INDIAN COUNCIL OF AGRICULTURAL RESEARCH
CHECKLIST FOR SUBMISSION OF FINAL RESEARCH PROJECT (RPF-III)

1   Project Details

Project No.	Institute Code No.
Programme 3	IXX01238

2   Investigators as approved in RPF-I, If any change attach IRC proceedings:

Principal Investigator	CC-PI	Co-PI
Dr. P. Krishnamoorthy Scientist, PD_ADMAS		Dr. M.R. Gajendragad Principal Scientist, PD_ADMAS Dr. K. Prabhudas, Project Director (Up to 30.4.2011), PD_ADMAS Dr. H. Rahman, Project Director (After 30.4.2011) PD_ADMAS Dr. J.P. Ravindra Principal Scientist, NIANP Dr. Raghavendra Bhatta Senior Scientist, NIANP Dr. D.T. Pal Senior Scientist, NIANP

3	Date of Start & Date of Completion (Actual). If any extension granted enclose IRC proceedings		**July 2008**	**March 2012**
			Yes	No
4	Whether all objectives met		**Yes**	No
5	All technical programmes completed (if not give details and reasons thereof)		**Yes**	No
6	Cost of the Project		Estimated (RPF-I)	
			Rs.22,41,000/-	
7	Salient achievements/major recommendations included		**Yes**	No
8	Annual Progress Reports (RPF-II) submitted	1st Year	**Yes**	No
		2nd Year	**Yes**	No
		3rd Year	**Yes**	No
		nth year	Yes	No
9	Reprint of each of publication attached		**Yes**	No
10	Action for further pursuit of obtained results		**Yes**	No

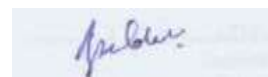|			
	indicated		
11	Report presented in Divisional seminar (enclose proceedings & action taken report)	Yes	**No**
12	Report presented in Institute seminar (enclose proceedings & action taken report)	**Yes**	No
13	IRC number in which the project was adopted	IRC No: Programme 3	
14	Any other Information		

Signature of
Principal Investigator: Dr. P. Krishnamoorthy   -
                    Scientist, PD_ADMAS

Co-investigators: 1. Dr. M.R. Gajendragad   -
                    Principal Scientist, PD_ADMAS

                    2. Dr. K. Prabhudas   -
                    Project Director (up to 30.4.2011),
                    PD_ADMAS

                    3. Dr. H. Rahman   -
                    Project Director (After 30.4.2011)
                    PD_ADMAS

                    4. Dr. J.P. Ravindra   -
                    Principal Scientist, NIANP

                    5. Dr. Raghavendra Bhatta   -
                    Senior Scientist, NIANP

                    6. Dr. D.T. Pal   -
                    Senior Scientist, NIANP

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
Final Report (RPF- III)

1. Project Title : **Economics of reproductive disorders in bovines of organized farms vis-à-vis to nutritional status**

2. (a) Name of the Lead Institute- **Project Directorate on Animal Disease Monitoring and Surveillance (PD_ADMAS)**
   (b) Name of Division/ Regional Center/ Section- Epidemiology

3. (a) Name of the Collaborating Institute(s)- **National Institute of Animal Nutrition and Physiology, Bangalore**
   (b) Name of Division/ Regional Center/ Section of Collaborating Institute(s)- Animal Physiology, Bioenergetics and Environmental Sciences and Animal Nutrition

4. Institute Project Code – **IXX01238**

5. Priority Area – **Applied Research**

6. Project Duration: Date of Start – **July 2008**   Date of Completion – **March 2012**

7. a.   Objectives
   1. To know the interrelationship of reproductive disorders due to diseases and minerals & nutritional status in cattle.
   2. To provide economic model for the benefit of livestock owners.

    b.   Practical utility including background information
   Our institute has developed Brucella and Infectious bovine rhinotracheitis diagnostic kits and prevalence of the diseases in bovine has been studied thoroughly. Next major diseases of economic importance in cattle after mastitis and FMD is the diseases that causing abortion and reproductive disorders. These diseases cause yield reduction, carrier state, endemic form and also mortality leading to dairying a loss to farmers.

   The cattle population of India has decreased by 6.89 per cent particularly the indigenous cattle which are supposed to be resistant to various diseases. One of the possible causes of farmers going away from livestock sector may be heavy losses incurred due to various reproductive disorders or diseased in the form of mortality and morbidity. The losses are loss in milk production, body weight gain, work for draught animals, delayed reproduction, etc. Some cows do not show estrus or have to be bred several times before they conceive. To maintain such cows for long time and wait for its successful breeding

is cost effective. Most of the studies in livestock economics are related to growth pattern, resource productivity and employment generation in this sector. To find the economics of various reproductive disorders and its relationship to nutritional and mineral status of bovines in organized dairy farms.

8. Technical Programme
    1. Identification of two organized farms in Karnataka and Tamilnadu.
    2. Data collection on reproductive disorders and management practices of the farm
    3. Feed, blood and clinical sample collection from the farm animals.
    4. Analysis of feed for metabolizable energy (ME) and crude protein
    5. Screening of serum sample for antibodies against Brucella, IBR and Leptospira.
    6. Identifying animals with reproductive disorders in the farm.
    7. Estimation of serum minerals - calcium, phosphorus, copper, zinc, manganese & cobalt.
    8. Serum progesterone and estrogen estimation during estrous cycle using repetitive sampling technique.
    9. Analysis of data.
    10. Assessment of economic losses, if any due to various reproductive disorders and development of economic modules.
    11. Preparation of results and report writing.

9. Key Words- Reproduction – minerals – relationship – economics

10. Project Team(Name(s) and designation of PI, CC-PI and all project Co-PIs, with time spent)
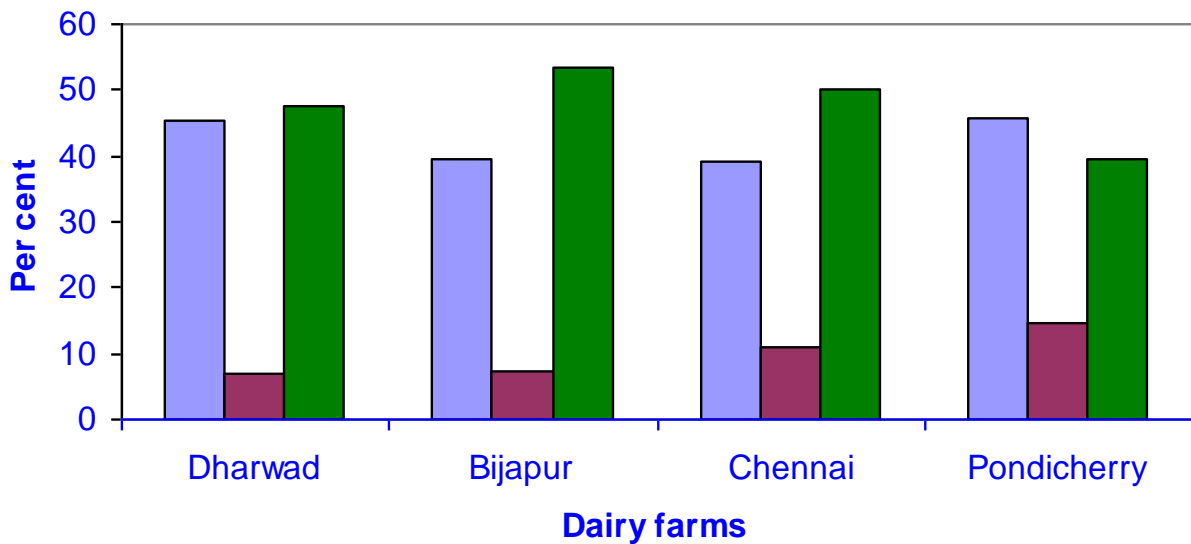
No	Name	Designation	Time to be spent	Work done
1	Dr. Krishnamoorthy, P.,	Scientist	60%	Sample & data collection, Screened for diseases, interpretation of results and writing report
2	Dr. M.R. Gajendragad	Principal Scientist	25%	Prepared economic modules and analysis of data
3	Dr. K. Prabhudas (up to 30.4.2011)	Project Director	10%	Guidance and advisory capacity
4	Dr. H. Rahman (After 30.4.2011)	Project Director	10%	Guidance and advisory capacity

5	Dr. J.P. Ravindra	Principal Scientist	25%	Hormone (oestrogen and Progesterone) estimation from serum
6	Dr. Raghavendra Bhatta	Senior Scientist	25%	Feed analysis (Proximate analysis)
7	Dr. D.T. Pal	Senior Scientist	25%	Serum mineral estimation (Ca, P, Cu, Zn and Mn)

11. Final Report on the Project (Methodology used, objective wise achievements, results and discussion and conclusions)

Sample survey of organized dairy farms was carried out and selected organized cattle farms in Hubli, Dharwad, Bijapur in Karnataka and Pondicherry, Chennai in Tamilnadu for the study. The farms were having intensive system of rearing with stall feeding except Dharwad which is having semi range system of rearing. Paired serum samples with gap of one month apart were collected from 128, 72, 123, 109 and 138 cattle in Hubli, Dharwad, Bijapur, Pondicherry and Chennai respectively. Reproductive history like repeat breeding, abortion, metritis, retention of placenta, pregnancy and milk yield data were collected from the organized farms. Feed and soil samples were also collected. Out of 570 Serum samples screened for Brucella and IBR antibodies, it was found 254 (44%) and 158 (27%) positive respectively. The serum minerals like copper, zinc, calcium, phosphorus and magnesium were estimated. The serum copper, zinc, calcium, magnesium and phosphorus were 1.35 ppm, 1.52 ppm, 10.88 mg%, 4.65 mg% and 2.67 mg% respectively in apparently healthy animals. Serum copper and zinc levels were estimated and found zinc levels decreased in animals with reproductive problems. Feed analysis revealed that the crude protein, crude fat and metabolizable energy in concentrate was 14.98, 3.63 and 12.45 MJ/kg and fodder was 9.98, 1.06 and 4.73 respectively. The values obtained for the cattle feed were within the normal range. Soil samples were analyzed for trace minerals like copper, zinc and molybdenum. The soil analysis for mineral levels varied widely depending on the type of the soil in the organized farms. Economic analysis of the data showed the reproductive disorders are the major factor causing loss to the farms. In which, the repeat breeding and abortion were causing the significant economic losses in the organized dairy farms.

Distribution of bovines in four organized dairy farms

Reproductive disorders in bovines of four organized farms in Karnataka and Tamilnadu
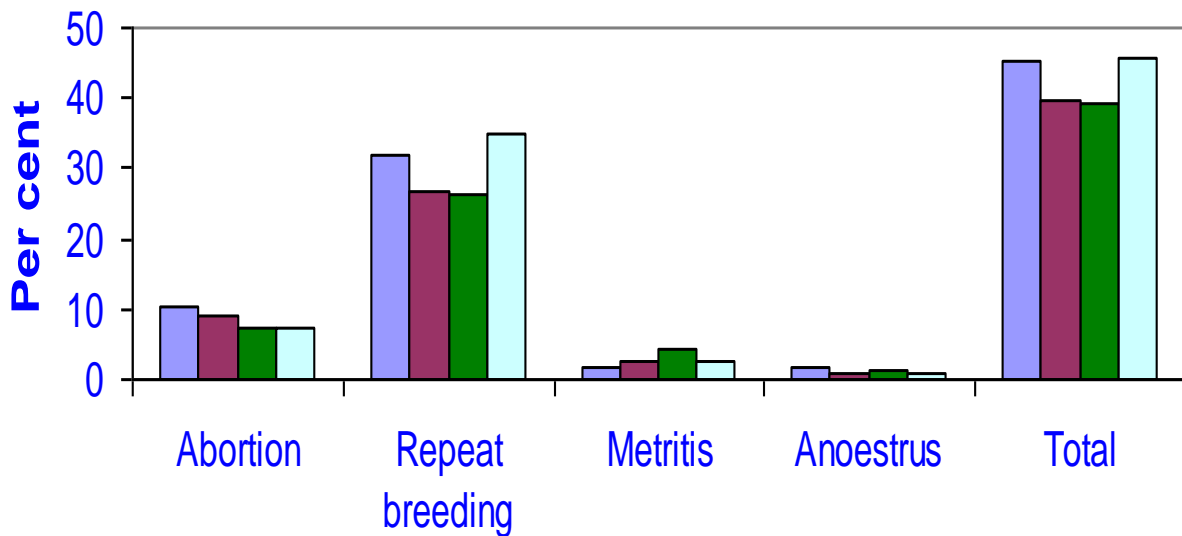
Serum mineral status of bovines in organized farms

Hormone status of bovines in organized farms
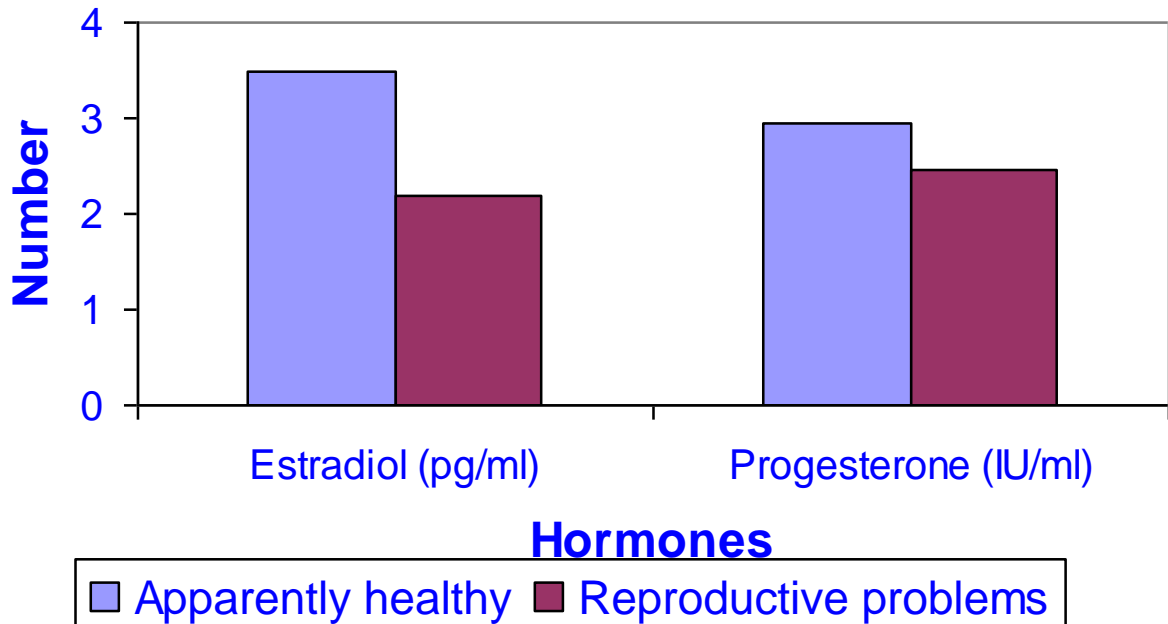
12. Budget

12.1   Manpower

S. No.	Category	Man months	Cost (₹.)
1.	Scientific	42 months	
2.	Technical	36 months	5,04,000
3.	Supporting	36 months	4,32,000
	Total	114 months	9,36,000

12.2   Research Contingencies
     Chemicals   -   ₹.3,50,000
     Glasswares   -   ₹.1,00,000
     Biochemical kits -   ₹.2,50,000
     Travel   -   ₹.2,75,000

12.3 Non-Recurring Cost
    (Including cost of equipment)

12.4 Any Other Expenditure Incurred

13. Cumulative Output
    a. Publications (one copy each to be submitted if not already submitted)
        i.   Research papers
        ii. Reports/Manuals
        iii. Working and Concept Papers
        iv. Popular articles
        v.   Books/Book Chapters
        vi. Extension Bulletins

    b. Intellectual Property Generation
       (Patents - filed/obtained; Copyrights- filed/obtained; Designs- filed/obtained;
       Registration details of variety/germplasm/accession if any)

    c. Presentation in Workshop/Seminars/Symposia/Conferences
       (Relevant to the project in which scientists have participated)

    d. Details of technology developed
       (Crop-based; Animal-based, including vaccines; Biological – biofertilizer,
       biopesticide, etc; IT based – database, software; Any other – please specify)

    e. Registration details of variety/germplasm/accession, if any

    f. Trainings/demonstrations organized

    g. Training received

h. Any other relevant information

14. Extent of achievement of objectives and outputs earmarked as per RPF-I

Objectives Institute Wise	Month & year of start	Month & year of completion	Output Monitorable Target(s)	Objective wise output	Extent of Achievement (%)	Reasons for Shortfall
1.						
2..						

15. Efforts made for commercialization/technology transfer

16. Benefits Accrued In Economic Terms

17. How the output is proposed to be utilized?

18. Future line of research work/other identifiable problems

19. Signature of PI, CC-PI(s), all Co-PIs
Signature of
Principal Investigator: Dr. P. Krishnamoorthy
          Scientist, PD_ADMAS   –   *P. Krishnamoorthy*

Co-investigators: 1. Dr. M.R. Gajendragad
              Principal Scientist, PD_ADMAS   –

          2. Dr. K. Prabhudas
             Project Director (up to 30.4.2011),   –
             PD_ADMAS

          3. Dr. H. Rahman,
             Project Director (after 30.4.2011)   –

          4. Dr. J.P. Ravindra
             Principal Scientist, NIANP   –

          5. Dr. Raghavendra Bhatta
             Senior Scientist, NIANP   –

          6. Dr. D.T. Pal
             Senior Scientist, NIANP   –

20. Observations of PME Cell

21. Signature (with comments if any along with rating of the project in the scale of 1 to 5 on the overall quality of the work) o f Head of Division/Regional Center/ Section – **Not applicable**

22. Signature (with comments if any along with rating of the project in the scale of 1 to 5 on the overall quality of the work) of JD (R)/ **Project Director**

                                        (Dr. H. Rahman)
                                        Project Director