
- b. Well insulated;
- c. Safeguarded from rodents;
- d. Properly grounded;
- e. Regularly tested; and
- f. In adherence with local building codes.

E 8: Design of passageways

- a. Passages must be of such design and width, and so constructed, to allow two animals to pass freely.
- b. Chutes and races should be designed and measured to prevent balking and permit buffaloes to move smoothly through the system in a single line without having to tilt their head, due to the presence of horns.
- c. Care should be taken to minimize the number of, and ideally exclude, blind alleyways in the buildings. Floors must not be reflective and must have ramps to minimize occasional floor incline.
- d. Farm alleyways must be maintained to prevent damage to the animals' hooves.

E 9: Cleaning and disinfection

Internal surfaces of housing, handling areas and pens must be made of materials that can readily be cleansed, disinfected, or easily replaced when necessary.

B. Thermal environment and ventilation

OBJECTIVES: *Buffaloes are raised outdoors on range or pasture, in natural environment with or without abundant water supply (rivers, reservoirs, pools), or confined in pens or feedlots. In any of those systems, conditions should prevent distress in periods of extreme heat or cold, allowing animals to express their natural behaviors and alleviate thermal discomfort.*

E 10: Pasture conditions

Buffaloes must be provided with enough natural or artificial shelter from adverse weather for all animals in the group at the same time. Natural resources such as ditches, wetland, trees, big rocks, or slopes may be used for this purpose.

E 11: Pens and feedlots

- a. The thermal environment within buildings where buffaloes are housed must not be so hot or so cold as to cause distress;
- b. Must have built or natural non-slip flooring systems; and
- c. Must have natural or artificial shade.

E 12: Extreme climate

- a. Animals with an abnormal behavior caused by exposure to conditions of extreme weather must be provided with an alternative environment that allows thermoregulation and minimizes distress.
- b. Winter housing must keep buffaloes out of intense wind, rain, and the low temperatures that reduce insulation and animal comfort.
- c. Mechanical or natural ventilation must help remove excessive heat, moisture, carbon dioxide, dust, harmful gases, and airborne pathogens, and restore fresh air in the building, which must be appropriately distributed considering the buffaloes' location and building construction as directed by professional advice.

Buffaloes tolerate cold weather, but cold winds and sudden temperature drops may cause illness, pneumonia and even death (Marai and Haezeb, 2010).

E 13: Indoor air quality

- a. Provisions must be made to ensure that, when buffaloes are housed, aerial contaminants do not reach a level at which they are noticeably unpleasant to a human observer (as specified by the Occupational Safety and Health Administration).
- b. Where climatic conditions require buffaloes to be housed for a period of time, the ammonia concentration should not exceed 25 ppm.
- c. Building ventilation must aim to achieve a relative humidity below 80% when ambient conditions permit.

The objective is to provide a large volume of air and high ventilation rates to remove moisture produced by the buffaloes and to reduce the number of airborne pathogens being passed from animal to animal.

Factors contributing to good ventilation include sufficient and correctly positioned air inlets and outlets and correct air inlet-outlet height differential. Professional advice should be sought if ventilation problems are encountered.

E 14: Partially roofed shelters

- a. When buffaloes are confined in partially roofed spaces, they must be provided with a dry and comfortable lying area and an effective shelter to protect them from the wind.
- b. When the floor is partially made of dirt, the space that each animal needs must be increased since buffaloes like wallowing for thermoregulation and ectoparasitic control when rainwater accumulates.

C. Windbreaks – Sunshade – Sprinklers

E 15: Thermoregulation

- a. All facilities for buffaloes must offer proper thermoregulation opportunities in case of extreme temperatures and adverse weather conditions. Appendix 4 shows the Temperature Humidity Index values for lactating dams, which indicate buffaloes' heat stress threshold.

- b. Buffaloes must be provided with adequate space to perform behavioral adjustments important for thermoregulation and have access to facilities or natural shelters or barriers.
- c. Watering holes or bathing system (when available) must be separated from drinking areas to avoid mud, especially in equatorial regions and those where heat can be high throughout the year.

E 16: Windbreaks

Windbreaks are required for buffaloes on pasture and/or in feedyards, according to the region and average temperature. Windbreaks can consist of natural tree belts, fences, or manmade structures that are strategically placed to block prevailing winds. Natural geographic features such as hills or canyons may be used in pasture range grazing conditions.

Buffaloes are very susceptible to heat distress due to their little sweating capacity. They have fewer sweat glands than bovines, and, therefore, they need constant access to fresh drinking water and shade. Some signs that show heat distress in buffaloes are:

- 1. Increase of redness on chest skin, under the belly and between the legs;*
- 2. Exposed tongue;*
- 3. Panting;*
- 4. Visible blood circulation in the eyes (swollen veins);*
- 5. Very hot skin to the touch;*
- 6. Increase of rectal temperature (normal temperature varies considerably).*

E 17: Shade

- a. Shade, either natural or artificial, must be provided for buffaloes in open pastures or feedyards and are essential in regions where heat and humidity can be extreme.
- b. The size and number of buffaloes in a group will determine the amount of shade (size and number of shade areas) needed. Young buffaloes require 10.8 – 21.5 sq. ft (3.3 – 6.6 m²) of shade per animal and adult buffaloes 21.5 – 43.1 sq. ft (6.6 – 13.1 m²).
- c. When animals are kept in areas where the weather is hot or during periods of extreme heat (>91,4°F/33°C), especially when buffaloes are confined, the use of a wallowing or evaporative system (water sprinklers, misters, water cannons or other appropriate devices) is recommended. This system should be working for an hour during the hottest periods of the day. The Temperature Humidity Index can be found in Appendix 4.

In addition to shade, water systems must be used in feedyards to provide cooling for buffaloes during hot summer conditions.

During periods of extreme heat, when access to water for wallowing or cooling (sprinklers, misters, water cannons or other appropriate devices) is limited, heat dissipation may be insufficient, which reduces welfare and milk production (De Rosa et al., 2009).

E 18: Feedyards

- a. Open dirt feedyards should be mounded to provide dry resting areas for buffaloes and meet Environmental Protection Agency Standards for dust management.
- b. During periods of prolonged wetness, mud must be managed appropriately since buffaloes like wallowing, staying idly in the mud and often falling asleep in wet areas. Attention must be paid to feeding and watering areas to prevent part of their body from blocking the access of other animals to the feeders and drinkers.

D. Lying area/space Allowances

E 19: Freedom of movement

- a. Except as noted in E27, all buffaloes must always have:
 1. Sufficient freedom of sideways movement to be able to groom themselves without difficulty;
 2. Sufficient room to lie down and freely stretch their limbs; and
 3. Sufficient room to rise and turn around.
- b. Tethering of buffaloes is prohibited.

E 20: Lying area

Buffaloes must always have access to a lying area that is:

- a. Well drained or well maintained; and
- b. of sufficient size to accommodate all animals lying down together in normal resting posture.

E 21: Hard floors

- a. The barn or corral must provide adequate space for all animals in accordance with the floor area recommendations described in the following table:

Animal category	Covered Area /animal (m²/sq. ft)
Adult male	12.0 / 129.2
Adult female	3.5 / 37.7
Females at calving	12.0 / 129.2
Calves 0-3 months	1.0 / 10.8
Calves 3-6 months	1.5 / 16.1
Calves 6-12 months	2.0 / 21.5

- b. Hard floor pens must be designed and built with material suitable for buffaloes, and be water, and urine resistant. Acceptable hard floors include unfinished concrete, partial concrete slats, or rubber mats.
- c. Water must be drained to avoid mud in passageways and in front of feeders and drinkers.
- d. Surfaces must be slip resistant, grooved or scored, but not abrasive. Diamond grooves are preferred to have 3.9 inches (9.9 cm) spacing between them and a depth of 0.5 inch (1.27 cm).
- e. Hard surfaced pens used for resting, sick animals, or calving should have moisture-wicking bedding material or rubber mats.
- f. Manure handling systems need to be considered when designing barns with hard surface flooring systems unless manure buildup is avoided using other methods to prevent run-off and other environmental hazards.

E 22: Freestalls

- a. When using freestalls, group size must not exceed the number of available freestalls.
- b. Free stall housing must provide a clean, dry, and comfortable bed.
- c. A 'loafing' area must be provided.
- d. Unbedded areas must be slatted, concrete, or packed earth, and manure must be removed at least once daily.
- e. Slats must not result in injury to hooves.
- f. Buffaloes nearing parturition should be offered 120% of the required space allowance (80% of the required stocking density).

Buffaloes may show some abnormal behavioral and physiological responses due to space restrictions. In free-stall systems with access to an outdoor area, a bedding space of 108 sq. ft (10m²)/animal and an outdoor area of 161-388 sq. ft (15 - 36m²)/animal showed an increase in milk production.

E 23: Housing

- a. Loose-housed, growing buffaloes must be grouped according to size and age.
- b. The space allowance for cattle housed in groups must consider:
 1. The presence or absence of horns; and
 2. The size of the group.
- c. Minimum space allowance is 60 sq.ft. (5.6 m²) / (per adult female, and all animals must be able to lie down simultaneously).
- d. If buffaloes are raised in a compost-barn system, the following standards must be met:
 1. Producer must provide a written and implemented plan that requires that bedding:
 - a) Be managed sufficiently to prevent mastitis and maintain air quality.
 - b) Be devoid any substance, material or objects that can cause injury to animals, e.g., large pieces of rock, gravel, or wood.
 - c) Consist of smooth, dry, and uniform substrate.
 - d) Be maintained at a level that enables cattle to easily step into the feed alley. Therefore, bedding must be less than 8 inches (20 cm) below the base of the feed alley.
 2. Uniform airflow must be accomplished in the barn to avoid the congregation of animals in higher-airflow areas and consequential buildup of manure.
 3. Animal cleanliness must be monitored daily and recorded weekly. Refer to Appendix 5 for proper hygiene scoring.
 4. Stocking density must meet E 21 and be in accordance with climate variations across regions to maintain bedding of sufficient quality.

E 24: External space allowance

- a. The outdoor area must follow these recommendations:

Animal category	Outdoor area /animal (m²/sq. ft)
Adult male	24.0 / 258.3
Adult female	7.0 / 75.3
Females at calving	12.0 / 129.2
Calves 0-3 months	2.0 / 21.5
Calves 3-6 months	3.0 / 32.3
Calves 6-12 months	4.0 / 43.1

- b. The space allowance for buffaloes housed in groups must be calculated in relation to the whole environment, and the age, sex, live weight, and behavioral needs of the stock, considering the presence or absence of horns and the size of the group.
- c. Buffaloes must have the conditions to keep themselves fairly clean and without soil (manure) due to overcrowded pens or areas without proper drainage.

E 25: Confinement is prohibited

Buffaloes must not be closely confined except in the following circumstances and even then, only for the shortest period of time necessary:

- a. For the duration of any examination, routine test, blood sampling, veterinary treatment;
- b. While they are being fed;
- c. For the purpose of marking, washing, or weighing;
- d. While facilities are being cleaned;

- e. During artificial insemination;
- f. Awaiting entry into the milking parlor
- g. In the milking parlor; or
- h. Awaiting loading for transportation.

E. Housing for buffaloes

E 26: Housing design

- a. Tie stall or stanchion barns are prohibited as a means of housing.
- b. Natural shelter with windbreaks, sunshades, a treatment facility for sick/injured animals, and calf housing will be considered where applicable.
- c. All fencing including gates must be adequately inspected and maintained.
- d. Electrical fences must be designed, installed, used, and maintained so that contact with them does not cause more than momentary discomfort to the cattle.

Renovated tie stall barns may be used for milking procedures only, and HFAC will review and assess the individual farm for compliance with the standards.

E 27: Management of housing

- a. Animals must have access to housing that provides a clean, dry, and comfortable bed, free from contamination with feces or urine.
- b. Animals must be able to lie down in a normal position without risk of being stepped on or kicked by other animals.
- c. Bedding:
 - 1. Must be provided at a minimum depth of 3 inches/ 7.6 cm.
 - 2. Cow mattresses (not the solid type) may be used with a minimum of 1 inch/2.5 cm of bedding to absorb moisture.

When handled properly, many fibrous and granular bedding materials may be used, including long or chopped straw, hay, sand, wood shavings, and rice hulls. Inorganic bedding materials (sand or ground limestone) provide an environment that is less conducive to the growth of mastitis pathogens. Sand bedding may also keep buffaloes cooler than straw or wood shavings.

- d. Dams and calves must be kept clean and free of soil.
- e. Bedding must not transfer soil onto the dams.

There is a serious problem if more than 5% of the buffaloes have soil on their bellies or udder. See Appendix 5 to check the hygiene scoring chart. In farms where hygiene scores are higher than 2, animal welfare may be compromised.

E 28: Design of freestalls

- a. Stalls must be constructed so that they prevent animals from standing so far forward that they consistently soil the back of the stalls.

A 4% slope downward from front to rear is recommended.

- b. Buffaloes must be able to change position from standing to lying and vice versa in a normal manner without difficulty or injury.

- c. A forward lunging area must be provided of a minimum of 2 feet/0.61m.
- d. When lying, all the buffaloes' body must fit on the bed including the hocks and the udder.
- e. Freestalls must be designed to align females properly and must prevent interference with or injury to a cow's neighbor or herself.

When there are free-stall issues (e.g., animals refusing to use it, jibbing, or lying down with only part of their body in it, or recurrent injuries due to an inappropriate project), professional advice should be sought.

E 29: Step design

- a. The step between the freestall bed and the dung passage must avoid slurry being pushed into the bed during scraping and must encourage buffaloes to enter the cubicle head-first.
- b. The height of the step must not be such that it results in increased incidence of concussion injuries to soles.

E 30: Preparation for calving and milking

Female buffaloes, especially young ones, must be adequately prepared for calving and subsequent milking by early introduction to:

- a. Pre- and post-calving housing; and
- b. The production ration.

E 31: Monitoring introduced animals

Young females should be closely monitored when introduced into an established herd of adult females.

F. Lighting

E 32: Sufficient light in buildings

- a. When buffaloes are housed, adequate light, whether fixed or portable, must be available to enable them to be thoroughly inspected at any time.
- b. Animals continuously housed must be provided with light comparable intensity to natural light, during the normal period of daylight hours.

G. Calving Environment

E 33: Monitoring of calving

- a. Heifers calving on pasture or range must be checked at least daily and preferably more frequently for signs of impending parturition.
- b. All female buffaloes must be checked on a regular basis for calving problems. A check at least daily is strongly recommended but frequency must be based on history of calving problems, parity, and pasture and weather conditions.
- c. It is strongly recommended that first calf heifers be kept in a separate pasture or range area from the adult female herd.
- d. Weather conditions must be considered when determining frequency of monitoring during calving season, with higher frequency during adverse weather.

E 34: Calving areas

- a. Female buffaloes must be transferred to the calving area prior to due date.
- b. Calving buffaloes must be kept separate from other females or animals of other species (individual pens are preferable).

- c. When calving on pasture, a dry area must be carefully selected and access to an artificial or natural shelter provided according to weather conditions.
- d. Pens, corrals, or stalls for calving must be free of pools and watering holes, providing a dry and safe environment for animals. Buffaloes may find pain relief staying in pools, rivers, and lakes. Therefore, access to those areas should not be allowed during calving season due to a higher chance of females calving in those areas, causing the drowning and death of the calf at birth.
- e. Feed and water must be available.
- f. There must be an area of such a size and equipped with a means of restraint (e.g., chute, head gate) as to permit a person to attend the dams and their calves safely if necessary.
- g. Internal surfaces of calving areas must be of materials which can be easily cleaned, drained, and disinfected.

Buffaloes calve without much difficulty. Excessive human intervention during calving may cause unnecessary distress to the dams. Human proximity to calves must be avoided right after calving since it may cause rejection of the dam, especially heifers. However, when the dam and/or calf need to be assisted, human proximity is advisable.

E 35: Environmental conditions

Insulation, heating, and ventilation of buildings must ensure that air circulation, dust level, temperature, air relative humidity, and gas concentrations are kept within limits which are not harmful to calves.

H. Milking Parlor

E 36: Milking parlor hygiene

The highest standards of hygiene must be practiced in the parlor to reduce risk of infection:

- a. Buffaloes must be clean at milking, paying particular attention to udders and teats;
- b. Udder, teats and flanks should be clean, dry and free from sores on entry to the parlor;
- c. Parlor staff must have clean hands when handling teats.
 - 1. Consideration should be given to the use of clean rubber gloves.
 - 2. Single-use udder cloths should be used;
- d. All cases of mastitis must be treated promptly and underlying predisposing factors corrected;
- e. When the mastitis rate exceeds the target figure of a 2-month period, the specific organisms involved must be identified;
- f. Buffaloes with mastitis should be marked and milked last with milk discarded or pasteurized. Alternatively, they may be milked with a separate cluster and bucket;
- g. Herd somatic cell counts, individual clinical cases of mastitis and mastitis tube usage must be monitored and recorded. Records must be kept of all medications used and withdrawal times observed;
- h. Milking machinery must be properly maintained;
- i. All teats must be treated pre- and post-milking with an approved teat disinfectant. An emollient must be used when teats are dry, chapped or cracked;
- j. Following completion of milking, females must be encouraged to remain standing for approximately an hour to allow the teat canal sphincter to close;
- k. Measures must be in place to minimize the risk/incidence of mastitis in dry buffaloes.

Dairy buffaloes present anatomical differences from dairy cows:

- *Buffaloes have longer teats;*
- *Teat canal epithelium is thicker and more compact in buffaloes;*
- *Muscle (sphincter) around the teat canal is thicker in buffaloes;*
- *Teat canal is longer in buffaloes.*

Thus, any equipment must be properly kept and adapted.

E 37: Milking machines

- a. Milking machine testing must be carried out at least once every 6 months.
- b. Proper application, function and maintenance of the milking machinery must be ensured, by practicing the following:
 1. Avoid under and over milking;
 2. Select appropriate teat cup liners;
 3. Check teat cup liners daily and replace damaged/rough teat liners;
 4. Exchange liners according to manufacturer's recommendations;
 5. Ensure correct pulsation rate and a correct release/squeeze ratio; and
 6. Ensure the correct functioning of the vacuum regulator. Vacuum fluctuation must be prevented.

Vacuum levels higher than 30 kPa may be necessary to relax the buffalo's sphincter (10 – 15 kPa higher than kPa for bovine cows). However, some situations only need pressure levels similar to those for bovine cows.

I. Bull Pens

E 38: Bull pen management

- a. Bull pens must be sited to allow the bulls sight, sound and odor of other buffaloes and general farm activity.
- b. Bulls must be attended to at least daily by farm staff.

E 39: Bull pen design

- a. Bulls, mainly those not used to the presence of others, must be kept segregated and distant, especially during breeding season, because the characteristic odor might cause serious damage to the facilities and injuries to the handlers.
- b. Individual accommodation for an adult bull of average size must include a bedded sleeping area and loafing area (See E21 and E24).
- c. For very large bulls, the sleeping area must not be less than 9 sq. ft (0.84 m²) for each 132 lbs. (60 kg) of live weight.
- d. Bull pens must be safe for the stock keepers tending the bulls. Adequate restraining facilities and an escape route must be provided.
- e. In areas used for breeding, the floor should not be slatted or slippery.

J. Handling facilities

E 40: Passageways

- a. Alleyways and gates must be designed and operated so as not to impede the movement of buffaloes.
- b. When operating gates and catches, every effort must be made to reduce excessive noise, which may cause distress to the animals.
- c. Noise reduction mechanisms must be installed if necessary.
- d. The walls of passageways, alleys and gates must be built of solid material and designed to minimize the animals' distress and provide safety to handlers.
- e. The walls of passageways and gates must be solid and at least 4.9 ft (1.5 m) high to prevent animals from escaping.
- f. Flooring must be non-slip.

E 41: Maintenance of restraint equipment

- a. Hydraulic or manual restraining chutes must be adjusted for the proper size of buffaloes.
- b. Regular cleaning and maintenance of all working parts is required to ensure the proper working of the system and the safety of the buffaloes and handlers.
- c. Hydraulic restraint systems should have their pressure relief valves adjusted to avoid excessive pressure applied to buffaloes when being restrained.

Signs that restraining chutes are causing excessive pressure are mooing, tension and difficulty breathing.

K. Specific Provisions for Calves

E 42: Dairy calves

On-farm killing or euthanasia of healthy dairy bull and heifer calves is prohibited.

E 43: Facilities for stressed calves

- a. Managers must take proper precautions to prevent and manage hypothermia in young calves.
- b. Hypothermia and additional stress must be minimized in susceptible calves by housing them in a well-ventilated building, using thick, dry bedding, and by avoiding drafts or providing supplemental heat. While healthy young calves can tolerate low air temperatures, newborn animals, calves that have been transported or deprived of food, and sick calves are particularly susceptible to hypothermia.

E 44: Quarantining calves

- a. When there is a high risk of infectious disease, consideration must be given to individual quarantine of calves during their initial rearing period.
- b. Producers must consult local or state veterinary professionals to determine the length of quarantine period when disease risk is high.

E 45: Locating calf pens for quarantine

Location or placement of individual calf pens used for quarantine must be such that each calf has an opportunity to see and hear other calves.

Group housing or pair housing of calves as early as two weeks is encouraged. Buffaloes are gregarious animals and group pens provide calves with the opportunity to socialize and exhibit natural behaviors. Freedom of movement and exercise are also enhanced in group pens.

E 46: Light requirements for calves

- a. Calves must not be kept in total darkness.
- b. To meet their behavioral and physiological needs, appropriate natural or artificial light must be provided; if the latter, it must function for a period at least equivalent to the period of natural light normally available between 9 a.m. and 5 p.m.
- c. In addition, suitable lighting (fixed or portable) strong enough to allow the calves to be inspected at any time, must be available.

E 47: Outdoor access

After weaning, calves must be housed in groups of similar age and size and be allowed regular access to outside, weather permitting.

L. Calf hutches

E 48: Space for calves - See E21 and E24

E 49: Calf hutches or individual pens

- a. Calf hutches or individual pens must be of a size appropriate for the age, size, and breed of the animal.
- b. Individual pens or hutches must not be used to house calves older than 8 weeks of age.
- c. The calf must be able to stand up, turn around, lie down, rest and groom itself without hindrance.
- d. Tethering of calves is prohibited.
- e. Calves must always have access to a lying area that is:
 1. Of solid construction (i.e., not perforated or slatted)
 2. Bedded to provide a comfortable, clean, dry area sufficient to avoid discomfort; and
 3. Sloped as necessary to provide drainage.
- f. There must be enough bedding in the hutch to exclude any drafts, and to keep the calves clean.

There is a serious problem if more than 5% of the calves are soiled on their belly. Bedding must not transfer soil onto the calves.

- g. Hutches or pens must be arranged so that calves may see and hear other calves in neighboring units.
- h. Hutches or pens must be made of material that minimizes heat stress and wide temperature fluctuations.
- i. Hutches or pens must be sufficiently ventilated to remove excess humidity, ammonia, and condensation, while at the same time eliminating drafts but retaining constant air circulation.
- j. Hutches or pens must be placed on a free draining base and affixed to the ground, when necessary, to prevent movement in high winds.
- k. Hutches or pens must be sited in a sheltered location, away from prevailing weather.
- l. An outdoor exercise area must be provided, weather permitting.

M. Fencing

E 50: Design and maintenance of fences

- a. All fencing, including gates, must be adequately inspected, and maintained on a regular basis.
- b. Electric fences must be designed, installed, used, and maintained so that contact with them does not cause more than momentary discomfort to the buffaloes.
- c. Feed bunk dividers must be designed to avoid any potential threat to the animals (e.g., horned animals becoming trapped between the dividers or panels).
- d. Confinement fences must be at least 5.9 ft (1.8 m) high and be made of solid metallic bars and/or other material such as steel cable.

PART 4: MANAGEMENT

OBJECTIVES: *A high degree of caring and responsible management is vital to good animal welfare. Managers and caretakers must be thoroughly trained, skilled and competent in animal husbandry and welfare and have a good working knowledge of their system and the buffaloes under their care.*

A. Managers

M 1: Farm Plan

All records, checklists, health plans, contingency plans, farm pest control plans, written standard operating and emergency procedures, policies, and publications that the HFAC Animal Care Standards for Dairy Buffaloes require the producer to keep and maintain, must be made available for the HFAC inspector.

M 2: Understanding the Standards

Managers must ensure that they and all stockpersons:

- a. Have a copy of the Humane Farm Animal Care *Animal Care Standards for Dairy Water Buffaloes*;
- b. Are familiar with the standards; and
- c. Understand the standards.

M 3: Management and record keeping activities

Managers must:

- a. Develop and implement a suitable training program for stock keepers, with regular updates and opportunities for continuing professional development. Producers/Managers must be able to demonstrate that staff with responsibilities for stock care have the relevant and necessary skills to perform their duties and, if necessary, are given the opportunity to participate in an appropriate form of training;
- b. Provide an Emergency Action Plan, highlighting procedures to be followed by those discovering an emergency such as fire, flood, or power failure, sited in an easily accessible location, which must include:
 1. Procedures to be followed by those discovering such an emergency;
 2. The location of water sources for use by the fire department;
 3. An address, map grid (GPS) reference, and/or postal code to easily locate the unit.
- c. Ensure the Animal Health Plan (see H1) is implemented and regularly updated and that the required data are recorded appropriately;
- d. Keep and make available to the *Humane Farm Animal Care* inspector, records of quarantine procedures and use of medication. These records must include documentation on all incoming and outgoing animals on the farm, as well as types and quantities of medicines used; and
- e. Ensure animals to be transported, including cull female buffaloes, are fit for transport to their destination. For unfit animals, alternative arrangements should be made, including on-farm euthanasia if necessary.

M 4: Mitigating problems

- a. Managers must understand the times and circumstances in which buffaloes are prone to welfare problems on their unit.
- b. Managers must be able to demonstrate competence in recognizing and dealing with these problems and act accordingly to prevent and fix any situation that may cause animal welfare issues.

M 5: Awareness of the welfare implications of management practices

- a. Managers must be aware of the welfare implications of calving, injection, oral dosing, disbudding, dehorning, identification procedures, castration, foot trimming, breeding procedures, and extra teat removal, among other health or veterinary care procedures.
- b. They must also be aware of welfare concerns related to breeding and calving, particularly: the selection of suitable adult males, semen, and embryos for use in heifers, as well as the vulnerability of newborn calves, buffaloes post-partum conditions and competition among bulls when mating.

M 6: Training

- a. Prior to being given responsibility for the welfare of buffaloes, employees must be properly trained and/or have enough experience appropriate to their job responsibilities, and:
 - 1. Be able to recognize signs of normal behavior, abnormal behavior, and fear;
 - 2. Be able to recognize signs of common diseases, understand how to prevent and control them, and know when to seek veterinary help;
 - 3. Have a basic knowledge of body condition scoring;
 - 4. Have the knowledge of what constitutes proper nutrition in buffaloes;
 - 5. Understanding of functional anatomy of the normal foot, and its care and treatment;
 - 6. Understanding of the functional anatomy of the normal teat and udder;
 - 7. Knowledge of calving and the care of the newborn calf;
 - 8. Understanding of fundamental principles of breeding and genetics, rearing and handling of buffaloes;
 - 9. Understanding the requirements for good parlor hygiene and a well-maintained milking machine.
- b. Formal or on-the-job training should be made available to staff (including temporary and part-time employees).

M 7: Compassionate treatment

- a. Managers must be able to demonstrate competence in handling animals in a positive and compassionate manner.
- b. Managers must be able to demonstrate their proficiency in low stress handling and procedures that have the potential to cause discomfort to buffaloes (e.g., injections, foot trimming, disbudding, dehorning, castration, and marking).

M 8: Complaints to Operators

- a. To be certified, an Operation must maintain systems for receiving, responding to, and documenting complaints alleging the Operation's failure to comply with Humane Farm Animal Care standards.
- b. Whenever an Operator receives a complaint, the Operator must:
 - 1. Take appropriate action to respond to the complaint; and
 - 2. Correct any deficiency in products or services that affect their compliance with requirements for certification.
- c. Written records must be retained by the Operation for a minimum of 3 years from the date of the records' creation. Records must contain information documenting:
 - 1. All complaints received (written or verbal),
 - 2. Actions taken by the operator to respond to the complaint.
- d. These records must be made available to Humane Farm Animal Care upon request. HFAC will review these records at least annually, during the operation's annual inspection.
- e. If a farm operation has "organic" or "natural" certification, operators must notify Humane Farm Animal Care if an adverse ruling related to the operation's status (such as suspension or revocation of certification, fine, or sanction) is levied against the operation by another certifier or by a governmental program that regulates the industry.

The complaints log is ONLY for recording if someone makes a complaint to a producer about their compliance with the HFAC Standards.

B. Handling

M 9: Quiet handling

- a. Buffaloes move slower than other bovines, so they must be handled with care, at a slow and comfortable pace, and in a manner that imposes the minimum possible stress on the animals.
- b. Handlers should refrain from using loud noises to move buffaloes or hitting them in a manner that might cause injury.

M 10: Anticipating animal stress factors

- a. Animal handlers must be trained to understand and identify the likely stressors that buffaloes may be subjected to before handling them.
- b. Animal handlers must be knowledgeable about how buffaloes react toward other buffaloes, toward humans and to strange noises, sights, sounds and smells, and they must minimize these potential stressors.

Dairy buffaloes have the following behavioral characteristics, which must be taken into consideration when they are moved:

1. *They have a wide field of vision and may startle if they see moving objects, even at long distances;*
2. *They walk slowly;*
3. *They have acute hearing, so they should not be subjected to loud noises;*
4. *They are herd animals and, if possible, should not be left in isolation.*
5. *They have several skin neuroreceptors, so they are more sensitive to shocks than humans;*
6. *They have a good sense of smell that allows them to identify other herd members, pheromones and situations of stress and danger (they can identify “warning” substances in the urine and feces of animals that went through some kind of stress).*

M 11: Handling in passageways

- a. Buffaloes must not be driven unless the exit or the way forward for the lead animal is clear.
- b. Buffaloes must not be intentionally rushed or run along narrow alleyways, passageways, or through gateways.

A fall rate higher than 1% when handling buffaloes indicate a need for improvement of handling methods or facilities.

M 12: Benign handling

- a. Sticks and flags may be used as benign handling aids, i.e., as extensions of the arm.
- b. Animals must not be pulled or lifted by the tail, skin, ears, or limbs.
- c. Aggressive tail twisting (e.g., jacking) can cause tails to break, especially in young animals, and is prohibited.
- d. Sticks must not be used to beat buffaloes.
- e. The use of electric prods is prohibited, except when animal and human safety is in jeopardy, and it is the means of last resort.
- f. Pulling or dragging calves is specifically prohibited.

With proper handling and early adjustments, buffaloes respond well to handlers without the need to use any extra equipment. If an animal does not adjust to the handling routine and continues to be aggressive, it must be removed from the herd.

M 13: Equipment

A buffalo handling unit must be available, comprising a collecting system and an individual method of restraint, appropriate to the type, environment, and number of animals to be managed.

M 14: Calving aids

- a. Calving aids must only be used to assist a delivery when necessary and not to produce a calf as quickly as possible.
- b. Before any type of calving aid is used, the dam must be examined to ensure that the calf is in the right position and of a size when natural delivery can be reasonably expected, without causing undue pain and distress to either the dam or the offspring.

M 15: Dipping Navels

Newborn calves' navels must be dipped in an effective antiseptic solution as soon as possible after birth. This procedure must be properly done to minimize the risk of the calf being rejected by the dam, especially first calf heifers.

M 16: Rapid diagnosis and treatment

- a. All efforts must be made to ensure a rapid and proper diagnosis/treatment of any sick animal.
- b. If the animal does not respond to treatment, euthanasia must be considered.

M 17: Non-ambulatory Animals

- a. All non-ambulatory animals must be treated without delay.
- b. Appropriate equipment (e.g., sling or harness, sled, bucket of a front-end loader, floatation tank, or stone boat) must be available to move an injured or non-ambulatory animal. Whatever type of lifting gear is used on a recumbent animal, care must be taken not to cause unnecessary pain or distress to the animal.
- c. No live animal can leave the farm or be transported unless it is able to walk unassisted (except for veterinary care).
- d. The use of hip-lifters is permitted only for emergency, short-term assistance. Buffaloes must never be left unattended when hip-lifters are in use.
- e. Hoisting animals by using chains, dragging, lifting them without complete body support, and other means that can cause further physical damage is prohibited.
- f. All non-ambulatory and injured animals must be provided with deep bedding, secure footing, shelter from adverse weather, and accessible water and feed.
- g. Where the prognosis for recovery of a non-ambulatory animal is poor, early intervention by euthanizing the animal on farm must be undertaken.
- h. For acceptable methods of moving non-ambulatory cattle refer to the North American Meat Institute's Guidelines (available at <http://www.animalhandling.org>).

C. Managing replacement animals

M 18: Brought-in calves

- a. On arrival at the operation, calves acquired as replacement animals must not be mixed with calves from other sources until their health status has been determined.

- b. Acquired calves must be rested in comfortable conditions.
- c. Once the overall health status of brought-in calves is verified, their introduction to the herd must be made in a neutral environment (e.g., handling pens) to minimize possible aggressive interactions among animals.

D. Identification

M 19: Identification equipment

The high capacity of regeneration (healing) of the buffaloes' skin and their wallowing habit make identification difficult. Consideration should be given on the following identification observations:

- a. Ear tags or other items used for identification purposes must be fitted with care to avoid unnecessary pain or distress.
- b. Ear tattoos, using a small tattoo machine with permanent black or green ink, as long as the animal can be identified.
- c. Hot branding of horns after proper development in adult animals.
- d. Face branding of any type is prohibited (unless required otherwise by the federal government).
- e. Wattling (waddling) and ear splitting are prohibited.
- f. The use of corrosive substances is prohibited.

M 20: Marking

Marking of buffaloes for identification and other purposes must be done with care by trained, competent operators to avoid unnecessary pain or distress to the animals, both at the time of marking and subsequently. Freeze branding is preferable to hot branding.

M 21: Temporary marking

Methods used for temporary marking must be non-toxic (e.g., crayons, paint, and chalk markers especially developed for animals).

E. Equipment

M 22: Using equipment

When equipment that affects animal welfare is installed, managers must be able to:

- a. Demonstrate their ability to operate the equipment properly;
- b. Demonstrate their ability to carry out routine maintenance;
- c. Recognize common signs of malfunction; and
- d. Demonstrate knowledge of actions to be carried out in the event of a failure.

M 23: Automatic equipment

All automatic equipment (e.g., misters, feeders, electric fences) must be thoroughly inspected by a stock keeper or other competent person, not less than once each day to confirm that there are no defects. When a defect is found in an automatic equipment:

- a. The defect shall be rectified promptly; or
- b. If this is impracticable, measures must promptly be taken (and must be maintained until the defect is rectified) as required to safeguard buffaloes from suffering unnecessary pain or distress as a result of the defect.

M 24: Automatic ventilation equipment

When automatic equipment includes a ventilation system, the system must contain:

- a. An alarm that will give adequate warning of the failure of that system and will operate even if the principal electricity supply to it has failed;
- b. Additional equipment or means of ventilation (whether automatic or not) which, in the event of a failure of the ventilation system, will provide adequate ventilation to prevent buffaloes from suffering unnecessary distress as a result of the failure.

F. Inspection

M 25: Monitoring

- a. Caretakers must inspect the animals frequently enough to guarantee the welfare of the buffaloes.
- b. Caretakers must justify the frequency of their routine inspections.

G. Farm dogs and natural predators

M 26: Managing stock dogs

- a. Dogs, including working dogs, must be properly trained (with due verification), must not cause injury or distress to buffaloes and must be always kept under control.
- b. Dogs are not permitted in the milking parlor.

Dogs are not generally used to handle or move buffaloes but may be in the farm for other purposes. Thus, the same control standard applies to all of them.

M 27: Managing predators

If natural predator species are known to be dangerous in the region, a predator control/action plan should be developed with local or state wildlife control agencies, using non-lethal or exclusion control methods, if possible.

H. Watering holes, showers and pools

M 28: Managing watering holes, showers and pools

- a. Watering holes and showers must have a continuous flow and adequate treatment to prevent the accumulation of feces and urine, and not to compromise the quality of the water;
- b. Pools (water accumulation) in undesirable places or where animals walk must be drained and covered to avoid mud where animals lie down.

PART 5: HERD HEALTH

OBJECTIVES: *The environment in which livestock are housed must be conducive to good health. All producers must have a herd health plan that is in accordance with good veterinary and husbandry practices. Herd health must be maintained to the highest possible standards. Health problems must be identified immediately and resolved as quickly and completely as possible.*

A. Health Care Practices

H 1: Animal Health Plan

- a. An Animal Health Plan (AHP) must be drawn up and regularly updated in consultation with a veterinarian that has experience treating buffaloes. The AHP must include details of:
 1. Nutrition program;
 2. Vaccination program;
 3. Parasite prevention;
 4. Biosecurity and infectious disease protocols, including tolerance limits on overall herd performance;
 5. Laminitis prevention procedures / foot care;
 6. Mastitis prevention procedures and protocols;
 7. Non-ambulatory (downer) animal procedure; and
 8. Euthanasia for culling and emergencies.
- b. Records must be kept of all medical/animal health procedures that are performed.

Some pour-on drugs used for bovines are not suitable for buffaloes, possibly due to differences of skin, which is more sensitive to the compounds and substances present in those products. Particular attention must be paid to organophosphate medications, which are toxic to buffaloes.

H 2: Mitigating health problems

Sudden deaths, disease outbreaks or mortality that cannot be readily identified by the manager must be investigated in consultation with a veterinarian.

H 3: Health monitoring

- a. The herd must be monitored for herd performance including production disease, infectious diseases, and injury as a result of housing/husbandry. For example:
 - Stress (may be evident by increased disease rate, skinny animals, restlessness, persistent bellowing, increased aggressive interaction, isolation);
 - Metabolic Disorders – (hypocalcaemia, hypomagnesaemia, ketosis, displaced abomasum, laminitis, bloat, acidosis);
 - Septicemia or infections;
 - Enteritis or parasitosis;
 - Problems at Calving;
 - Lameness;
 - Calf Scours;
 - Repetitive Physical Injury;
 - Dermatitis;
 - Respiratory Diseases;

- Body Condition;
- Non-ambulatory animals.
- b. If any herd performance parameters fall outside the tolerance limits identified by the producer and the herd veterinarian, or if casualty and culled cattle numbers exceed those specified in the AHP, a veterinarian must be consulted, and management practices adjusted to try to resolve the problem.

H 4: Segregation pens

- a. Contagious or downed animals must be segregated and cared for separate from the herd.
- b. Any buffalo suffering from illness or injury must be treated without delay, and veterinary advice sought when needed. If necessary, such animal must be euthanized.

In some circumstances, segregation is not feasible or may disrupt the social hierarchy or cause additional stress to the animal. The advantages of segregation should be weighed against its disadvantages, especially for mild illnesses or injuries that can be easily managed.

- c. Isolation pens must be of a size that is appropriate for the age, size, and breed of the animal.
 - 1. The animal must be able to stand up, turn around, lie down, rest and groom itself without hindrance.
 - 2. Water, feed and shelter must be always readily accessible to all buffaloes (including non-ambulatory animals, even if they are not housed in a hospital pen), unless otherwise directed by the veterinarian.
- d. Urine and dung from hospital pens in which sick and injured animals are housed must be disposed of so as not to spread infection to other stock.
- e. Pens must be constructed to facilitate effective cleaning and disinfection of surfaces, and the possible removal of a carcass from the area.

H 5: Managing brought-in animals

Replacement animals brought in from other sources must be quarantined after being examined by a veterinary, vaccinated, and/or appropriately treated for disease, illness, parasitic infestation, or other health-related problems in accordance with the AHP (or standard operating procedures or other written description of how this is to be done) before integration into the herd.

H 6: Grouping cattle

- a. In loose housing, polled and horned buffaloes must not be grouped together, except when a social group exists.
- b. Precautions must be taken to prevent aggressive interactions and injuries if mixing buffaloes that are extremely territorial. A first contact should take place in a neutral environment for animals to smell each other and start a new social structure within the new herd.

H 7: Mitigating behavioral problems

- a. If abnormal behavior activities develop repeatedly and inhibit normal functioning of the animal in any pen, a program of modification/enrichment must be pursued until the problem is overcome.
- b. Close attention must be paid to the behavior between healthy and sick animals, since buffaloes tend to reject, expel, or leave behind any sick member of the herd.

Possible abnormal behavior patterns include repeated rubbing in the absence of disease, tongue rolling/aerophagia, pica (licking/chewing solid objects), eating soil/sand/dirt, navel and ear sucking, urine drinking, persistent bellowing, excessive mounting.*

**In feedyards, this may be an indicative of Buller Steer Syndrome. In this case the buller steer must be removed from the pen. Although the precise cause is not known, studies indicate high stocking densities are a contributing factor.*

H 8: Controlling parasites and predators

- a. It is important that all practical measures be taken to prevent or control external and internal parasitic infestations as set forth in the Animal Health Plan.
- b. When developing and implementing farm pest and predator control plans, physical exclusion methods and the removal of elements in the vicinity of livestock that might encourage the presence of pests and predators must be included.

Methods of physical exclusion and discouragement of pests and predators include:

- Construction/maintenance of fencing appropriate for excluding the pests/predators in question;
- Removal of shelter/cover (e.g., weeds) in the area surrounding livestock buildings;
- Removal/protection of obvious food sources; and
- Maintenance/proofing of buildings against pest and predators.

H 9: Hoof care

- a. Close attention must be paid to the condition of the hoof. The feet of all buffaloes must be inspected for signs of abnormal wear, infection, or excessive growth at least annually, or as required by a competent hoof trimmer.
- b. Producers must demonstrate methods for prevention of acute hoof conditions. These methods include traditional footbaths, sponge baths or individual spray therapy.
- c. Preventive hoof care practices must be addressed in the Animal Health Plan.
- d. Lameness in lactating buffaloes should be under 5%.

In general, a normal dorsal hoof wall length (distance from the coronary band to the tip of the toe, after clipping) is 9 cm in buffaloes. Length ranging from ≥ 9.1 to ≤ 10 cm are considered moderate "overgrowth", but still within an acceptable range; a dorsal hoof wall length greater than 10 cm is considered severe "overgrowth" and classified as foot disorder (Guccione et al., 2016).

A locomotion score of 1 to 5 (1=normal locomotion; 5=severely lame) can be used to assess the level of lameness in the herd (Mason & Leaver, 1988). Animals with a score of 3 or more are considered to have clinical laminitis. Locomotion score:

1. No uneven gait, no apparent weakness.
2. Uneven gait, mild weakness, little external rotation of the limbs outside the flexion axis (abduction) or internal rotation of the limbs outside the flexion axis.
3. Slightly obvious lameness, no affected behavior.
4. Obvious lameness, difficulty turning, affected behavior pattern, weight loss.
5. Extreme difficulty getting up, difficulty walking, adverse effects on behavior pattern, noticeable weight loss.

Buffaloes should be considered lame if they score 3, 4, or 5 when using the ZinPro Locomotion Scoring Chart (Appendix 6).

Producers can reduce the occurrence of lameness in herds by:

- Minimizing exposure to concrete floors. In addition to increasing the time animals spend on good quality, dry pasture, the use of bedding material in barns must be considered.
- Keeping all walking areas clean, dry, and free of slurry.
- Ensuring buffaloes have spacious and comfortable stalls where they can rise and lie down without encumbrance.
- Balancing the feed ration to prevent sub-clinical rumen acidosis and providing excellent bunk management with good feed access and frequent feed push-ups.
- Avoiding feeding large amounts of concentrate in a single feeding.

- Providing fresh feed more often throughout the day.
- Develop a lameness prevention strategy with input from experts such as the producer's veterinarian and nutritionist.

H 10: Drying off period

There must be a minimum dry period of 60 days.

H 11: Physical alterations

The only potentially injurious husbandry procedures in dairy buffaloes permitted under the Animal Care Standards are as follows (except those done for therapeutic reasons by a veterinarian):

- a. Although considered a rare procedure in dairy buffaloes, removal of supernumerary teats may be performed up to 5 weeks of age using pain management.
- b. Disbudding (as soon as a prominent bud has formed, around 1 or 2 months of age) can be conducted using a hot iron and pain management. Horn removal on calves between 2 and 6 months of age must be conducted using pain management. See Appendix 7 for information on pain management methods.
 1. Cautery paste may be used to disbud calves not older than 7 days of age, with the paste being applied by a person who is proficient in the process. Pain management must be used. It is not recommended to carry out this procedure in wet conditions.
 2. The following disbudding/dehorning methods are prohibited:
 - a) sawing;
 - b) banding;
 - c) embryonic wires;
 - d) other methods not designed for the purpose of disbudding/dehorning; and
 - e) chemical substances.
- c. The removal of horns from animals over 6 months of age must:
 1. only be performed by a veterinarian, using pain management methods; and
 2. not be a routine procedure.
- d. In adult animals, horns can be trimmed (only 0.4 in/1 cm) if it is hurting the animal (due to abnormal growth, mainly in Murrah and Jafarabadi water buffalo breeds) or to prevent them from tangling up in other animals or places (steel cables, pipes, and chains).

Special attention should be paid to the horns. Since buffaloes are animals that like rubbing against each other, they can tangle up (or lock) their horns, causing accidents and injuries, such as loss of horn layers and even death. In addition, preventive measures must be taken in the mother-calf relationship, especially in the Jafarabadi breed and its crosses, since calves can get their neck trapped in the accentuated curvature of the mothers' horn, which can cause cervical dislocation and death.

- e. Castration:
 1. It is strongly recommended that if bull calves are to be castrated, this should be done at the earliest possible age.
 2. Between 7 days and 6 months of age, banding methods, such as "Calibrate" or "E-Z Bander" may be used only with pain management.
 3. Surgical castration of bulls over 6 months of age must be performed by a veterinarian using pain management and provisions for controlling bleeding.
 4. Castration using emasculator, spermatic cord crush (Burdizzo clamp) or rubber rings is not permitted.
- f. Tail docking is prohibited.
- g. Wattling (waddling) and ear splitting is prohibited.
- h. All of these practices must be performed by trained and competent managers in a way that minimizes suffering.
- i. The above procedures must:

1. Not be performed on sick animals; and
 2. Only be performed using appropriate, properly-maintained equipment.
- j. Use of a nose lead as the sole form of restraint is prohibited.

H 12: Medicines

Medicines used in buffaloes must be:

- a. Clearly labeled;
- b. Stored in accordance with label instructions;
- c. Kept in a secure store which is safe from animals and unauthorized people;
- d. Kept separate from food producing areas;
- e. Stored by a person responsible for their management. Appropriate records must be kept for stock control purposes;
- f. Licensed by the Animal Health Official Authorities for use in that species or, exceptionally, other medicines approved for use in cattle under veterinary supervision.

H 13: Induction of parturition

Induction of parturition must never be used as a routine management procedure but is acceptable in accordance with the veterinarian's recommendations.

H 14: Ultrasound for pregnancy detection

Non-veterinarians performing rectal ultrasound pregnancy detection must have received appropriate training in the relevant techniques.

H 15: Genetically modified or cloned animals

The use of genetically modified and/or cloned animals and their offspring is prohibited.

B. Casualty Animals

H 16: Euthanasia

- a. Each farm must have provisions for timely and humane euthanasia of casualty buffaloes. This can be accomplished on-farm by a trained and competent member of farm staff or a veterinarian. The method of euthanasia that will be used in each age group of animals must be specified in the Animal Health Plan.
- b. If there is any doubt as to how to proceed, the veterinarian must be called at an early stage to advise whether treatment is possible or whether humane slaughter or euthanasia is required to prevent suffering. If an animal is in uncontrollable severe pain, it must be promptly and humanely euthanized.
- c. Nothing stated here is intended to discourage the prompt diagnosis and appropriate treatment of any ill or injured animal.

A copy of the AVMA Guidelines on Euthanasia is available on the HFAC website, www.certifiedhumane.org in the Standards section.

H 17: Carcass Disposal

Disposal of the carcass must meet local requirements and regulations and it must be done in a timely manner, using procedures that minimize the impact on the environment and prevent the spread of infectious disease or pathogens.

PART 6: TRANSPORTATION

OBJECTIVE: *Animal transport systems must be designed and managed to ensure buffaloes are not subjected to unnecessary distress or discomfort. The transport and handling of livestock must be kept to an absolute minimum. Personnel involved in transport must be thoroughly trained and competent to carry out the tasks required of them. ALL buffaloes transported to slaughter as Certified Humane® must have spent their entire lives on Certified Humane® farms.*

A. Conditions of transportation

T 1: Loading facilities

- a. Loading facilities:
 1. Should provide a ramp of no more than 20% incline.
 2. Must be clean, and
 3. Must be well lit.
- b. Both loading ramps and tailboards must be fitted with means of preventing the buffaloes, regardless of their size, from slipping and falling off.
- c. Ramps should be of non-slip footing and appropriately designed with spaced foot battens for better traction and to avoid slips.
- d. Consideration must be given to providing a loading bay and/or ramp that is well lit and enables animals to walk straight into or out of the vehicle on a level or slight gradient with little shadowed areas or contrasts.

T 2: Passageways

- a. Alleyways and gates must be designed and operated so as not to impede the movement of buffaloes. Very narrow gates (less than 6.6 ft/2 m wide) cause problems to animals and make their handling difficult.
- b. When operating gates and catches, every effort must be made to reduce excessive noise, which may cause distress to the animals.
- c. If noise from the equipment is causing the animals distress, noise reduction mechanisms must be installed and monitored.

T 3: Transport personnel

- a. Personnel in charge of cattle transporters must be able to demonstrate competence in handling buffaloes when loading and unloading them, and while in transit.
- b. Animal handlers must be knowledgeable about likely stressors and how buffaloes react towards other buffaloes, towards humans and to strange noises, sights, sounds and smells.

T 4: Handling in passageways

- a. Buffaloes must not be driven unless the exit or the way forward for the lead animal is clear.
- b. Buffaloes must not be rushed or run along alleyways, passageways, or through gateways.

T 5: Benign handling

- a. Sticks and flags may be used as benign handling aids, i.e., as extensions of the arms.
- b. No buffalo must be pulled or lifted by the tail, skin, ears, or limbs.
- c. Aggressive tail twisting (e.g., jacking) can cause tails to break, especially in young buffaloes, and is prohibited.
- d. Sticks must not be used to beat buffaloes.

- e. The use of electric prods is prohibited, except when animal or human safety is in jeopardy, and it is the means of last resort.
- f. Pulling or dragging calves or other buffaloes is specifically prohibited.

T 6: Pre-transport feed and water

- a. All buffaloes, including calves, must have access to water up to the point of transport.
- b. All buffaloes, including calves, must have access to food until at least 5 hours prior to loading onto the truck.

T 7: Transport time

- a. The timing of transport for any purpose must be planned between the transporter and producer, and slaughterhouse, if applicable, to minimize traveling and waiting time for the buffaloes.
- b. Transport of buffaloes must not exceed eight hours.
Note: A derogation can be considered if a slaughter plant (inspected and approved for use under the HFAC standards) is not available within eight hours traveling distance from the farm.
- c. For distances over 3-4 hours, transport personnel must get animals wet as frequently as possible.
- d. Buffaloes must be separated according to sex, size, temperament, and family groups if any.

T 8: Records of transport

Producers must keep records of transport of animals off their farm, including:

- a. Date of transport;
- b. Number of animals transported and their destination;
- c. Trucking company; and
- d. Type of vehicle used;

Transportation by ship is prohibited.

T 9: Casualty animal transport

- a. A sick or injured ambulatory animal may only be transported:
 - 1. If it is being taken for veterinary treatment or to the nearest available place for humane slaughter; and
 - 2. If the said animal is suitable for loading, traveling, and unloading (can walk unassisted).
- b. No animal with a BCS of less than 2 (score 1-5; see FW5, Appendix 1) may be transported or leave the farm unless for veterinary treatment.

PART 7: SLAUGHTER

A: Slaughter procedures

S 1: Minimizing pre-slaughter handling

- a. Pre-slaughter animal handling must be kept to an absolute minimum.
- b. Handling must be calm and without causing any kind of unnecessary distress or discomfort.
- c. The use of shock equipment is prohibited, except in situations that pose a danger to other animals or their handlers.

S 2: Trained employees

People dealing with the slaughter of specific species must be rigorously trained and competent.

S 3: Slaughter systems

All slaughter systems must be designed and managed to ensure buffaloes are not caused unnecessary distress or discomfort.

- a. The slaughter plant must be inspected by a Humane Farm Animal Care's inspector to verify compliance with the North American Meat Institute (NAMI) transport and slaughter beef checklist, except for religious slaughter. NAMI Guidelines and checklists can be found at www.certifiedhumane.org under the Standard section.
- b. The slaughter of buffaloes without prior stunning appropriate to the species and age or size of the animal is prohibited.
- c. Special attention must be given to the stunning of buffaloes, especially adults. Captive bolt gun with 230 psi and 240 psi pressure must be used for better efficiency. A bolt longer than the one used in bovines should be placed between the horns, in the depression below the intercornual protuberance and above the nuchal ligament tissue attachment (SEE Appendix 8).
- d. Correct locations for stunning as well as gun calibration should be checked regularly by a properly trained professional.

Buffaloes have a thick skullcap due to the insertion and structure of the horns. Special attention should be given to older animals, which have well-developed horns.

S 4: For dairies that are not marketing their buffaloes as Certified Humane® Dairy meat, milk and milk products are the only products that carry the certification.

Once the farmer sells dairy buffaloes and they leave the farm, these animals are no longer certified and HFAC has no authority to track or monitor them.

PART 8: PROCESSING

A. Traceability

P 1: Processing systems

(Places where milk is processed into dairy products such as bottled milk, cheese, yogurt, ice cream, etc.)

- a. All systems that process milk from Certified Humane® farms must be inspected by HFAC for traceability to ensure that:
 1. Milk or dairy products from certified and non-certified farms are not mixed; and
 2. The Certified Humane Raised and Handled® logo is only present in the packaging of milk and dairy products whose raw material comes from Certified Humane® farms.
- b. Standards for processing systems are outlined in the Program Policy Manual, which can be found at www.certifiedhumane.org.

PART 9: APPENDICES

APPENDIX 1

Development of the body condition score system in Murrah buffaloes

BODY CONDITION SCORE	TAILHEAD TO PINS	SPINOUS PROCESSES OF LUMBAR VERTEBRAE	SPINOUS TO TRANSVERSE PROCESSES	TRANSVERSE PROCESSES	BETWEEN 12 TH AND 13 TH RIBS	SACRAL CREST	BETWEEN SACRAL CREST AND HOOKS	BETWEEN HOOKS AND PINS
1.0 (Emaciated)	bones extremely sharp with 'V' shaped cavity under tail	sharp individual processes	deep depression	distinct >1/2 length visible	severe depression	extremely sharp	severe depression	severe depression
1.5	'V' shaped cavity under tail	individual processes distinct	definite depression	1/2 length of the processes visible	prominent depression	sharp appearance	prominent depression	prominent depression
2.0 (Thin)	bones prominent, 'U' shaped cavity under tail	individual processes evident	clear depression	1/2 to 1/3 length of processes visible	definite depression	prominent convexity	definite depression	definite depression
2.5	evidence of fat under tail	sharp ridge	obvious depression	between 1/3 to 1/4 visible	moderate depression	definite convexity	moderate depression	thin fleshy covering
3.0 (Average)	bones smooth, shallow cavity under tail	prominent ridge	smooth concave curve	< 1/4 visible	depression evident	clear convex ridge	depression evident	depression evident
3.5	slight fat filled depression under tail	smooth ridge	smooth slope	distinct ridge, no individual processes discernable	slight depression	convexity evident	obvious depression	slight depression
4.0 (Fat)	bones rounded with fat	flat, spinous processes not evident	nearly flat	smooth rounded edge	flat in appearance	smooth appearance	slight depression	sloping
4.5	bones buried in fat	no spinous processes discernable	flat appearance	edge barely discernable	barely discernable	covered appearance	flat appearance	flat appearance
5.0 (Obese)	cavity filled with fat forming tissue folds	buried in fat	rounded appearance	buried in fat	rounded appearance	fat appearance	rounded appearance	rounded appearance

Fig. 1. Body condition scoring chart for Murrah and Graded Murrah buffaloes in a 1 to 5 scale using 0.5 increments.

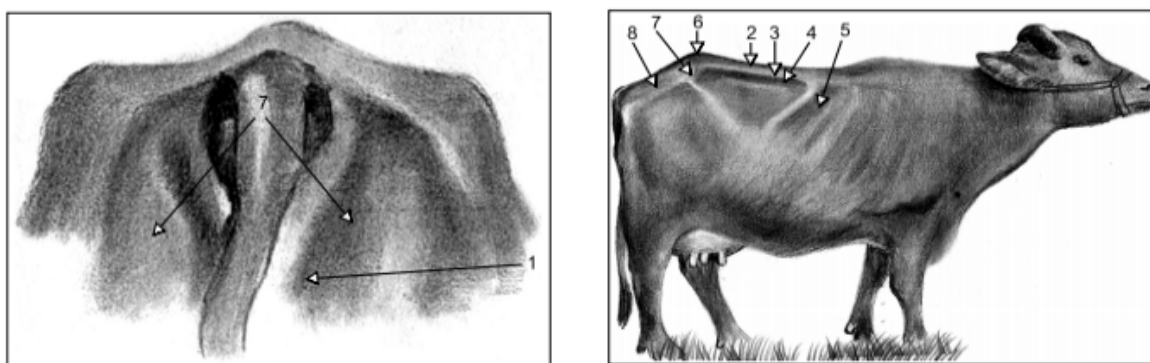


Fig. 2. Murrah buffalo showing the skeletal check points for body condition score. 1. Tail head to pins, 2. Spinous processes of the lumbar vertebrae, 3. Depression between the spinous and transverse processes, 4. Transverse processes of lumbar vertebrae, 5. Between 12th and 13th ribs, 6. Sacral crest, 7. Depression between sacral crest and hooks, 8. Depression between hooks and pins.

Source: Development of the body condition score system in Murrah buffaloes: validation through ultrasonic assessment of body fat reserves (Alapati et al., 2010).

https://www.researchgate.net/publication/41657139_Development_of_the_body_condition_score_system_in_Murrah_buffaloes_Validation_through_ultrasonic_assessment_of_body_fat_reserves/link/5b9f8543299bf13e6038124f/download

APPENDIX 2: Recommended Weaning Methods

Weaning time can be stressful for cows and calves. Under traditional weaning systems, changes in environment, diet composition, and pathogen exposure can reduce animal performance and result in health problems.

Fenceline weaning is a management system in which the calves are removed from their dams but are allowed to see, hear, and smell their dams. Depending on the fencing used, physical contact may also be possible. It has the potential to reduce stress related to transport, changes in environment, and diet adaptation. Fenceline weaning may also reduce labor demands and costs associated with drylot facilities.

Considerations:

1. Fencing should be substantial enough to prevent the calves from nursing and keep the cows and calves separated. Producers have used various combinations of electric and non-electric, and high-tensile, barbed, and woven wire fencing. For cattle that have not been exposed to electric fencing, either woven wire or at least 5 strands of electric fencing will likely be necessary. If the cattle are familiar with electric fencing, three strands will likely be sufficient. Yet another option is to utilize 4 to 5 strands of barbed wire combined with a single strand of electric fence offset from the main fence.
2. Pasture the cows and calves together in the pasture where the calves will be after weaning. One week in the pasture allows time for the calves to become familiar with the fences and water source. At weaning time, return the calves to the same pasture and move the cows to the adjoining pasture.
3. Some producers have found it useful to use a yearling or a cow without a calf in the weaning pasture to lead the calves to the water source.
4. Performance of the weaned calves is highly dependent on forage quality and quantity. Options to provide high quality forage in the weaning pasture are:
 - a. Graze early in the season and allow adequate re-growth prior to weaning,
 - b. Harvest hay and then graze at weaning time.
 - c. Plant ryegrass, small grains, or other annual forages to provide high quality forage.
5. Fenceline weaning fits well into a management system where maximize gain is not important (replacement heifer development or backgrounding calves).
6. The need for supplementation of calves weaned on pasture depends on forage quality and quantity and the desired average daily gain.

Sources: Hassan et al., 2019; [Strategies for easing the weaning process for beef calves | OSU Extension Service \(oregonstate.edu\)](#).

APPENDIX 3

WATER FOR LIVESTOCK

1. Guidelines for Consumption

(*Note* — these are average figures and there will be wide variation in practice depending on climate and the water content of feed.) As a guide buffalo require an additional 25-30% more water than these cattle figures.

Body weight (kg)	Average Water Consumption (litres per day)
50	6 - 7
70	7 - 9
90	10 - 11
120	14 - 16
150	18 - 20
190	20 - 25
350	25 - 35
450	35 - 45
540 to 730 (dry cows)	20 - 40
540 to 730 (lactating cows)	45 - 110

[Source: Tulloch, D.G. (1972). Some aspects of the ecology of the water buffalo in the NT. In: *A Collection of Papers Related to the Northern Territory Buffalo Industry*, pp. 18-28. (J.B.Moran and B.D. Ford, editors) Darwin:ASAP.]

Source: Australian Model Code of Practice for the Welfare of Animals. Farmed Buffalo (2003)
<http://www.publish.csiro.au/ebook/download/pdf/389>

APPENDIX 4

Chart 1: Weather Hazard Chart of Temperature Humidity Index (THI) values for cattle and buffalo Heat Stress thresholds

Temp	Humidity (%)																			
°C	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
24.0	66	67	67	68	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75
24.5	67	67	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75	76	76
25.0	67	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75	76	76	77
25.5	68	68	69	69	70	70	71	71	72	73	73	74	74	75	75	76	76	77	77	78
26.0	68	69	69	70	70	71	71	72	73	73	74	74	75	76	76	77	77	78	78	79
26.5	69	69	70	70	71	72	72	73	74	74	75	75	76	76	77	78	78	79	79	80
27.0	69	70	70	71	72	72	73	73	74	75	75	76	77	77	78	78	79	80	80	81
27.5	69	70	71	71	72	73	73	74	75	75	76	77	77	78	79	79	80	81	81	82
28.5	70	71	71	72	73	73	74	75	75	76	77	78	78	79	80	80	81	82	82	83
29.0	70	71	72	72	73	74	75	75	76	77	78	78	79	80	80	81	82	83	83	84
29.5	71	72	72	73	74	75	75	76	77	78	78	79	80	81	81	82	83	84	84	85
30.0	71	72	73	74	74	75	76	77	78	78	79	80	81	81	82	83	84	85	85	86
30.5	72	73	73	74	75	76	77	77	78	79	80	81	81	82	83	84	85	85	86	87
31.0	72	73	74	75	76	76	77	78	79	80	81	81	82	83	84	85	86	86	87	88
31.5	73	74	75	75	76	77	78	79	80	80	81	82	83	84	85	86	86	87	88	89
32.0	73	74	75	76	77	78	79	79	80	81	82	83	84	85	86	86	87	88	89	90
33.0	74	75	76	76	77	78	79	80	81	82	83	84	85	86	86	87	88	89	90	91
33.5	74	75	76	77	78	79	80	81	82	83	84	85	85	86	87	88	89	90	91	92
34.0	75	76	77	78	79	80	80	81	82	83	85	85	85	87	88	89	90	91	92	93
34.5	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
35.0	76	77	78	79	80	81	82	83	84	85	85	87	88	89	90	91	92	93	94	95
35.5	76	77	78	79	80	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96
36.0	77	78	79	80	81	82	83	84	85	86	87	88	89	91	92	93	94	95	96	97
36.5	77	78	80	80	82	83	83	85	86	87	88	89	90	91	92	93	94	95	96	98
37.0	78	79	80	81	82	83	84	85	87	88	89	90	91	92	93	94	95	96	98	
38.0	78	79	81	82	83	84	85	85	87	88	90	91	92	93	94	95	96	98		
38.5	79	80	81	82	83	84	85	87	88	89	90	92	93	94	95	96	98			
39.0	79	80	82	83	84	85	86	87	89	90	91	92	94	95	96	97	98			
39.5	79	81	82	83	84	86	87	88	89	91	92	93	94	96	97	98				
40.0	80	81	83	84	85	86	88	89	90	91	93	94	95	96	98					
40.5	80	82	83	84	86	87	88	89	91	92	93	95	96	97	99					

Unstressed Mild stress Moderate/Serious Severe stress

Source: Management of Australian Water Buffalo in South-East Asian Cattle Feedlots (Foulkes, 2019).
https://dpiir.nt.gov.au/data/assets/pdf_file/0010/658954/management-water-buffalo-south-east-asia-EN.pdf

APPENDIX 5: Hygiene Scoring Chart



Scoring Guide

Lower leg

The scoring system aims to track the amount of manure present and the distance it extends proximally up the leg.

Score 1 is little or no manure above the coronary band. Score 2 is minor splashing above the coronary band. Score 3 is distinct plaques of manure above the coronary band, but with leg hair visible. Score 4 is a solid plaque of manure extending high up the leg.

Typically stanchion / tie stall cows have clean legs and freestall cows have a high degree of leg contamination from walking through manure filled alleyways.

Upper

Observe the udder from the rear and the side if possible. The presence of visible manure near the teats is a risk factor for udder infection. Score 1 is no manure present. Score 2 is minor splashing of manure near the teats. Score 3 is distinct plaques of manure on the lower half of the udder and Score 4 is confluent plaques of manure encrusted on and around the teats.

Manure may be transferred to the udder either by lying on a filthy surface or by resting the udder on a manure contaminated lower leg.

Upper leg and Flank

Score 1 is no manure. Score 2 is minor splashing of manure. Score 3 is distinct plaques of manure with hair showing through and Score 4 is confluent plaques of manure.

This zone maybe contaminated either by lying on a filthy surface as would occur in a poorly managed stanchion barn stall, or by a manure encrusted tail swishing around the rump area.

Source: Hygiene Scoring Color Chart (Cook, 2002).

<https://www.vetmed.wisc.edu/fapm/clinical-info/>

APPENDIX 6

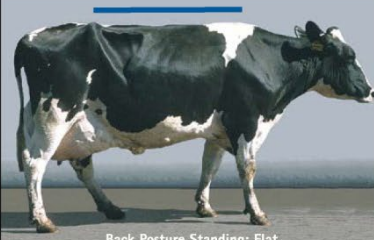
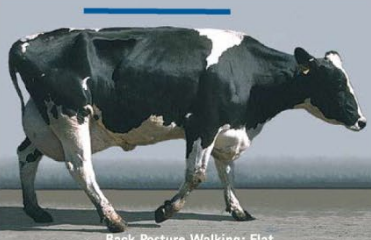
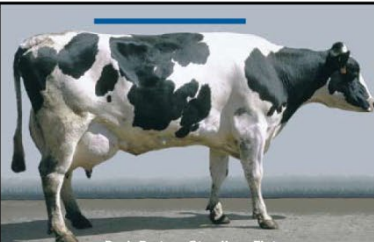
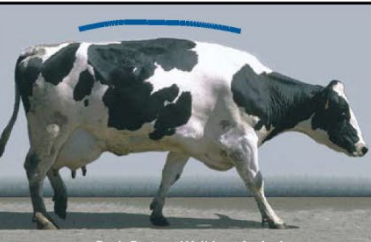




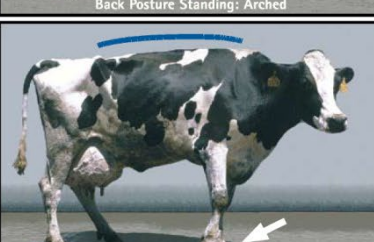
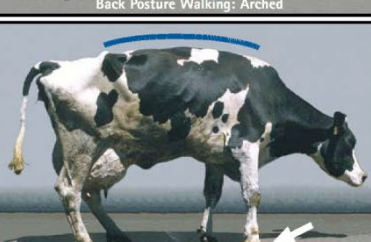


LOCOMOTION SCORING OF DAIRY CATTLE*

Locomotion scoring is based on the observation of cows standing and walking (gait), with special emphasis on their back posture. This system is intuitive and, therefore, easy to learn and implement. Use of locomotion scoring is effective for early detection of claw (hoof) disorders, monitoring prevalence of lameness, comparing the incidence and severity of lameness between herds and identifying individual cows for functional claw (hoof) trimming.

Animal observations should be made on a flat surface that provides good footing for cows. Cows scoring 2 or 3 should be examined and trimmed to prevent more serious problems. Trimming should be done by a competent trimmer with the goal of returning the claws to functional weight bearing and conformation.



<p>Locomotion Score 1</p> <p>Clinical Description: Normal</p> <p>Description: Stands and walks normally with a level back. Makes long confident strides.</p>	 <p>Back Posture Standing: Flat</p>	 <p>Back Posture Walking: Flat</p>
<p>Locomotion Score 2</p> <p>Clinical Description: Mildly Lamé</p> <p>Description: Stands with flat back, but arches when walks. Gait is slightly abnormal.</p>	 <p>Back Posture Standing: Flat</p>	 <p>Back Posture Walking: Arched</p>
<p>Locomotion Score 3</p> <p>Clinical Description: Moderately Lamé</p> <p>Description: Stands and walks with an arched back and short strides with one or more legs. Slight sinking of dew-claws in limb opposite to the affected limb may be evident.</p>	 <p>Back Posture Standing: Arched</p>	 <p>Back Posture Walking: Arched</p>
<p>Locomotion Score 4</p> <p>Clinical Description: Lamé</p> <p>Description: Arched back standing and walking. Favoring one or more limbs but can still bear some weight on them. Sinking of the dew-claws is evident in the limb opposite to the affected limb.</p>	 <p>Back Posture Standing: Arched</p>	 <p>Back Posture Walking: Arched</p>
<p>Locomotion Score 5</p> <p>Clinical Description: Severely Lamé</p> <p>Description: Pronounced arching of back. Reluctant to move, with almost complete weight transfer off the affected limb.</p>	 <p>Back Posture Standing: Arched</p>	 <p>Back Posture Walking: Arched</p>

* Adapted from Sprecher, D.J.; Hostetler, D.E.; Kaneene, J.B. 1997. Theriogenology 47:1178-1187 and contribution from Cook, N.B., University of Wisconsin.

APPENDIX 7

Pain Management in Calves and Cattle
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Castration and dehorning are painful, but necessary husbandry procedures. Castration is necessary to reduce injuries in cattle associated with aggression and mounting behavior in males. It is also necessary to prevent mis-mating by genetically inferior males. Dehorning is required to avoid injury to animals and humans. Not all cattle have horns, but those that do quickly learn that they have a distinct advantage over their polled counterparts in battles over dominance. So, the question regarding castration and dehorning is not should we perform these procedures; but how should we perform them in a way that minimizes pain and distress to the animals?

Careful adherence to the procedures outlined in the Beef, Dairy and Young Dairy Beef standards will minimize the pain and discomfort associated with these important management practices. However, when conditions arise that make it necessary to implement pain management beyond local anesthesia, participants of the Certified Humane program should be cognizant of the following.

At the present time there are no drugs labeled for the control of pain in cattle. For example, Flunixin Meglumine (Banamine) is a non-steroidal drug labeled as having anti-pyretic (fever reducing) and anti-inflammatory activity in cattle, but it is not an analgesic (capable of providing pain relief). Furthermore, according to the label directions, Banamine is for intravenous use only. To use it for pain in cattle or by any other route than intravenously constitutes extra-label use of this drug (ELDU) which until passage of the Animal Medicinal Drug Use Clarification Act (AMDUCA) in 1996 was illegal. AMDUCA amended the Federal Food, Drug, and Cosmetic Act, legalizing extra-label drug use by and under the order of a licensed veterinarian within the context of a valid veterinarian-client-patient relationship. So, what does this mean? In short, it means that the use of Banamine or Meloxicam or any other drug used for pain that is not specifically labeled for use in cattle or for this purpose (i.e. ELDU) in the United States requires strict adherence to the provisions of AMDUCA which include the following:

Extra-label drug use (ELDU):

- Is permitted only by or under the supervision of a veterinarian.
- Is allowed only for FDA approved animal and human drugs.
- Requires a valid Veterinarian/Client/Patient Relationship as a prerequisite for all ELDU.
- Is for therapeutic purposes only (when the animal's health is threatened). It does not apply to drugs for production use.
- Rules apply to dosage form drugs and drugs administered in water. ELDU in feed is prohibited.
- Is not permitted if it results in a violative food residue, or any residue which may present a risk to public health.
- FDA prohibition of a specific ELDU precludes such use.

When and if these conditions can be met, ELDU is permissible provided that the accurate records of the animals treated are maintained according to the following:

In addition, strict record-keeping of ELDU is required:

- Identify the animals, either as individuals or a group.
- Animal species treated.
- Numbers of animals treated.
- Conditions being treated.
- The established name of the drug and active ingredient.
- Dosage prescribed or used.
- Duration of treatment.
- Specified withdrawal, withholding, or discard time(s), if applicable, for meat, milk, eggs, or animal-derived food.
- Keep records for 2 years.
- FDA may have access to these records to estimate risk to public health.

Finally, whenever drugs are used in an ELDU manner, the bottle or drug container must include the following information on the label:

- Name and address of the prescribing veterinarian.
- Established name of the drug.
- Any specified directions for use including the class/species or identification of the animal or herd, flock, pen, lot, or other group; the dosage frequency, and route of administration; and the duration of therapy.
- Any cautionary statements.
- Your specified withdrawal, withholding, or discard time for meat, milk, eggs, or any other food.

In summary, castration and dehorning are health management procedures that cause discomfort in cattle. Conducting them at the earliest age practicable should be a primary objective. In those infrequent situations where these procedures may need to be conducted in older calves, pain management options should be considered keeping in mind that use of unapproved drugs must follow the AMDUCA regulations. Meloxicam tablets administered orally at the rate of 0.45 mg/lb (1 mg/kg) are reported to be a cost-effective means of providing analgesia in cattle. In European countries where Meloxicam is approved a 15-day meat and 5-day withdrawal time for milk is recommended. Flunixin meglumine used as an anti-inflammatory in post-surgical conditions provides limited analgesia. It is important that if used for reducing inflammation that it be administered intravenously, otherwise it constitutes ELDU. The use of Flunixin meglumine by the intramuscular route causes significant damage to tissues at the injection site and may significantly alter withdrawal times for meat and milk. Persons considering ELDU should work closely with their veterinarians for appropriate guidance in the safe and proper use of drugs in livestock.

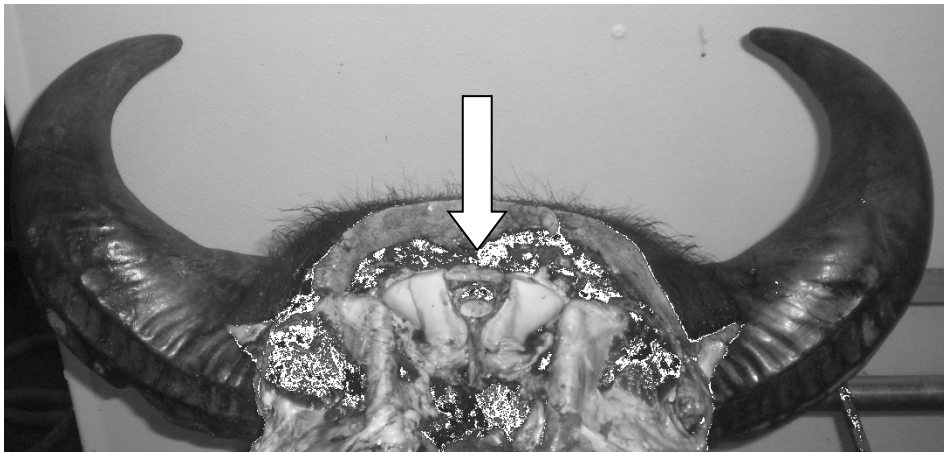
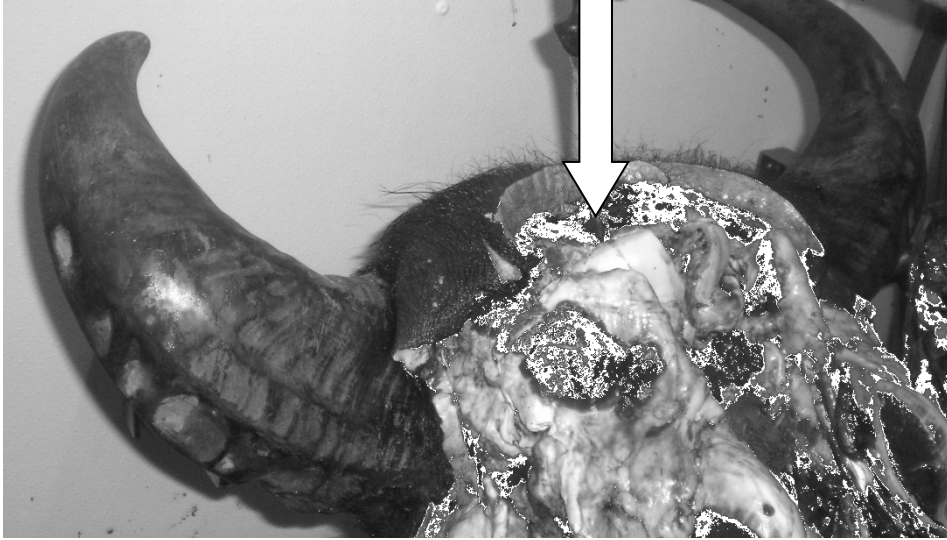
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APPENDIX 8: Stunning

Positioning of the stunner between the horns according to Gregory et al., 2009
<https://pubmed.ncbi.nlm.nih.gov/22063979/>



Photos: Modified by Erika Voogd, 2020.

KNOCKING

The knocking box is where the animal is stunned or despatched and should be well lit and not a dark hole that the animal will be hesitant to enter. There should be a perceived escape route for the buffalo, a "light at the end of the tunnel", so that force is not required to enter the box facing a blank wall. It is usually easier to move a buffalo forward if there is one in front to follow. The buffalo should not be held in the knocking box for any more than one minute before despatch.

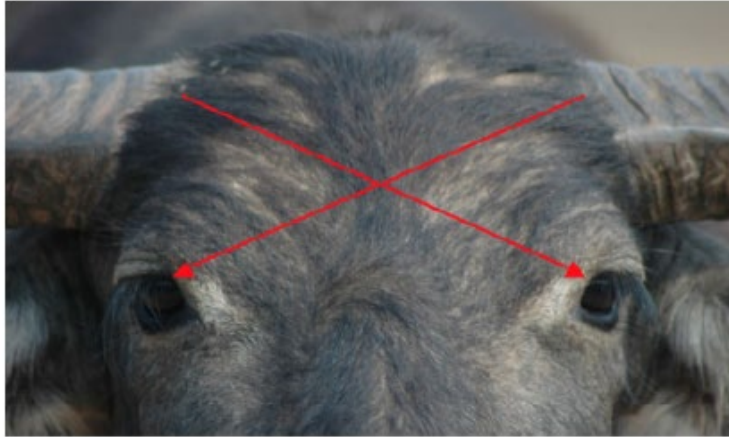


Figure 7.3 Aiming position for rifle for a clean despatch. A penetrating bolt stunner is more likely to be effective in the poll position (behind the skull).

Knocking is most often carried out with a rifle as a captive bolt pistol requires a much heavier charge than for an equally aged or sized cattle cow. The skull structure is much heavier than cattle and skin thickness much greater. The captive bolt pistol is less effective the larger the animal. Percussion stunners are also not effective in larger buffalo without using very heavy loads. There is currently work being done by CSIRO to study stunning in buffalo to develop an effective Halal method, particularly for overseas exports. The current theory is that poll stunning is more likely to be an effective method than frontal stunning. In the Northern Territory experience over many years, it has been found that a .22 magnum calibre rifle using solid projectiles is adequate for most animals up to 450 kg liveweight in the frontal position. For older cows and particularly big bulls, a bigger calibre and power projectile is necessary and a .223 was found to be effective in all cases.

The aiming point is similar to cattle and is the bisection of two diagonal lines from the eye sockets to the base of the opposite horn.

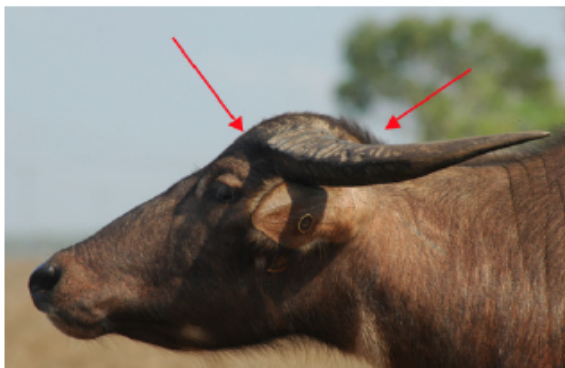


Figure 7.4 Angle of penetration for frontal rifle projectile or alternative poll shot.

Source: The Australian Water Buffalo Manual (Lemcke, 2017)

<https://www.agrifutures.com.au/wp-content/uploads/publications/17-003.pdf>

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