

Calf Rearing Programme (CRP) for Female Cow & Buffalo Calves



**National Dairy Development Board
Anand 388 001, India**

Situation of calf rearing under field conditions



- Stunted growth.
- Suffer from parasitic infestations.
- No specific feed for young calves.
- No proper housing for calves.
- Age at first calving is very high & lifetime productivity is low.



Why calf rearing programme ?

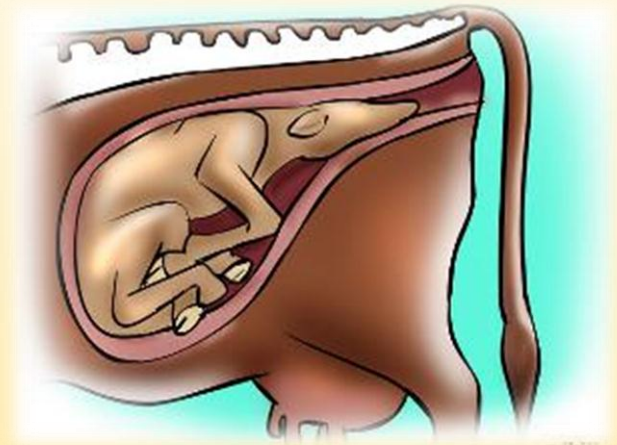
- ✓ For improving productivity, it is important that the calves born are healthy and reared on scientific lines so that they attain early maturity and start producing milk at an early age.
- ✓ The potential to enhance the productivity of indigenous breeds through optimum nutrition & improved management practices is immense.
- ✓ These are an excellent breeds with genetic potential for producing higher milk, thrive on fibrous feeds & perform better in adverse climatic conditions.
- ✓ Unfortunately, calves of almost all breeds of animals are not fed on scientific lines.
- ✓ As a result, their production potential under field & farm conditions is not fully exploited.
- To address this, NDDDB has initiated calf rearing programmes in the states of Gujarat, Punjab and Karnataka, wherein, animals in advance stage of pregnancy are fed special pregnancy ration. This way, calves born are healthy, when raised on scientific feeding indigenous calves have expressed first heat at the age of 16-17 months, whereas, under field conditions it takes double the time.
- This programme will greatly help in reducing age at first calving, inter-calving interval and improving productive life of dairy animals.

Objectives

- ▶ **Providing essential nutrients during all stages of growth, pre-natal, neo-natal & post-natal.**
- ▶ **Reducing age at first calving by improving daily growth rate & achieving early maturity, by feeding calf starter & calf growth meal.**
- ▶ **Increasing lactation yield and lactation period.**

Proposed steps in calf rearing programme

- Feeding pregnancy feed during the last two months of pregnancy, to ensure calf born is healthy.
- Providing adequate quantity of colostrum within 1 to 2 hours of birth to have optimum maternal immunity in calves.
- Follow package of practices:
 - Prevent naval cord infection
 - De-worming
 - Protection from heat/winter
 - Vaccination
 - Ear tagging
- Feeding whole milk, calf starter, good quality fodder (hay), calf growth meal and regular feed.
- Body weight measurements, AI on maturity etc.



A Pilot study on calf rearing

- **Advanced pregnant buffaloes (min. 8 months pregnant) & indigenous cows (min. 7 months pregnant) were identified from the villages around Anand/Kheda districts.**
- **During advanced stage, pregnancy feed was offered to selected animals @ 3 kg per day.**
- **Female calves born were provided calf starter & calf growth meal, as per the standard feeding schedule.**
- **Milk yield and service period data of cows and buffaloes given pregnancy ration were also recorded, after calving.**
- **Birth weight, average daily gain, immune status and microbial protein synthesis of calves born to these dams were also recorded/estimated.**
- **Farmers were advised on improved management practices like importance of colostrum feeding, clean & dry environment for housing of calves, de-worming, timely vaccination & availability of drinking water.**

Progress of CRP-Pilot Project

| Pregnant animals selected | Total (n=225) | Gir (n=75) | | Kankrej (n=30) | | Buffalo (n=120) | |
|---------------------------|---------------|----------------|--------------|----------------|-------------|-----------------|---------------|
| | | Control (n=32) | Exp. (n=43) | Control (n=10) | Exp. (n=20) | Control (n=47) | Exp. (n=73) |
| Calving | 225 | 32 | 43 | 10 | 20 | 47 | 73 |
| Male | 92 | 13 | 16 | 5 | 8 | 22 | 28 |
| Female | 133 | 19 | 27 | 5 | 12 | 25 | 45 |
| Male Mortality | 18 | 3 | 1 | 2 | 1 | 8 | 3 |
| Female Mortality | 19 | 4 | 2 | - | 1 | 5 | 7 |
| No. of calves died | 37 | 7 | 3 | 2 | 2 | 13 | 10 |
| Calf mortality (%) | 16.44% | 21.8% | 6.97% | 20% | 10% | 27.65% | 13.69% |

Performance of buffalo calves

| Particulars | Control (n=20) | Experimental (n=38) |
|-----------------------|---------------------------|---------------------------|
| Initial BW (kg) | 29.81±6.67 ^a | 32.05±5.20 ^b |
| Body wt at 6 months | 73.35±16.40 ^a | 97.47±15.81 ^b |
| 12 months | 122.09±27.30 ^a | 173.67±28.17 ^b |
| 18 months | 175.39±41.34 ^a | 249.53±6.83 ^b |
| 24 months | 228.51±61.21 ^a | 323.54±52.49 ^b |
| Body Weight Gain (kg) | 198.53±44.39 ^a | 291.30±47.25 ^b |
| ADG (kg/d) | 0.276±0.063 ^a | 0.404±0.065 ^b |

| Parameters | | |
|----------------------------|---------------------------|---------------------------|
| | Control | Exp. |
| Blood serum profile | | |
| IgG (mg/ml) | 19.36±0.60 ^a | 23.68±1.02 ^b |
| IgM (mg/ml) | 2.65±0.11 ^a | 3.18±0.11 ^b |
| IgA (mg/ml) | 0.48±0.02 ^a | 0.62±0.02 ^b |
| IgE (mg/ml) | 0.067±0.00 | 0.051±0.00 |
| FRAP (μM/l) | 496.36±25.68 ^a | 733.33±26.30 ^b |

Effect of feeding pregnancy ration on production & reproductive performance of dams

| Parameters | Buffaloes | |
|-------------------------------------|-----------------------------|-----------------------------------|
| | Control (n=47) | Exp. (n=73) |
| Milk production | | |
| Milk yield (kg/day) | 7.17±0.16 | 8.40±0.14 |
| Mean peak yield (kg/day) | 8.74±0.48 | 9.41±0.45 |
| Time taken to attain peak yield (d) | 48.90±12.87 ^a | 62.43±10.53^b |
| Reproductive performance | | |
| I Post partum Heat in days | 103±15.03 ^b | 83.05±9.72 ^a |
| Service Period (days) | 149.64±21.83 ^b | 117.83±13.79^a |
| | (6.7 mo.) | (4.8 mo.) |
| Dry period (days) | 202.82±29.58 ^b | 145.48±17.03 ^a |
| Lactation Length (days) | 259.91±37.91 ^a | 285.81±33.45 ^b |
| Calving Interval (days) | 459.36±67 ^b | 428.88±50.20 ^a |
| Lactation Yield (kg) | 1528.18±222.91 ^a | 1772.09±207.41^b |

| | | |
|------------------------------------|----------------------------|----------------------------------|
| Microbial protein synthesis | | |
| Microbial yield (g CP/d) | 787.28 ^a ±40.74 | 1001.99^b±41.03 |
| Immune status | | |
| IgG (mg/ml) | 21.89 ^a ±0.86 | 25.05^b±0.82 |
| IgA (mg/ml) | 0.44 ^a ±0.03 | 0.51 ^b ±0.02 |
| IgM (mg/ml) | 2.98 ^a ±0.10 | 3.24 ^b ±0.12 |
| Serum FRAP (μM/l) | 707.41 ^a ±51.51 | 951.53^b±39.10 |

Performance of Gir Calves

| Particulars | Control (n=2) | Experimental (n=12)) |
|---------------------------------|---------------|----------------------|
| Initial BW (kg) | 27.18±1.47 | 29.59±2.02 |
| Body weight at 6 months | 68.27±7.10 | 95.56±5.86 |
| Body weight at 12 months | 108.82±7.61 | 162.42±10.73 |
| Body weight at 18 months | 171.49±5.77 | 226.41±11.35 |
| Average daily weight gain (g/d) | 267.24±15.30 | 364.48±18.17 |

Performance of Kankrej Calves

| Particulars | Control (n=5) | Experimental (n=5) |
|---------------------------------|---------------|---------------------|
| Initial BW (kg) | 28.13±1.09 | 30.47±2.07 |
| Body weight at 6 months | 64.69±3.90 | 94.68±4.16 |
| Body weight at 12 months | 100.86±7.92 | 165.00±8.70 |
| Body weight at 18 months | - | 228.39±3.36 |
| Average daily weight gain (g/d) | 202.02±17.47 | 366.51±20.30 |

Effect of feeding pregnancy ration on production & reproductive performance of dams

| Parameters | Gir | | Kankrej | |
|-------------------------------------|----------------------------|---------------------------------|----------------------------|----------------------------------|
| | Control (n=32) | Exp. (n=43) | Control (n=10) | Exp. (n=20) |
| Milk production | | | | |
| Milk yield (kg/d) | 4.57±0.15 | 5.41±0.15 | 3.97±0.15 | 4.51±0.19 |
| Mean peak yield (kg) | 5.95±0.23 | 6.56±0.20 | 4.71±0.37 | 5.11±0.28 |
| Time taken to attain peak yield (d) | 41.40±10.34 ^a | 58.96±9.67^b | 44.75±12.64 ^a | 56.51±10.07^b |
| Reproductive performance | | | | |
| Service Period (days) | 146.50±4.5 ^b | 113.74±3.34 ^a | 141.38±8.75 ^b | 111.60±4.40 ^a |
| Dry period (days) | 124.50±7.05 ^b | 89.13±2.61 ^a | | |
| Lactation Length (days) | 301.58±4.65 | 302.61±3.31 | 296.25±8.85 | 302.14±5.85 |
| Calving Interval (days) | 426.20±4.30 ^b | 391.74±3.02 ^a | - | 388.1±2.90 |
| Lactation Yield (kg) | 1496.63±52.52 ^a | 1757.78±52.23 ^b | 1266.37±33.37 ^a | 1482.90±63.30 ^b |
| Microbial protein synthesis | | | | |
| Microbial yield (g CP/d) | 652.36±40.56 ^a | 814.28±38.44^b | 752.12 ^a ±60.8 | 1066.08^b±68.73 |
| Immune status | | | | |
| IgG (mg/ml) | 24.59±1.89 ^a | 28.65±2.07 ^b | 20.96±1.02 ^a | 24.91±0.93 ^b |
| IgA (mg/ml) | 0.59±0.03 | 0.65±0.02 | 0.39 ^a ±0.04 | 0.51 ^b ±0.03 |
| IgM (mg/ml) | 2.67±0.15 ^a | 3.28±0.14 ^b | 2.90 ^a ±0.12 | 3.29 ^b ±0.12 |
| Serum FRAP (µM/l) | 668.84±34.22 ^a | 803.16±45.0 ^b | 568.79 ^a ±51.0 | 816.55 ^b ±28.96 |

EFFECT OF FEEDING CALF STARTER ON DAILY WEIGHT GAIN



**Control-6 months old; Body wt: 91 kg
Growth rate: 325 g/day**



**Experimental-6 months old; Body wt: 123 kg
Growth rate: 498 g/day**



**Control-5 months old; Body wt: 74 kg
Growth rate: 298 g/day**



**Experimental-5 months old; Body wt: 97 kg
Growth rate: 435 g/day**

CONTROL

EXPERIMENTAL





Date of First heat- 10/03/17 (25 months)
BW at First heat- 235.57 kg



Date of First heat- 21/1/17 (24 months)
BW at First heat- 230.72 kg

Control animals



Date of First heat- 16/03/17 (26 months)
BW at First heat- 246.47 kg



Date of First heat- 04/03/17 (25 months)
BW at First heat- 231.47 kg



Body weight -213kg (heat at 18 mo, AI at 21 mo)



Body wt -250 kg (1st heat: 17 mo., AI at 20 mo.)



BW at First heat- 259.49 kg at 19 mo, AI at 22 mo.



Body weight -221 kg (heat at 18 mo & AI at 21 mo)

Experimental heifers



Date of First heat- 17/06/16 (18 months)

Date of Conception- 10/11/16

BW at Conception- 308.56 kg



Date of First heat- 10/08/16 (19 months)

Conception at 21 months

BW at Conception- 315.74 kg



First heat- 13/08/16 (20 months)

Conception at 22 months

BW at Conception- 302.04 kg



First heat- 18 months)

Conception at 21 months

BW at Conception- 296.71 kg



Birth wt - 30.12 kg

Date of First heat- 19/06/16 (16 months)

Conception at 15/09/16 (19 months)

BW at Conception- 261.94 kg

Project proposal on calf rearing programme

Project outlay

- Under the one project, 2000 advanced pregnant cows (7 month \pm one week pregnant)/ buffaloes (8 months \pm one week pregnant) will be identified from 80-100 villages, 25-30 cows from each village, depending upon the availability.
- In addition, five animals from each village may be kept as control and maintained on traditional ration fed by the milk producers. All the animals under the programme will be ear tagged, with 12 digits ear tag.
- Animals under the study will be fed with pregnancy ration @ 3 kg/animal/day for about 60 days prior to calving.
- Out of the 2000 calves born, about 50% will be male and excluded from the programme, after recording their birth weight. However, daily milk yield, peak milk yield, lactation yield, lactation length and reproductive performance i.e. first heat after calving, no. of AI per conception, any metabolic disorders etc. of all the dams under study will be recorded.
- 1000 new born female calves will be registered, ear tagged & fed adequate quantity of colostrum and reared on improved management practices. Timely de-worming and vaccination will also be ensured.
- All the data will be captured in Information Network for Animal Productivity and Health (INAPH), using Android based Tablets/laptops. Female calves will be fed calf starter and calf growth meal, as per the standard feeding schedule. Pregnancy feed, calf starter and calf growth meal would be made available to milk producers covered under the programme at 50% subsidy.

Manpower arrangement:

- In one module of 2000 animals, there will be 2 field officers (VOs) and 80 field supervisors/LRPs. Field officers should be exclusive for coordinating activities of this project.
- Under one field officer, there will be 40-50 villages, who will be responsible for project implementation, monitoring, and liaising with NDDDB for all projects related activities.
- One field supervisor will be identified from each village, who will be responsible for ensuring the feeding of pregnancy feed, calf starter and calf growth meal and recording body weight of calves every month, using Tablet/Netbook. There will be about 40 field supervisors under one field officer.

Implementation plan:

Information pertaining to advanced pregnant animals

- Organizing village awareness meeting for the identification of beneficiaries from the villages.
- Identification of advanced pregnant animals, ear tagging and registration.
- Capturing details pertaining to pregnant cows, ID number, previous history like milk yield, lactation yield, date of conception, expected date of calving, mastitis or other metabolic and reproductive disorders in INAPH, using Tablet/ Netbook by field supervisor.
- Feeding pregnancy ration @ 3 kg/animal/day for 60 days.
- Ensuring regular feeding of pregnancy ration.
- On calving, capturing data such as male/female calves, any reproductive and metabolic disorders such as retention of placenta, metritis, milk fever, ketosis etc.
- Capturing of daily milk yield, peak milk yield, date of first heat after calving, no. of AI per conception, date of conception, lactation yield etc of all the dams under the programme, including providing RB advices.

Information pertaining to newly born female calf

- Registration of female calf immediately after birth will be done by field supervisor. Ear tagging of female calves will also be done after 10-12 days, with twelve digit unique identification number.
- Birth date & ear tag number of registered calf/calves will be entered in the Tablet. In addition, birth weight of calf and average daily weight gain will be recorded. In case of male calf, only birth weight will be recorded.
- Providing adequate quantity of colostrum within 1 to 2 hours of birth.
- Feeding calf starter from 4th day onwards, upto 26 weeks of age.
- Ensuring to follow package of practices such as preventing naval cord infection, de-worming, protection from heat/winter, timely vaccination and AI.
- Capturing dry matter intake, age at maturity, age at first heat/oestrous, age at conception, age at first calving etc. by field supervisor using Tablet.
- Pregnancy feed, calf starter, calf growth meal, mineral mixture, de-wormer drug etc. will be made available in the identified villages under the programme. Pregnancy feed, calf starter and calf growth meal will be provided at 50% subsidized rate.
- On getting pregnant at a desired age, eligible amount of incentive will be given to milk producers, about Rs. 5,000 per calf. This incentive may be in the form of providing calf starter/calf growth meal for continuity of the programme.

NDDB's role

- Preparation of package of practices and rollout plan.
- Two days training to field staff at the respective locations of implementing agency.
- Formulation of pregnancy feed, calf starter and growth meal and quality monitoring.
- Overall monitoring.

Training Module for CRP

| Time | Particulars/topic | Facilitator |
|--------------|---|-------------|
| Day 1 | | |
| 10:00-10:30 | Introduction to calf rearing programme (CRP) | |
| 10:30-11:30 | Basic aspects of animal nutrition | |
| 11:30-11:45 | Tea break | |
| 11:45-12:30 | Feeding and management of advanced pregnant animals | |
| 12:30-13:30 | Package of practices for calf rearing | |
| 13:30-14:30 | Lunch break | |
| 14:30-16:00 | Role and responsibility of key manpower in CRP implementation and monitoring | |
| 16:00-16:15 | Tea break | |
| 16:15-17:00 | Importance of feeding pregnancy ration, calf starter & calf growth meals & their feeding schedule | |
| 17:00-18:00 | Demonstration of ear tagging, measurement of body weight and filling the data in prescribed format by field supervisors | |
| Day 2 | | |
| 09:00-13:00 | Visit to farm to demonstrate calf rearing at farmers' doorstep | |
| 13:00-14:30 | Lunch break | |
| 14:00-15:00 | CRP monitoring and report generation, including use of tablets/laptops for data entry | |
| 15:00-16:00 | Practical aspects of training field supervisors under CRP | |
| 16:00-16:30 | Tea break | |
| 16:30-18:00 | Discussions, Q & A session | |

Expected outcome from the programme :

- ▶ Average age at first calving in buffaloes and cows would be reduced by minimum 6 months.
- ▶ Calf mortality would be reduced by 10%.
- ▶ Average lactation length would be increased by 30-45 days.
- ▶ Average calving interval would be reduced by 2 months.

Glimpses of CRP for Kankrej cows in

Dussej MU



Project target:

- No. of pregnant Kankrej cows to be covered: 2000 in experimental & 500 animals in control.
- No. of villages to be covered: 80-100 depending upon the availability of animals
- Duration: 4 years with financial outlay of Rs. 450 lakh from BMU

Progress of CRP: Kankrej cows

- No. of villages covered: 41 (2 control villages)
- No. of advanced pregnant cows covered: 1321 (75 control cows)
- No. of animals calved, so far: 393 (8 in control)
- No. of male calves: 201
- No. of female calves: 192



Feeding pregnancy
feed



New born calf



Calf rearing programme in Murrah Buffalo Calves in Punjab

- **Mohali Milk Union:** Target: 500 Advanced Preg. Murrah buffaloes.

Initiated production & supply of specialized feeds at villages covered under CRP. 380 animals ear tagged and initiated feeding of pregnancy feed. 5 veterinary officers/field officers are involved in monitoring of project in their respective area. Training of FO/FS completed.

- **Ludhiana Milk Union: Target : 500 animals.** Till date on an average 15 animals per village have been selected and ear tagged. One veterinary officer is exclusively involved in monitoring of project.
- **Patiala Milk Union & Jalandhar Milk Union : Target 500 animals for each place.** Programme would commence soon.

CRP for HF Crossbred Cows in Bengaluru Milk Union

Target: 2000 advanced preg. CB cows

Progress: Initiated identification of animals & production of specialized feed.

Kolar and Mandya Milk Unions under KMF would initiate CRP soon.



Please remember, today's calf is tomorrow's dairy animal (cow/buffalo)

Thanks