Original Research Article

Breeding, Calf and Health Management Practices Opted by Buffalo Owners in Junagadh and Porbandar Districts of Gujarat: A Comparative Study

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ABSTRACT

The study was conducted in Junagadh and Porbandar districts of Gujarat to compare breeding, calf and health management practices opted by buffalo owners (n=300). Majority of farmers practiced natural service (59%), late heat for insemination (76.34%), pregnancy diagnosis (90%) and treatment of anoestrous/repeaters buffaloes (90.33%). Most of respondents attended calving and took care of calves after parturition (98%) and cleaned calves (93.67%). However, few farmers practiced ligation/ cutting and disinfection of navel cord (14.33%) and feeding colostrum to calf (33.33%). Such above managemental practices varied between Junagadh and Porbandar districts (P ≤0.05). Majority of owners dewormed their calves (71.67%), allowed to suckle (77%) one teat (91.33%) and offered greens (96.67%) or concentrate (94.67%) to calves at 3 months of age. Majority of respondents practiced vaccination (84.67%) particularly F.M.D. (68.67%), but few farmers dewormed their animals (11%). Buffalo owners cleaned water trough/ manger on every day in most cases (59.67%), but cleaned the shed on every alternate day (47.67%). Cleaning practices of waterer/ manger and shed differed statistically between the two districts (P ≤0.05). Majority of owners isolate sick buffaloes (87.67%), used medicine for ectoparasites (80.67%), washed hind quarter after placenta expulsion (93%) and called livestock inspector to treat their buffaloes (55.33%). Calling livestock inspector or veterinary doctors for treatment of buffaloes varied in both districts (P ≤0.05). Metabolic disorder was major problem in buffaloes (50.33%). Comparatively more number of owners in Porbandar reported reproductive problems but in less instance metabolic disorder than Junagadh district (P ≤0.05). Above results indicated that farmers were aware about different breeding, calf and health care management practices. Further, certain managerial practices also differed markedly between Junagadh and Porbandar districts.

Keywords
Breeding, calf, health, management, buffaloes

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Introduction

India is leading the world in terms of milk production since 1998 and produced 165.4 million tonnes milk with per capita availability of milk 335g during 2016-17. Buffalo shared about 49.2% of the total milk produced in India (Anonyms, 2018). Buffaloes not only contributed significantly to national milk pail of the country but also have great demand for
meat owing to banning of cattle slaughter. Buffaloes also efficiently utilize the poor
quality crop residues and convert to milk and meat as compared to cattle (El-serafy, 1991).
Calves are considered as future replacement stock of herd. Hence, proper care and
management could result a healthy replacement stock in a dairy farm. It has been
reported that calf management as well as health care practices of dam play significant
role on calf morbidity and mortality (Pal et al., 2016, Patbandha et al., 2017). Previous field
studies in Gujarat revealed that farmers were aware about some aspects of calf management
practices with wide variation from one part to another part of the state (Chaudhary et al.,
2016, Divekar et al., 2016, Sabapara et al., 2015, Patbandha et al., 2017). In dairy
buffaloes the production could be sustainable only when they remain healthy. Proper care
and preventive measures could reduce the risk of disease outbreak or the negative impact on
productivity due to disease (Kumar, 2015).

However, owing to money constraint or ignorance, some farmers treat their animals at
home by paravets or traditional means (Sabapara, 2014) which incurred huge production and economic loss. Similar to calf management, the health care management of
dairy animals varies in different parts of Gujarat as cited by different authors (Sabapara,
2014, Divekar et al., 2016). The present experiment was designed to compare
calf managerial and health care practices followed by the buffalo owners in Junagadh
and Porbandar districts of Gujarat.

Materials and Methods

The study was conducted in Junagadh and Porbandar districts of south-west Gujarat
during Jan-2017 to Feb-2018. Large number of farmers in this area reared buffaloes as well
as the researcher was also familiar to the area, hence selected purposefully. Five talukas, 2
from Porbandar (Porbandar and Kutiyana) and 3 from Junagadh (Keshod, Mangrol and
Manavadar), six villages from each taluka and 10 respondents from each village were
selected randomly with total sample size of 300. The respondents selected were evenly
distributed in the village and true representative of animal management practices prevailing in the study area. Information related to calf management and
health care practices were collected using a pre-designed structured interview schedule.
The interview schedule was prepared based on review of literatures and consultation with
experts. The information related to buffalo calf management and health care management
was collected.

Statistical analysis

Collected data were compiled, tabulated and presented as frequency and percent for better
interpretation. The parameters between the two districts (Junagadh and Porbandar) were
compared by chi-square test and considered as significant if P≤0.05.

Results and Discussion

Breeding management practices

Breeding management practices opted by the buffalo owners in Junagadh and Porbandar
districts are depicted in Table 1. The different managerial practices related to buffalo
breeding were similar between two districts. In the study area, overall majority of farmers
practiced natural service (59%) and rest used artificial insemination. In Junagadh and
Porbandar about 60.56 and 59% farmers practiced traditional natural service using the
village bull which is comparable to Patel et al., (2005), who found that 63% cases natural
service practiced by the farmers. However, Sunil et al., (2011) reported higher number of
respondents practising natural service.
On an average 76.34% respondents reported that late heat is the best time for insemination, with 72.78 and 81.67%, respectively in Junagadh and Porbandar districts. These findings are in contrary with Khadda et al., (2017) who found that 82.08% cent inseminate their buffaloes at mid heat. Moreover, Rangamma et al., (2016) reported that 67.67% respondents followed AM-PM rule for insemination of buffaloes. In both Junagadh and Porbandar, majority of farmers preferred pregnancy diagnosis for confirmation of pregnancy (89.44 and 90.83%, respectively) and the overall value was 90%. These findings are comparable with other studies on dairy buffaloes (Singh et al., 2015, Rangamma et al., 2016). Farmers on an average 90.33% cases treated anoestrous/repeaters buffaloes which comprised of 87.78 and 94.17% in Junagadh and Porbandar district, respectively. The results are comparatively higher than Rangamma et al., (2016), who observed that 68% farmers adopted treatment practices for anoestrous/repeaters buffaloes. Additionally, Sunil et al., (2011) who found that only 5% farmers treated their milch animals for anestrous and repeat breeding problem.

### Calf rearing practices

The buffalo calf rearing practices opted by dairy farmers in Junagadh and Porbandar districts are presented in Table 2. About 98% respondents attended calving and took care of the calves after parturition in the study area which differed significantly between Junagadh and Porbandar districts (99.45 vs. 95.83%, P ≤ 0.05). The results are inconsonance with previous researchers (Bais and Singh, 2013, Sabapara et al., 2015 and Kumar and Mishra, 2011), who reported presence of 95.33-100% farmers at the time of parturition. Though majority of buffalo owners in Junagadh and Porbandar districts cleaned calves after calving, there was marked variation of such practices between the two districts (96.67 vs. 89.17%, P ≤ 0.05) and the overall value was 93.67%. These findings are supported by the others (Bais and Singh, 2013, Sabapara et al., 2015 and Kumar and Mishra, 2011).

The results indicated that 95.56 and 70.83% respondents, respectively in Junagadh and Porbandar districts did not practice ligation/cutting and disinfection of the navel cord with overall value 85.67%. Such calf management activity differed statistically between the two districts (Table 2). The results are similar to the reports of Yadav et al., (2016) and Godara et al., (2017) but contrary to Bais and Singh, 2013, Sabapara et al., 2015. The variation of results in different studies might be associated with the regional variation or the knowledge level of respondents.

Majority of respondents (66.67%) did not feed colostrum to new born calves within 1-2 hours after calving in the study area and such practice differed statistically between the two districts i.e. 61.11 and 75%, respectively in Junagadh and Porbandar district (P ≤ 0.05). On the other hand, very less number of buffalo owners fed colostrum to calves within the recommended time of 1-2 hours soon after birth (Table 2). There was significant difference between Junagadh and Porbandar district in relation to feeding of colostrum to new born calf with time (38.89% vs. 25%, P ≤ 0.05). These results are in accordance with study of Kushwaha et al., (2007) and Maousami et al., (2013). However, Sabapara et al., (2015) reported that majority of respondents (97%) in South Gujarat offered colostrum to calves which might be attributed to their knowledge level on importance of feeding colostrum.

In this study, managerial practices like deworming of calves, weaning age of calves, number of teats allowed for suckling and age
at which greens or concentrated offered to calves were similar between the two districts (Table 2). In Junagadh district majority of respondents (72.22%) dewormed calves regularly. Similarly, in Porbandar 70.83% respondents dewormed calves regularly and the overall value was 71.67%. These results are in accordance with study of Rathore and Kachwaha (2009) and Godara et al., (2017). Contrary to our result, Sabapara et al., (2015) cited that about 48.76 and 40.67%, respectively farmers dewormed their caves regularly and occasionally.

In both Junagadh and Porbandar districts majority of buffalo owners allowed the calf to suckle their dam till natural weaning (72.22 and 76.67%, respectively), but in few cases the farmers weaned the calves (Table 2). Moreover, overall 77 per cent respondents allowed the calf to suckle their dam followed by 20.33% respondents practiced weaning of calf at the age of more than 3 months of age followed by 1.67 and 1%, respectively weaned the calf at 2 and 3 months of age.

These results are in accordance with study of Kushwaha et al., (2007). Majority of respondents (93.89%) allowed suckling of calf to one teat of their dam and remaining 6.11% allowed two teats of dam in Junagadh district. However, in Porbandar, 87.5% buffalo owners allowed to suckle calf only one teat of their dam followed by 12.5% allowed two teats of their dam to suckle. Overall 91.33% respondents allowed to suckle calf to one teat of their dam followed by 8.67 allowed two teats of their dam. These findings are supported by Yadav et al., (2016) and Sabapara et al., (2015).

In the study area, overall 96.67 and 94.67%, respectively buffalo owners started offering greens and concentrate when the calves attend 3 months of age. In both Junagadh and Porbandar district about 96.67% respondents started offering greens to calves at the age of 3 months. Similarly, initial offering of concentrate to calves started at the age of 3 months in both the districts as reported by majority of buffalo owners (96.67 and 91.67%, respectively in Junagadh and Porbandar district). However, very few farmers started offering greens and concentrate to the calves within 1-2 month of age (Table 2). Comparatively more number of farmers offered concentrate to calves in Porbandar district than the Junagadh district at the age of 2 months (8.33 vs. 2.22, Table 2). These findings are well supported by Yadav et al., (2016) but contrary to Sabapara et al., (2015). Sabapara et al., (2015) reported that majority of farmers did not offer concentrate to calves (97.33%) and offered greens to calves at the age of 2 months (82.33%).

**Health management practices**

Informations related to health management practices opted by the buffalo owners in Junagadh and Porbandar districts are depicted in Table 3. Though the central and state government is putting much emphasis on vaccination of bovines for prevention of infectious diseases, cent per cent farmers were not following the vaccination program. About 84.67% farmers followed vaccination program for their animals which comprised of 85.56 and 83.33%, respectively in Junagadh and Porbandar districts. The results indicated that in Junagadh district 70% buffalo owners practiced vaccination against F.M.D disease followed by 15.56% owners against H.S; while in Porbandar district 66.66% practiced vaccination against F.M.D disease followed by 16.67% against H.S. Overall 68.67% buffalo owners practiced vaccination against F.M.D disease followed by 16% owners against H.S in the study area. These findings are comparable with previous studies carried out on buffalo owners (Kumar, 2015, Vranda et al., 2017).
Table 1 Distribution of the buffalo owners according to breeding practices (n=300)

| Sr. no. | Particulars                           | Junagadh     | Porbandar    | Overall       | χ² - Value |
|--------|--------------------------------------|--------------|--------------|---------------|------------|
| 1      | Method of Breeding                   |              |              |               |            |
|        | Natural                              | 60.56(109)   | 56.67(68)    | 59.00(177)    | 0.450      |
|        | A.I.                                 | 39.44(71)    | 43.33(52)    | 41.00(123)    |            |
| 2      | Stage of estrus for insemination/ service |              |              |               |            |
|        | Early heat                           | 6.11(11)     | 1.67(2)      | 4.33(13)      | 3.431      |
|        | Mid heat                             | 21.11(38)    | 16.67(20)    | 19.33(58)     | 0.912      |
|        | Late heat                            | 72.78(131)   | 81.67(98)    | 76.34(229)    | 3.149      |
| 3      | Pregnancy diagnosis                  |              |              |               |            |
|        | Yes                                  | 89.44(161)   | 90.83(109)   | 90.00(270)    | 0.154      |
|        | No                                   | 10.56(19)    | 9.67(11)     | 10.00(30)     |            |
| 4      | Treatment of anoestrous/repeaters    |              |              |               |            |
|        | Yes                                  | 87.78(158)   | 94.17(113)   | 93.33(271)    | 3.366      |
|        | No                                   | 12.22(22)    | 5.83(7)      | 6.67(29)      |            |

Values within parenthesis indicate frequency.

Table 2 Distribution of the buffalo owners according to calf rearing practices (n=300)

| Sr. no. | Particulars                                      | Junagadh     | Porbandar    | Overall       | Chi square value |
|--------|-------------------------------------------------|--------------|--------------|---------------|-----------------|
| 1      | Attended calving and took care of calves after parturition |              |              |               | 4.790⁵          |
|        | Yes                                             | 99.45(179)   | 95.83(115)   | 98.00(294)    |                 |
|        | No                                              | 0.33(1)      | 4.16(5)      | 2.00(6)       |                 |
| 2      | Cleaning calf after parturition                  |              |              |               | 6.827³          |
|        | Yes                                             | 96.67(174)   | 89.17(107)   | 93.67(281)    |                 |
|        | No                                              | 3.33(6)      | 10.83(13)    | 6.33(19)      |                 |
| 3      | Practiced ligation/ cutting and disinfection of navel cord |              |              |               | 35.838⁵         |
|        | Yes                                             | 4.44(8)      | 29.17(35)    | 14.33(43)     |                 |
|        | No                                              | 95.56(172)   | 70.83(85)    | 85.67(257)    |                 |
| 4      | Feeding of colostrum to new born calf within 1-2 hours |              |              |               | 6.250⁵          |
|        | Yes                                             | 38.89(70)    | 25.00(30)    | 33.33(100)    |                 |
|        | No                                              | 61.11(110)   | 75.00(90)    | 66.67(200)    |                 |
| 5      | Deworming of calves                              |              |              |               | 0.068           |
|        | Yes                                             | 72.22(130)   | 70.83(85)    | 71.67(215)    |                 |
|        | No                                              | 27.78(50)    | 29.17(35)    | 28.33(85)     |                 |
| 6      | Weaning calves at the age of                    |              |              |               | 0.168           |
|        | Calf allowed to suckle                          | 77.22(139)   | 76.67(92)    | 77.00(231)    |                 |
|        | 2 months                                        | 0.56(1)      | 3.33(4)      | 1.67(5)       | 3.390           |
|        | 3 months                                        | 1.11(2)      | 0.83(1)      | 1.00(3)       | 0.056           |
|        | > 3 months                                      | 21.11(38)    | 19.17(23)    | 20.33(61)     | 0.168           |
| 7      | Number of teats allowed for suckling             |              |              |               | 3.713           |
|        | One teat                                        | 93.89(169)   | 87.5(105)    | 91.33(274)    |                 |
|        | Two teats                                       | 6.11(11)     | 12.5(15)     | 8.67(26)      |                 |
| 8      | Started giving green fodder after attaining age of |              |              |               | 0.380           |
|        | 1 month                                         | 1.66(3)      | 0.83(1)      | 1.33(4)       |                 |
|        | 2 months                                        | 1.67(3)      | 2.5(3)       | 2.00(6)       | 0.255           |
|        | 3 months                                        | 96.67(174)   | 96.67(116)   | 96.67(290)    | 0.000           |
| 9      | Started giving concentrate after attaining age of |              |              |               | 6.044⁴          |
|        | 1 month                                         | 1.11(2)      | 0(0)         | 0.67(2)       | 1.342           |
|        | 2 months                                        | 2.22(4)      | 8.33(10)     | 4.66(14)      |                 |
|        | 3 months                                        | 96.67(174)   | 91.67(111)   | 94.67(284)    | 0.168           |

Values within parenthesis indicate frequency. S - significant (P≤0.05)
### Table 3 Distribution of buffalo owners according to health management practices (n=300)

| Sr. no. | Particulars                              | Junagadh | Porbandar | Overall | \(\chi^2\) - Value |
|---------|------------------------------------------|----------|-----------|---------|------------------|
| 1       | Vaccination of animals                    |          |           |         |                  |
|         | Yes                                      | 85.56(154) | 83.33(100) | 84.67(254) | 3.120            |
|         | No                                       | 14.44(26)  | 16.67(20)  | 15.33(46)  |                  |
| 2       | If yes which disease                      |          |           |         |                  |
|         | F.M.D.                                   | 70.00(126) | 66.66(80)  | 68.67(206) | 0.372            |
|         | H.S                                      | 15.56(28)  | 16.67(20)  | 16.00(48)  | 0.066            |
|         | No                                       | 14.44(26)  | 16.67(20)  | 15.33(46)  | 0.274            |
| 3       | Deworming of buffaloes                   |          |           |         |                  |
|         | Yes                                      | 9.44(17)   | 13.33(16)  | 11.00(33)  | 1.112            |
|         | No                                       | 90.56(163) | 86.67(104) | 89.00(267) |                  |
| 4       | Cleaning interval of water trough and mangers |          |           |         |                  |
|         | Daily                                    | 59.44(107) | 60.00(72)  | 59.67(179) | 0.009            |
|         | Alternate day                            | 12.78(23)  | 30.00(36)  | 19.67(59)  | 13.517S          |
|         | Weekly                                   | 27.78(50)  | 10.00(12)  | 20.66(62)  | 13.897S          |
| 5       | Cleaning interval of animal shed          |          |           |         |                  |
|         | Daily                                    | 17.78(32)  | 30.83(37)  | 23.00(69)  | 6.930            |
|         | Alternate day                            | 40.55(73)  | 58.34(36)  | 47.67(143) | 9.122S           |
|         | Weekly                                   | 41.67(75)  | 10.83(13)  | 29.33(88)  | 33.022S          |
| 6       | Isolation of sick animals from healthy ones |        |           |         |                  |
|         | Yes                                      | 85.00(153) | 91.67(110) | 87.67(263) | 2.960            |
|         | No                                       | 15.00(27)  | 8.33(10)   | 12.33(37)  |                  |
| 7       | Practices to control ecto-parasites       |          |           |         |                  |
|         | Yes                                      | 78.89(142) | 83.33(100) | 80.67(242) | 0.912            |
|         | No                                       | 21.11(58)  | 16.67(20)  | 19.33(58)  |                  |
| 8       | Wash of hind quarters after drop of placenta |        |           |         |                  |
|         | Yes                                      | 94.44(170) | 90.83(109) | 93.00(279) | 1.442            |
|         | No                                       | 5.56(10)   | 9.17(11)   | 7.00(21)   |                  |
| 9       | Treatment of Sick animal                  |          |           |         |                  |
|         | Using local empirical knowledge           | 5.00(9)   | 4.17(5)   | 4.67(14)   | 0.112            |
|         | Livestock inspector                      | 66.67(120)| 38.33(46) | 55.33(166) | 23.386S          |
|         | Veterinary doctor                         | 28.33(51) | 57.5(109)  | 40.00(120) | 25.521S          |
| 10      | Diseases occurrence                      |          |           |         |                  |
|         | Reproductive                             | 12.78(24) | 23.33(28) | 17.33(52)  | 5.025S           |
|         | Mastitis                                 | 30.00(54) | 35.83(36) | 32.33(97)  | 1.120            |
|         | Metabolic                                | 56.67(102)| 40.84(49) | 50.33(151) | 7.737S           |

Values within parenthesis indicate frequency, S - significant (P≤0.05)

Further, Tewari et al., (2018) observed that 91.50% dairy farmers practiced regular vaccination of their animals against diseases like F.M.D. and H.S. The results are contrary to Singh et al., (2007), who reported that 46% farmers practiced vaccination against H.S. Majority of respondents (89.00%) did not deworm their buffaloes which included 90.56
and 86.67% in Junagadh and Porbandar districts, respectively. In a similar line, Meena et al., (2008) and Kumar (2015) observed that 11.7-13.75% of farmers practiced deworming and majority did not carry out deworming of animals. It was contrary to findings of Tewari et al., (2018), who indicated that that only 55% respondents practiced deworming at regular interval for their milch animals.

In this study, overall majority of respondents (59.67%) cleaned water trough and mangers on daily basis, whereas they cleaned animal shed on alternate day (47.67%). Daily cleaning of water trough and mangers by the buffalo owners was almost similar between the two districts (59.44 and 60%, in Junagadh and Porbandar districts respectively). However, cleaning of water trough/ manger on every alternate day and on every week showed marked variation between the two districts (Table 3). In Junagadh less number of respondents reported cleaning of water trough/ mangers on every alternate day (30 vs. 12.78%), but more number cleaned on weekly basis (10 vs. 27.78%) as compared to Porbandar district. These results are in accordance with Sreedhar et al., (2017). However, the results are contrary to Rathore et al., (2010), who observed that dairy farmers cleaned waterer/ manger in majority cases on weekly basis (78%).

In Junagadh district, 41.67% of farmers cleaned animal shed at weekly interval followed by 40.55% on alternative day and 12.78% on daily basis. On the other hand, 58.34, 30.83 and 10.83% buffalo owners respectively cleaned the animal shed on every alternate day, daily basis and weekly intervals in Porbandar district. Cleaning practices of animal shed on every alternate day and on every week varied between the two districts (Table 3). These results are contrary to findings of Rathore et al., (2010), who reported that 91.5% and remaining on alternate day. Sreedhar et al., (2017) also reported daily cleaning of animal shed by majority of farmers (59.17%) followed by every alternate day (25.83%) and weekly (15%).

In both the districts, majority of respondents isolated their sick buffaloes from healthy herd (85% in Junagadh and 91.67% in Porbandar) and the overall value was 87.67%. These findings are supported by Khadda et al., (2017), who reported that 63.75% of the buffalo keeper isolated their sick animals from healthy herd, while Kumar (2015) observed that isolation of sick animals was practiced by 20% farmers only. About 78.89 and 83.33% respondents, respectively practiced to control ectoparasites in Junagadh and Porbandar district and the overall value was observed to be 80.67%. These findings are supported by Singh et al., (2015) who observed that majority of respondents (68 %) followed various practices (dusting, spraying, injectable drugs) for the control of ecto parasites. However, the results are contrary to others (Rathore and Kachwaha, 2009, Kumar, 2015), who reported that 31.25-39.50% respondents took control measures against lice and ticks.

In the study area, overall 93% farmers practiced washing of hind quarters after the expulsion of placenta and in both districts such practices were similar (94.44 and 90.83% in Junagadh and Porbandar district respectively). These findings are supported by Tewari et al., (2018) who observed that 65% were disposing the placenta by burial in soil and cleaned hind quarters while the remaining 35% did not cleaned hind quarters after drop of placenta.

Buffalo owners, in majority of cases (55.33%) called livestock inspector for the treatment of their animals followed by veterinary doctors (40%) and in few cases they treat using local
empirical knowledge. In Junagadh district more number of respondents called livestock inspector as compared to Porbandar (66.67 vs. 38.33%), but less number of farmers called veterinary doctors as compared to Porbandar (28.33 vs. 57.5%). These results are supported by Singh et al., (2015), who observed that 66.3% of the respondents availed services of livestock inspectors, while 33.6% availed the services of qualified veterinarians for the treatment of their animals. These findings are contrary with Rathore and Kachwaha (2009) reported that 9.50 and 18.75% respondents approached veterinary doctor and livestock assistant, respectively for treatment of sick buffaloes. Moreover, 45% buffalo owners in Punjab treated their sick animals by veterinary doctors (Kumar, 2015).

The buffalo owners reported that metabolic disorders were the major problem in buffaloes (50.33%), followed by mastitis (32.33%) and reproductive disorders (17.33%) in the study area. The occurrence of different diseases particularly reproductive and metabolic conditions as reported by the buffalo owners differed statistically between the two districts (Table 3). In Junagadh district, less number of farmers reported occurrence of reproductive problems than Porbandar district (12.78 vs. 23.33%), but more number of reported metabolic disorders (56.67 vs. 40.84%). The results are more or less comparable with Thakur et al., (2017). Alteration of disease occurrence between the two districts might be attributed to different managemental practices followed by the farmers.

The results indicated that farmers were aware about most of the improved breeding, calf and health care management practices. Further, certain management practices related to dairy buffaloes also varied between Junagadh and Porbandar districts. Hence, while developing extension related policies for dairy farmers the regional variation of existing knowledge on different dairy husbandry managerial practices should be taken care.

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