Guidelines

for

Type Classification

of

Cattle and Buffalo

National Dairy Development Board

Anand, Gujarat

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1. Foreword

Traits that support higher level of milk production or the ones that increase animal's ability for longer productive life are very important to breed future dairy cows and buffaloes. Traditionally, the farmers in India had been placing emphasis on selection of good functional characters in animals. However, over the time the emphasis on functional characteristics got diluted. This document is an effort to help the organisations work on re-introducing the body characters, which are functionally important in dairy cattle and buffaloes in Indian dairy systems.

The physical appearance of animal in terms of all body characteristics that are associated with productivity and fertility of animal is termed as **Type** and the traits that collectively define the type of an animal are termed as **Type Traits**. Classification of animals on the basis of their type traits is termed as **Type Classification** or **Scoring**.

Current programmes for selection of dairy animals in India primarily focus on the milk production potential of dairy animals, and very less weightage/ no weightage is given to type traits. However, while animals are selected for milk production, one has to ensure that the body of the animal is able to sustain high level of production, else the efforts could be counter-productive. Selection solely based on milk yield may provide short term gains, but is prone to problems, which include, but not limited to, reduced feed conversion efficiency, mastitis, locomotion problems, dystocia and infertility and all these problems affect life-time production performance of the animal.

Type classification for functional traits is required to be included in breed improvement programmes to facilitate selection of dams and sires to produce the next generation animals. Type classification is done on linear scales in the form of scores for standard type traits. Type traits are usually moderate to highly heritable and many type traits are also correlated on varying degree with production traits. They are often correlated with each other. This means selection of animals on a particular type trait also impacts production as well as concerned correlated traits. These attributes of type traits make it possible to select and improve type traits at a much rapid pace than production and fertility traits.

Type classification of dairy animals can also aid in decision making related to purchase, breeding, culling and sale of animals as well as selection of mates.

2. The purpose

The system proposed here for measurement of type traits is **Linear scoring** as recommended by International Committee for Animal Recording (ICAR).

The proposed system has the following advantages:

- Mostly, the scoring is based on measurements rather than opinions/ visual judgement.
- Traits are scored individually.
- Scores cover a biological range.
- Variation within traits is identifiable.
- Degree rather than desirability is recorded.

In addition to production and reproduction records available from various Progeny Testing (PT) projects, type traits add value in evaluation and selection of animals based on a composite index. Giving weightage to type traits in selection of animals would improve the longevity of animals. Owing to high heritability of most of type traits, as mentioned earlier, it is also possible to realize faster improvement in these traits.

Thus, with the objective to implement animal type classification, the guidelines have been formulated, based on which the type classification of animals shall be carried out by various PT projects.

3. Standard traits

The standard traits to be considered during type classification are furnished below. They are divided into five major categories:

a) Dairy strength:
    - Stature
    - Heart girth
    - Body length
    - Body depth
    - Angularity
b) Rump:
    - Rump angle
    - Rump width
c) Feet and legs:
    - Rear legs set
    - Rear legs rear view
    - Foot angle

d) Udder:

- Fore udder attachment
- Rear udder height
- Central ligament
- Udder depth
- Front teat placement
- Teat length
- Rear teat placement
- Rear udder width
- Teat thickness

e) General:

- Body condition score

4. Eligibility criteria for animals

It is recommended that female animals should be type classified in first lactation between 30 to 90 days after calving with at least one milk record in INAPH.

Type classification should be done during daytime 5 hours after morning milk recording; udder parameters preferably one hour before evening milk recording.

5. Tools for type classification

Tools to be used for measurement of objective (measurable) traits are mentioned below:

i. Retractable measuring tape with levelling bubble and telescoping rod-like attachment
ii. Angularity goniometer
iii. Measuring tape
iv. Circumference measuring device

Table 1 mentions the use of instruments for objective traits.

Subjective assessment shall be followed for scoring of Rear Legs Set, Rear Legs Rear View, Foot Angle, Fore Udder Attachment, Central Ligament, Front Teat Placement, Rear Teat Placement and Body Condition Score.

Table 1: Instruments to be used for type classification for objective traits

Trait	Instrument
Stature	Retractable measuring tape with levelling bubble and telescoping rod-like attachment (Figure 2)
Rump Angle	
Udder Depth	
Body Depth	Measuring tape
Body Length	
Heart Girth	
Rump Width	
Rear Udder Height	
Teat Length	
Rear Udder Width	
Teat Thickness	Circumference measuring device (Figure 3)
Angularity	Angularity goniometer (Figure 4)

6. Methodologies for type classification

An animal to be type classified should be standing on a levelled surface and should be in a comfortable normal setting, preferably along with its herd mates and owner. Restraining of animals should be avoided as far as possible as it may make the animal tense, the condition which may affect measurement results and scoring of many type traits. Animals that are suffering from any type of congenital or acquired abnormalities should not be scored. Scoring of animals immediately after calving should also be avoided.

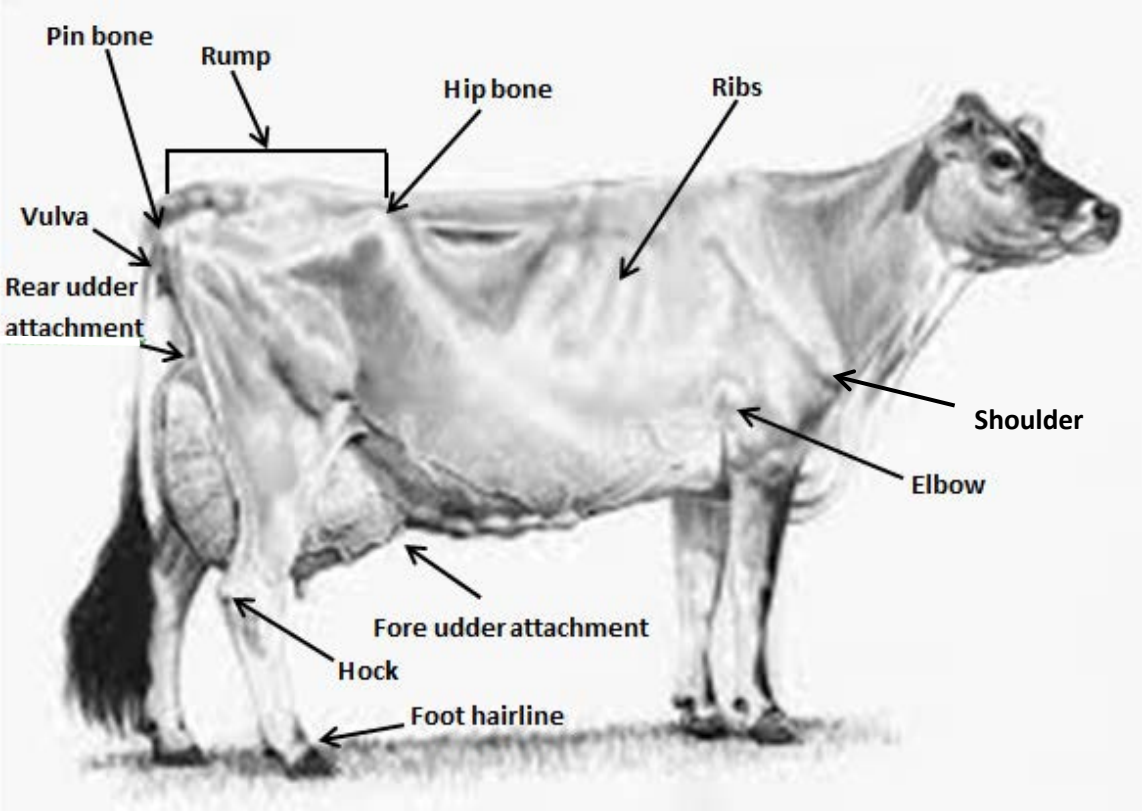
Figure 1 provides general information of critical points of reference applicable for type classification. Annex I describes, with the aid of images, methodology for measuring the type traits. The images clarify the mid-point along with biological extremes. Scores attached to each trait are on 1 – 9 range. Reference points have been highlighted to indicate clear location of the trait concerned. A short description on the measurement is also provided.

7. Information system

A scorecard to be used for type classification is provided at Annex II. Information related to village name, farmer name, animal tag no./name, date of birth of animal, lactation number and date of calving should be captured preliminary to scoring. Name of the classifier and date of classification must also be captured for reference.

Type classification data should be captured through the Information Network for Animal Productivity and Health (INAPH) application using netbooks/ notebooks/ desktops (depending on the facility and coverage availability).

Figure 1: Sketch showing important reference points and body parts for dairy cattle



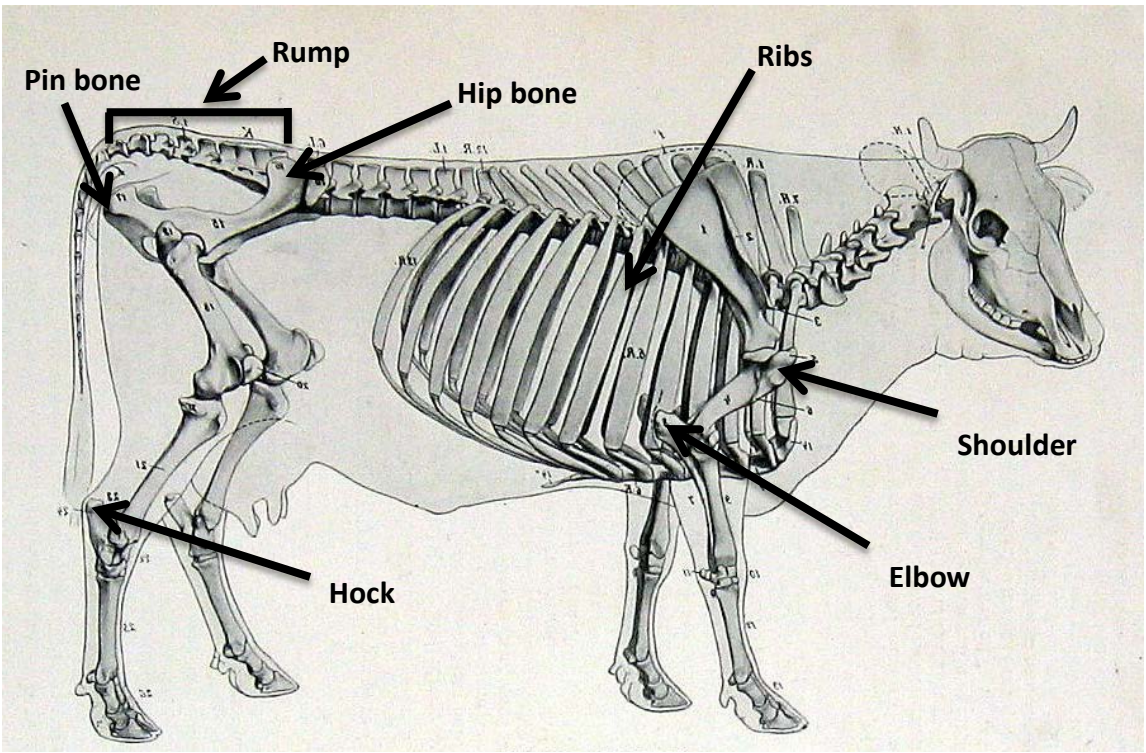


Figure 2: Retractable measuring tape with levelling bubble and telescoping rod-like attachment

Figure 3: Circumference measuring device

Figure 4: Angularity goniometer

Annex I: Methodology for type classification

1. Stature

Reference points: Measured from top of the spine in between hips (red spot) to the ground. Handling and alignment of measuring tape has been shown in the figures below.

1 Short
5 Intermediate
9 Tall

2. Heart Girth

Reference area: Circumference of thorax at the point of elbow.

1 Narrow
5 Intermediate
9 Wide

3. Body Length

Reference points: Measured between point of shoulder and pin bone.

1 Short
5 Intermediate
9 Long

4. Body Depth

Reference points: To be measured as distance between top of spine and bottom of barrel at last rib independent of stature. This would be full body girth at the deepest point of barrel i.e. at last rib.

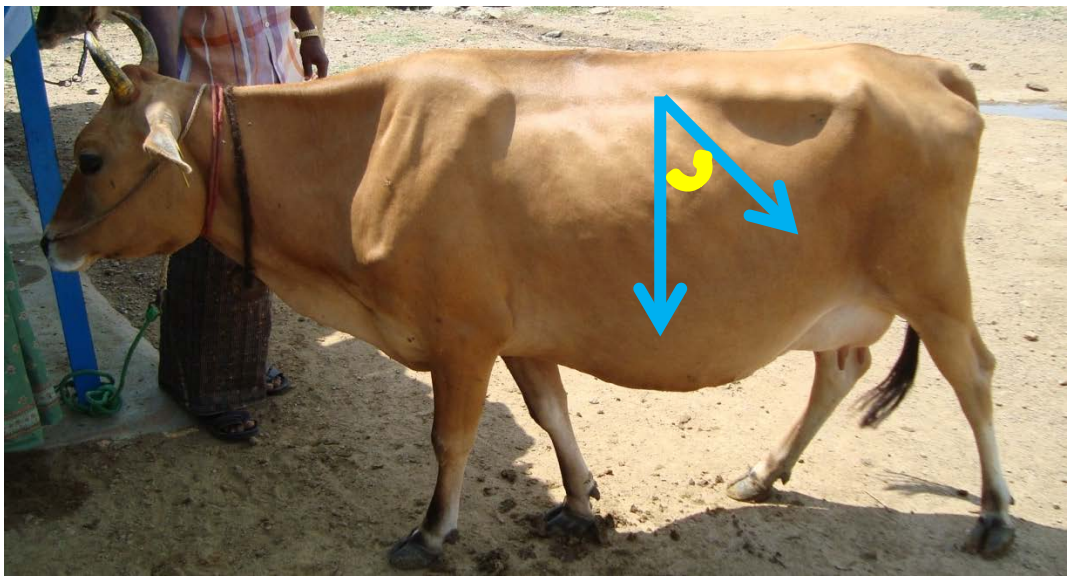
Score 1: Shallow

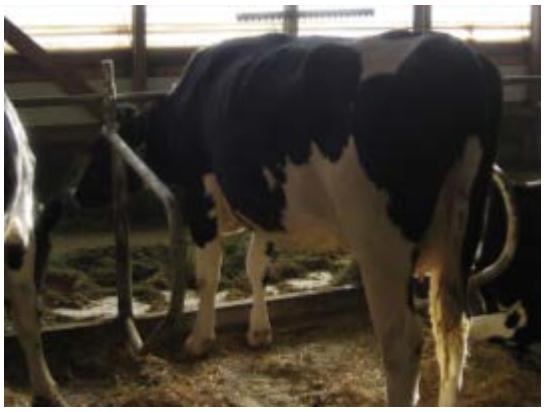
Score 5: Intermediate

Score 9: Deep

5. Angularity

Reference points: The angle formed by two imaginary lines - one perpendicular to the floor and the other through the last rib, as shown in figure below (blue lines are the imaginary lines and yellow curved line depicts the angle to be measured). The arm of the instrument with levelling bubble should be positioned on the perpendicular imaginary line to the floor, while the second arm should be adjusted to the other imaginary line through the last rib.





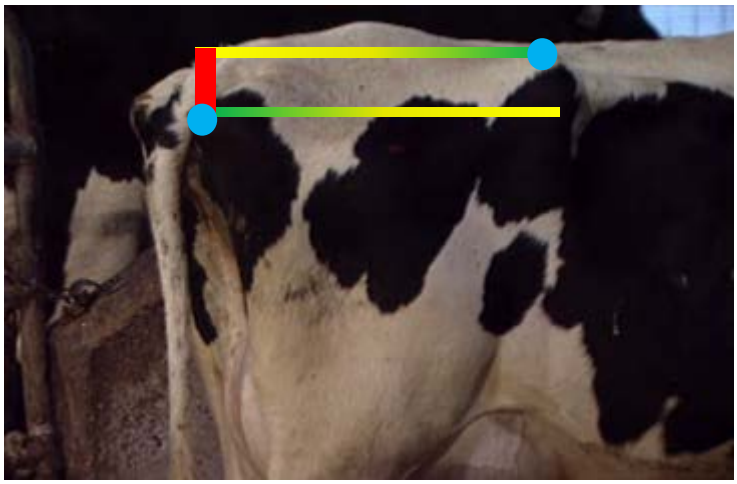
Score 1: Non-angular

Score 5: Intermediate

Score 9: Angular

6. Rump Angle

Reference points: Measured as angle of the rump from hips to pins. Two straight imaginary lines (yellow lines) may be assumed each from point of hip and uppermost point of pin (blue dots), and distance between them could be considered (red line). If pin bone is below hip bone, measure is positive; if vice versa, it is negative.



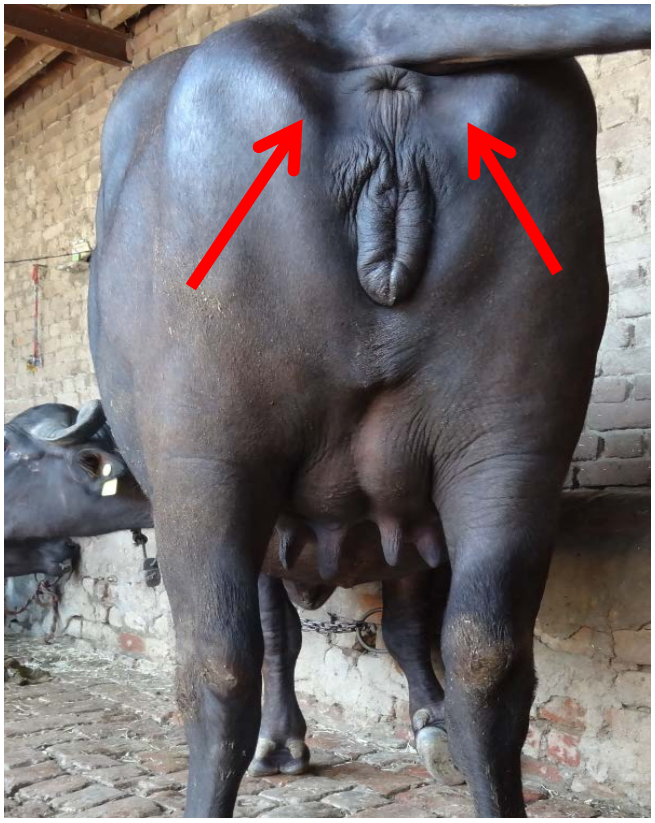
Score 1: High

Score 5: Intermediate

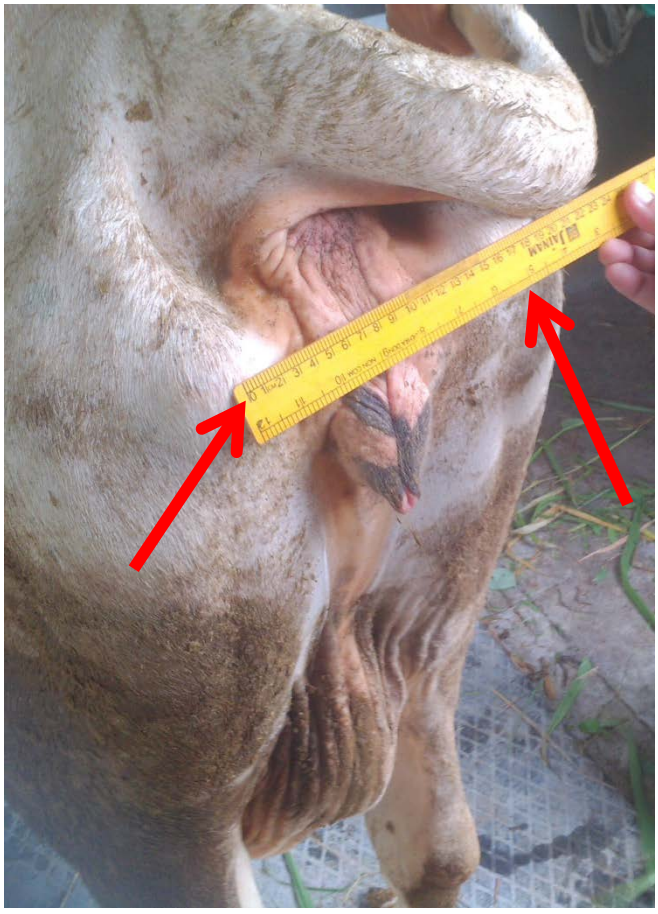
Score 9: Low

7. Rump Width

Reference points: The distance between the most posterior point of pin bones (distance between the marks pointed by red arrows below).



Reference points: Buffalo



Reference points: Cattle

Score 1: Narrow

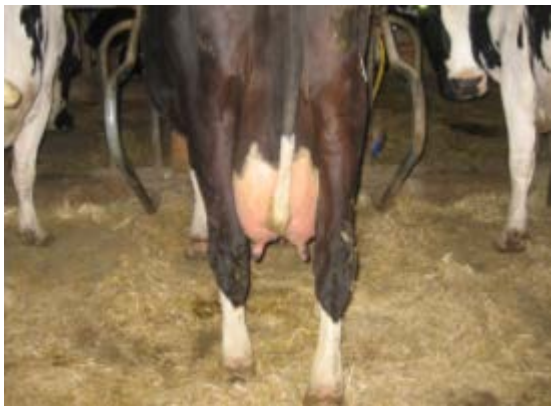
Score 5: Intermediate

Score 9: Wide

8. Rear Legs Rear View

Reference points: Direction of the rear feet when viewed from the rear.

Score 1: Hocked-in

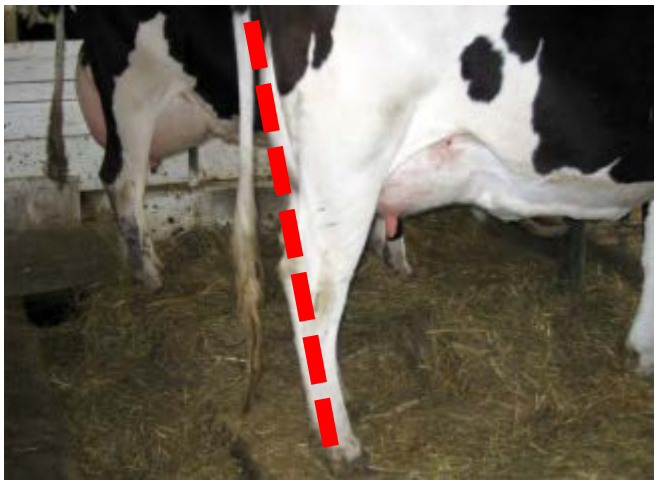


Score 5: Intermediate

Score 9: Straight

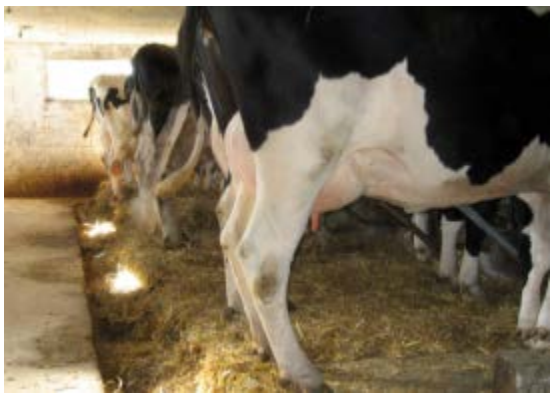
9. Rear Legs Set

Reference points: Angle measured at the front of the hock. An easy way would be subjective evaluation by assuming an imaginary line passing foot through hock (red line).



Score 1: Straight

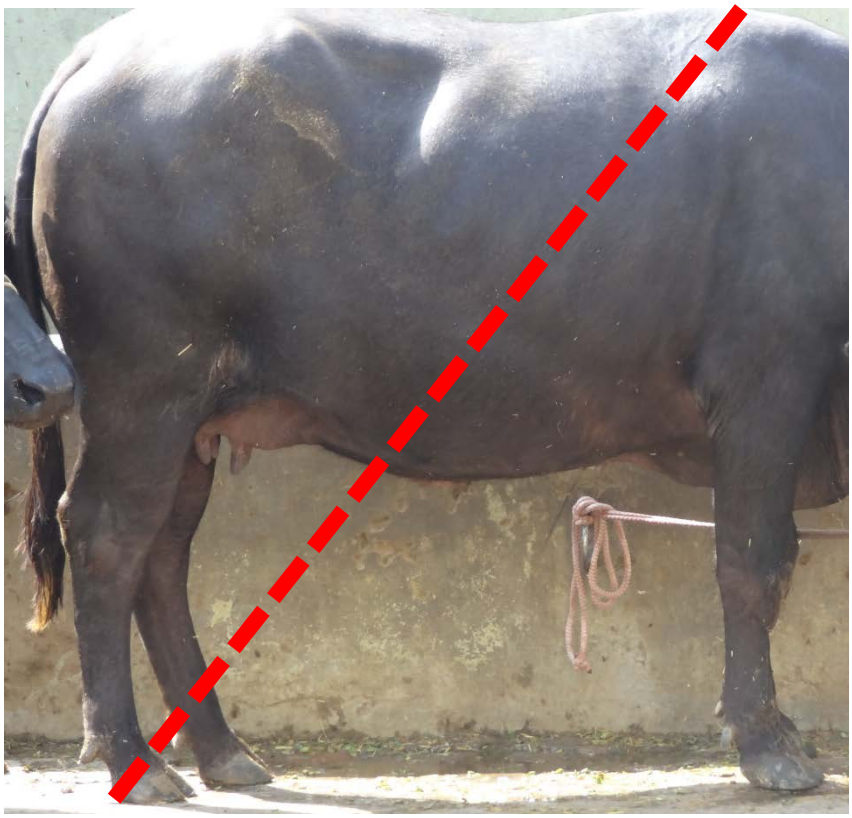
Score 5: Intermediate



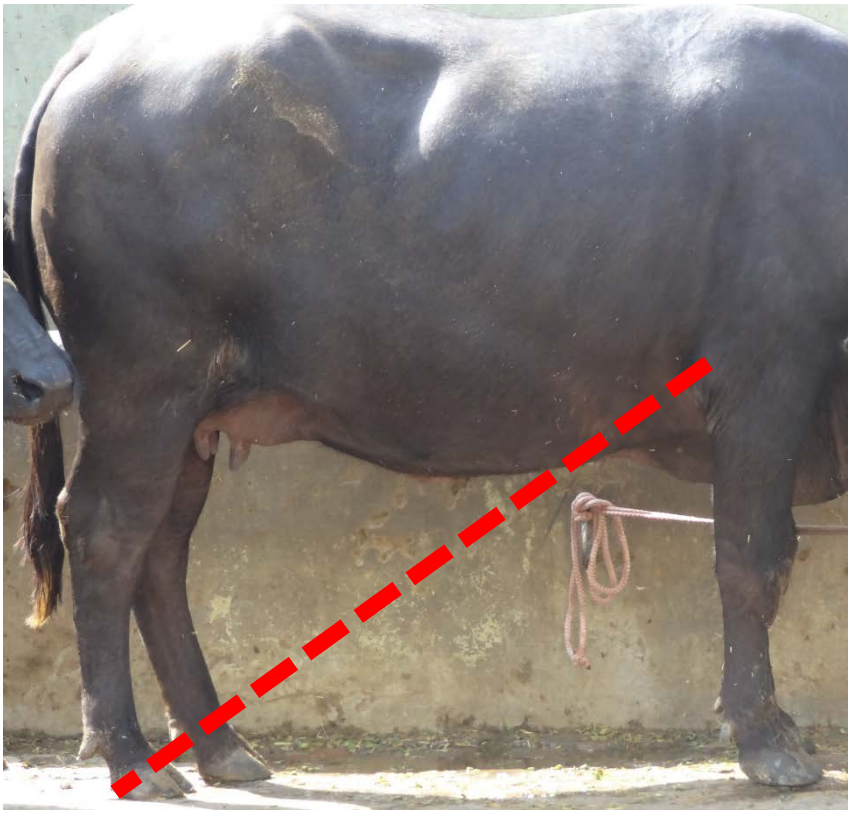
Score 9: Curved

10. Foot Angle

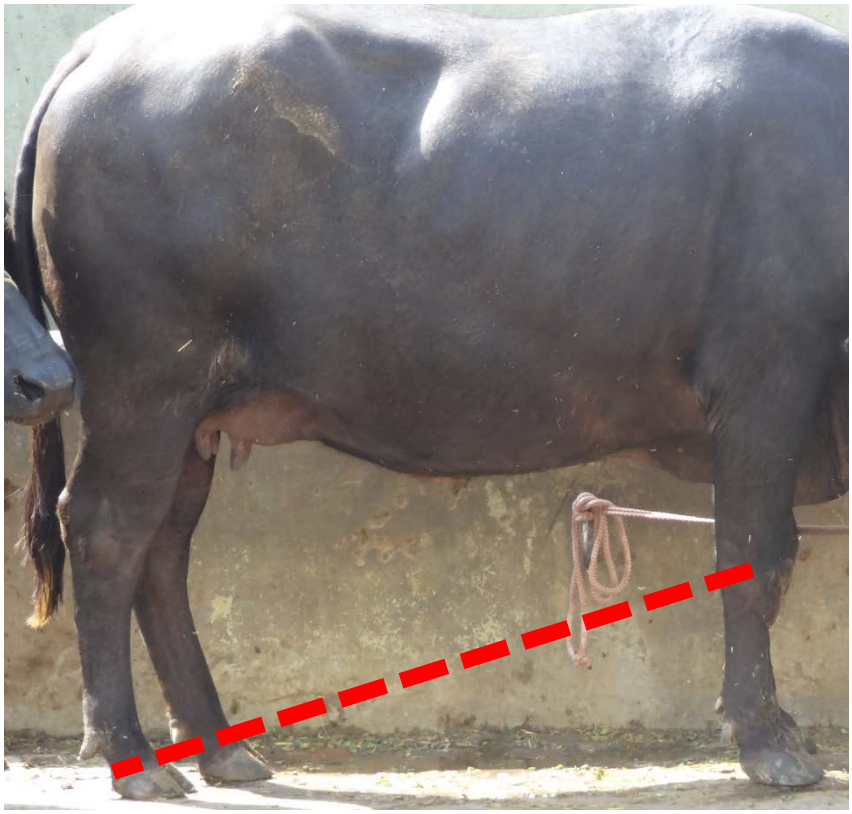
Reference points: Angle at the front of the rear hoof measured from the floor to the hairline at the right hoof. If visibility problem arises, subjective evaluation by an imaginary line (red line) through the hairline may be opted for.



Score 1: Low



Score 5: Intermediate



Score 9: Steep

11. Fore Udder Attachment

Reference points: The strength of attachment of the fore udder to the abdominal wall.

Score 1: Weak

Score 5: Intermediate

Score 9: Strong

12. Front Teat Placement

Reference points: The position of the front teat from centre of quarter as viewed from the rear.

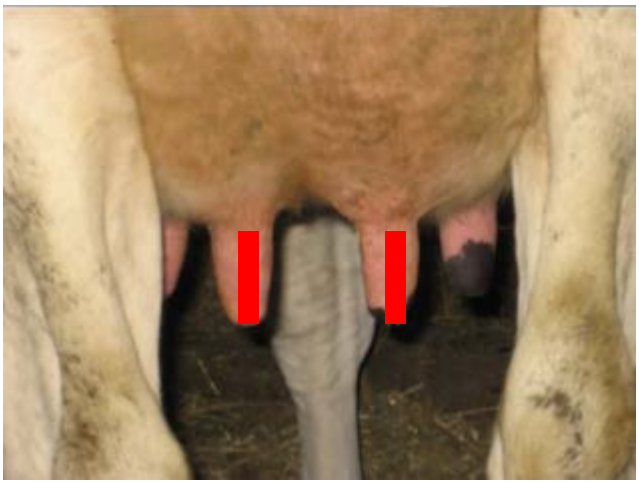
Score 1: Wide

Score 5: Intermediate

Score 9: Close

13. Teat Length

Reference points: The length of the left front teat for cattle and left rear teat for buffalo.



Score 1: Short

Score 5: Intermediate

Score 9: Long

14. Udder Depth

Reference points: The distance (red line) from the lowest part of the udder floor to an imaginary line through the hock (yellow line).

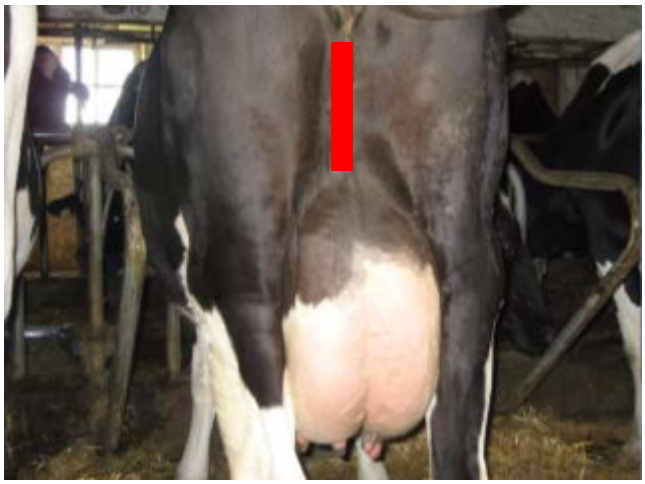
Score 1: Deep

Score 5: Intermediate

Score 9: Shallow

15. Rear Udder Height

Reference points: The distance between the bottom of the vulva and rear point of attachment of mammary gland.



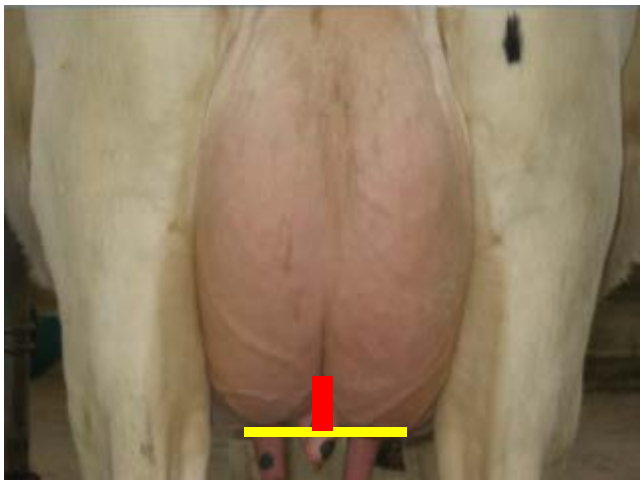
Score 1: Low

Score 5: Intermediate

Score 9: High

16. Central Ligament

Reference points: The depth of cleft, measured at the base of the rear udder.



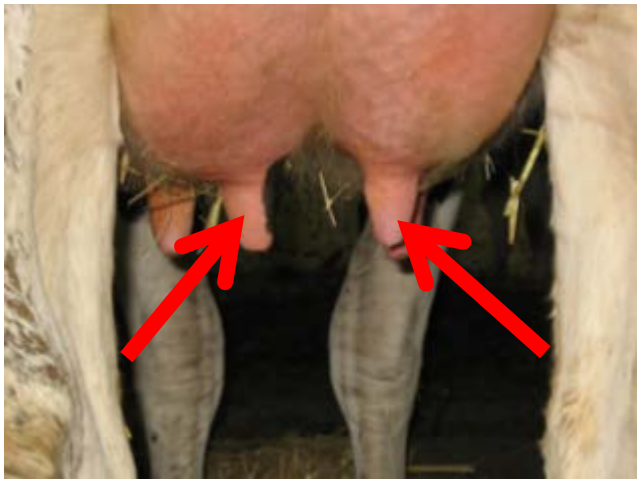
Score 1: Weak

Score 5: Intermediate

Score 9: Strong

17. Rear Teat Placement

Reference Points: The position of the rear teat from centre of quarter.



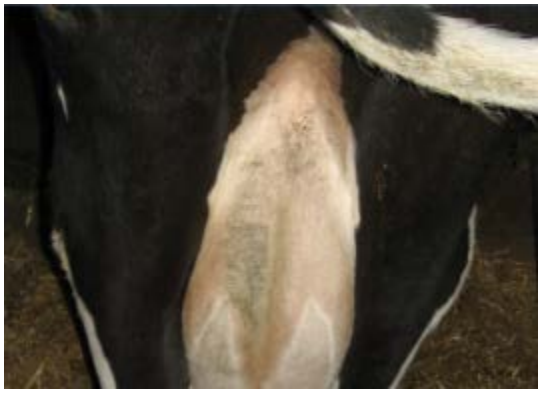
Score 1: Wide

Score 5: Intermediate

Score 9: Close

18. Rear Udder Width

Reference points: Width at the position where mammary gland is attached to the body at the rear.



Score 1: Narrow

Score 5: Intermediate

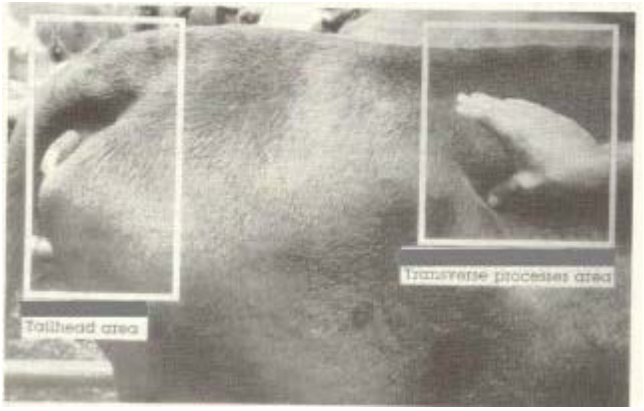
Score 9: Wide

19. Teat Thickness:

Teat thickness should be measured by Vernier caliper at the middle of the left front teat in cattle and left rear teat in buffalo.

20. Body Condition Score

Body condition scoring is concerned with two specific areas for assessment of fat covers. One is the loin area (between hip bone and last rib) which consists spinous and transverse processes of lumbar vertebrae and the other area is tail head and pin bones (shown in figure below).



Score Description

1. **Very thin (Emaciated):** Animal markedly emaciated; bone structure easily seen over body; little muscle present; animal weak, lethargic.
2. **Thin:** Animal emaciated; individual spinous processes, ribs, hooks (tuber coxae), pins (tuber ischii), shoulder blades and spine all prominent, sharply defined; some muscle development; neck thin; prominent withers; shoulders sharply angular. Area around the tail-head completely sunken.
3. **Less thin:** Vertebral column prominent and individual spinous processes can be felt; little fat, but superspinous muscle over spinous processes apparent; ribs, pins (tuber ischii) and hooks (tuber coxae) prominent; loin area and rump concave; little muscle or fat covering over withers and shoulders.
4. **Less than moderate:** Vertebral column prominent and individual spinous processes can be felt; little fat, but superspinous muscle over spinous processes apparent; ribs, pins (tuber ischii) and hooks (tuber coxae) prominent; loin area and rump concave; little muscle or fat covering over withers and shoulders.
5. **Moderate:** Superspinous muscles developed and readily apparent; vertebral column can be felt; hooks (tuber coxae) rounded; rump rounded, convex; pins (tuber ischii) not visible; some fat can be felt in shoulder area region and at base of neck; can feel ribs, but not visible.

6. **More than moderate:** Cannot feel spinous processes easily; back becoming flat well covered; rump convex and well muscled; some fat can be felt on neck, base of neck and shoulder area; neck filled into shoulder; hooks (tuber coxae) just visible.
7. **Less fat:** Back flat; cannot feel spinous processes; hooks (tuber coxae) just visible; fat on neck and shoulder area beginning to expand over ribs; flanks filling, neck thickening.
8. **Fat:** Animal appears well covered with body rounded with fat and bones not discernible; flanks filled, broad back.
9. **Very fat (obese):** Bones buried in fat; back broad or flat, in some cases crease along the backbone; large accumulations of fat on neck, over shoulder area and ribs; flank filled with fat.

Annex II: Type evaluation format

Village Name		**Farmer Name**	
Animal Tag No.		**Date of Birth**	
Lactation No.		**Date of calving**	
Classification Date		**Classified by**	

Section	Trait	Score										Measure (cm)
Strength	Stature	Short	1	2	3	4	5	6	7	8	9	Tall	
	Heart Girth	Narrow	1	2	3	4	5	6	7	8	9	Wide	
	Body Length	Short	1	2	3	4	5	6	7	8	9	Long	
	Body Depth	Shallow	1	2	3	4	5	6	7	8	9	Deep	
	Angularity	Non-angular	1	2	3	4	5	6	7	8	9	Angular	
Rump	Rump Angle	High	1	2	3	4	5	6	7	8	9	Low	
	Rump Width	Narrow	1	2	3	4	5	6	7	8	9	Wide	
Feet and Leg	Rear Legs Set	Straight	1	2	3	4	5	6	7	8	9	Curved	
	Rear Legs Rear View	Hocked-in	1	2	3	4	5	6	7	8	9	Straight	
	Foot Angle	Low	1	2	3	4	5	6	7	8	9	Steep	
Udder	Fore Udder Attachment	Weak	1	2	3	4	5	6	7	8	9	Strong	
	Rear Udder Height	Low	1	2	3	4	5	6	7	8	9	High	
	Central Ligament	Weak	1	2	3	4	5	6	7	8	9	Strong	
	Udder Depth	Deep	1	2	3	4	5	6	7	8	9	Shallow	
	Front Teat Placement	Wide	1	2	3	4	5	6	7	8	9	Close	
	Teat Length	Short	1	2	3	4	5	6	7	8	9	Long	
	Rear Teat Placement	Wide	1	2	3	4	5	6	7	8	9	Close	
	Rear udder width	Narrow	1	2	3	4	5	6	7	8	9	Wide	
	Teat thickness	Thin	1	2	3	4	5	6	7	8	9	Thick	
General	Body condition score	Thin	1	2	3	4	5	6	7	8	9	Fatty	