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Government of India
Ministry of Agriculture
Department of Animal Husbandry, Dairying & Fisheries

Krishi Bhawan, New Delhi.
Dated 6th June 2012.

Subject: Implementation of Standard Operating Procedure (SOP) & Minimum Standards (MS) and Evaluation Procedures for Pedigree Selection (PS) -regarding.

With the approval of competent authority, it has been decided to implement Standard Operating procedure (SOP) & Minimum Standards (MS) and Evaluation Procedures for Pedigree Selection (PS) by all agencies identified for undertaking PS for bovines in the country. The SOP & MS are likely to be revised from time to time depending on the animal production situation and recent developments in the field of PS.

SOP and MS have been developed after consultation with experts is enclosed herewith as ready reference. It is requested that the document may be given wide publicity and recommended for adoption by all concerned agencies in the State.



(R.S. Jayal)

Under Secretary to the Government of India

Encl: **SOP & MS for PS**

Distribution:

1. Secretary, Department of Animal Husbandry,(As per list)
2. Secretary Dairy Development(As per list)
3. Managing Director NDDDB Anand
4. Director of Animal Husbandry/Veterinary Services,(As per list)
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**Standard Operating Procedures (SOP),
Minimum Standards (MS)
and
Evaluation Procedure
for implementing
a Pedigree Selection (PS) programme
for
Cattle and Buffalo**

May, 2012

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Selection (PS) programme for Cattle and Buffalo**

Foreword

One of the key factors affecting productivity is the genetic ability of an animal for milk production, which is an inherited character, while others provide an enabling environment. The breeding bull contributes significantly in enhancing the genetic potential of its progenies for economically important traits like milk production, fat and protein production, fertility, body conformation etc. Therefore, building an infrastructure for evaluation and production of breeding bulls with high genetic potential for milk production and other important traits and an infrastructure to transmit their genetic potential to maximum number of progenies is very important in any animal breeding programme.

Selection of bulls could be done through methods like pedigree selection and progeny testing. Among the indigenous breeds, efforts are to be made to select bulls through pedigree selection owing to lack of large AI coverage and smaller population that makes Progeny Testing unfeasible. Selecting the best bulls based on the performance of their parents (milk production of dams in case of milk production traits) forms the basis of pedigree selection. This document describes the Standard Operating Procedures (SOP) and minimum standards for implementing a Pedigree Selection programme for Cattle and Buffalo under field conditions and for production of quality bulls by inseminating best performing elite females owned by farmers using semen of high genetic merit bulls

Objectives of the Programme

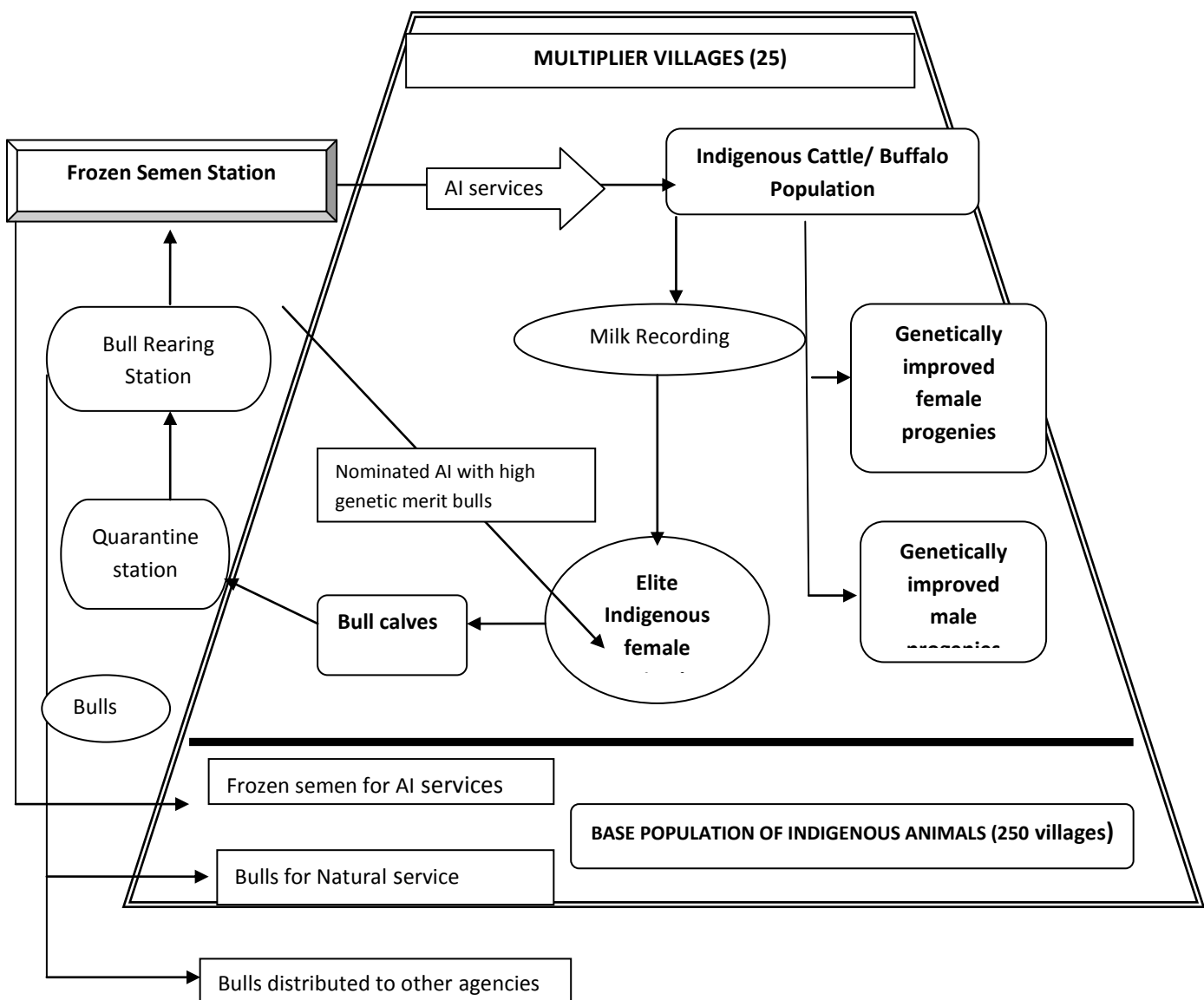
The main objectives of the programme are:

- a. Developing indigenous breeds in their native breeding tracts

- b. Improving the genetic potential of indigenous breeds for milk production in their native tracts
- c. Producing genetically superior quality bulls for semen production stations of the country
- d. Ensuring active participation of the communities in breed development programmes

A schematic representation of various activities that should be taken up in a pedigree selection programme is given in Figure 1.

Figure 1: Schematic representation of the Technical programme



Standard Operating Procedures (SOP), Minimum Standards and Evaluation procedure

A. Standard Operating Procedures (SOP)

a) Bulls and semen used in AI programme

- i. Semen produced from a semen station graded “A” or “B” by CMU, DADF, GOI shall only be used.
- ii. The very best bulls that meet the “Standards of Genetic Merit of Breeding Bulls” as specified in the Minimum Standards for Production of Bovine Frozen Semen prescribed by DADF, GOI shall only be used for AI

b) When an animal is brought for the first time for insemination, it would be ear-tagged and registered as a dam under the programme and then inseminated. Subsequently, the animals will be examined for pregnancy after 90 days of AI and then followed for calving.

c) Animal Identification:

- i. All female animals inseminated under AI programme, animals under milk recording and all daughters that are born under the AI programme and all male calves born out of nominated mating shall be identified by applying ear tags.
- ii. Only polyurethane laser printed ear tags having a 12 digit number and a bar code shall be used. The numbering system followed shall be unique with the last digit of the number being a “check digit” to ensure that no two animals are tagged with the same number. Only numbers supplied by an agency identified by DADF shall be used for unique identification of animals.
- iii. The specifications for the ear tag shall be: The male tag preferably as a button shall be with a minimum diameter of 27 mm with a metal point and the flag shaped female tag with a closed head shall be with a minimum size of 55 x 65 mm. 12 digits to be printed in two rows of six digits each;

second/lower six digits should be relatively much larger than first/upper six digits.

Figure A.1: Ear Tag



Figure A.2: Ear Tag applicator



- iv. The ear tag should be applied inside the ear of animals, in the center of the ear lobe with the female part of the tag, inside the ear.

Figure A.3: Ear tagged animal



- v. If the ear tag falls off, a new ear tag shall be applied within 10 days and the information shall be immediately updated in INAPH.

d) Registration of calves:

Upon receiving the information about the birth of daughter or male calf born from nominated mating, the AI technician along with the concerned supervisor and the Milk recorder / local resource person shall visit the calf and physically verify the animal and the number of the dam and the insemination particulars of the dam for verifying the sire number as well as ear tag the calf within 45 days of birth.

e) Parentage verification:

- i. Records of all daughters or male calves born of nominated mating where the gestation period is found to be less than 265 days (290 days in buffaloes) and greater than 290 days (320 days in buffaloes) would be re-checked for correct parentage. In all doubtful cases, a blood sample would be taken from both mother and progeny (daughter/ son) and semen sample from the sire, for parentage confirmation using DNA markers.
- ii. A blood sample of all male calves born out of nominated mating would be collected for parentage confirmation.
- iii. Parentage verification database would be created to give feed back to the concerned AI Technicians and supervisors.
- iv. Calf rallies: Calf rallies shall be conducted in the area to create awareness about the programme and to provide platform to the farmers to exhibit their improved animals.

f) Milk Recording

The key points to be considered for milk recording include:

- i. The milk recording work should be assigned to exclusive milk recorders. In case an AI technician is covering only one village, he could be entrusted with the responsibility of milk recording.

- ii. Area assigned to one milk recorder would depend on the number of animals under milk recording and the spread of animals. A milk recorder shall not do milk recording of more than 5 animals per day.
- iii. First recording would be carried out on or after 5 days of calving and not later than 25 days of calving.
- iv. Milk recording for an animal would be done once a month, morning and evening and also in the afternoon if three time milking is practiced, preferably on a fixed day of the month (plus minus 5 days) at the place of milking.
- v. A monthly milk recording schedule shall be prepared, detailing the animal to be recorded, order of recording, address of the farmer, name of the village, date and time of recording.
- vi. Milk recording would be carried out using a transparent calibrated plastic jar with a sensitivity of 100 cc or using an accurate calibrated weighing machine.

Figure A.4: Calibrated Plastic Jug



- vii. On each day of milk recording a milk sample would be taken in a sample bottle (during morning recording), properly labeled, recorded and sent to the laboratory for milk component analysis for fat.
- viii. Every animal would be recorded both for milk volume and milk components on a monthly basis continuously for 11 times or until the

animal becomes dry or is permanently lost from the system whichever is earlier.

- ix. If the animal becomes dry, the dry date should be recorded invariably.
- x. If weaning is not practiced by the farmer or if the farmer could not be motivated to practice weaning, at least on the day of milk recording the calf would not be allowed to suckle its mother. Milk collected from all four quarters would be measured and the farmer would be advised to feed the calf separately.
- xi. Milk would not be recorded on the day when milk has dropped suddenly by 50% of the previous recording or when the animal is suffering from some form of illness. In such cases the reason for sudden drop would be recorded and the milk recording would be reattempted after a period of at least five days.
- xii. If the animal gives milk only one time, then only that would be recorded and the other timing would be left blank.
- xiii. The milk recorder shall also record the details of the recorded yield in a milk recording card that is kept with the animal owner. Please refer the format T 12 at Annex I.
- xiv. Standard Lactation Yield of the milk recorded animal should be calculated using the Test Interval Method (A4) described at Section 2.1.5.1 of the International Agreement of Recording Practices published by International Committee for Animal Recording (ICAR).

g) Procedures for supervision

The main points to be considered for putting in place an appropriate supervision system include:

- i. One supervisor would exclusively be made responsible for supervising all the activities including milk recording. The number of supervisors would

depend on the number of villages a supervisor can supervise in a month, the work load and the distance between the villages.

- ii. Each supervisor would every month check all the events happening in that month such as – 100% of daughters born and 100% of male calves reported born to nominated mating, randomly check at least 30% of milk recordings and pregnancy diagnosis results in his assigned villages. He would submit a tour diary every month.
- iii. For checking the milk recordings, the supervisor would conduct a surprise check by visiting the site of milking, at the time of the scheduled milk recording and check the procedure of recording, the records and the functionality of the equipment used. Alternately, the supervisor would, on the day of visit to a particular village, visit a randomly selected animal, which is currently under recording, at the time of milking and measure the quantity of milk produced and record the data. This would be used to compare with the preceding milk recording data of the same animal.
- iv. In addition to supervisors, project activities would also be supervised and monitored by District Coordinator, and Project Coordinator through regular and surprise field visits, bimonthly review meetings, AITs review meetings etc.

h) Nominated Mating

- i. It should be ensured that only semen from top high genetic merit bulls of the respective breed shall be used for nominated mating of the top females declared elite under the project to produce superior male calves.
- ii. It shall be ensured that the standard lactation milk yield that has been arrived at of elite females, based on a milk recording for a complete lactation, is more than the yield specified in the “Standards of Genetic Merit of Breeding bulls” in the Minimum Standards for Production of Bovine Frozen Semen prescribed by DADF,GOI.

- iii. Semen from bulls whose dam's milk yield is more than the yield specified in the "Standards of Genetic Merit of Breeding bulls" in the Minimum Standards for Production of Frozen Semen prescribed by DADF should be used for nominated mating

i) Male Calf Procurement

The points to be kept in mind in procurement of male calves include:

- i. The male calves produced out of nominated mating would be procured by the project at the earliest possible to avoid loss of this superior germplasm
- ii. A price decided by the organization shall be paid to the owner for a healthy male calf.
- iii. It shall be ensured that all the procured bull calves have a confirmed parentage that has been confirmed using DNA markers and it would be ensured that the bull calves are free from any physical and congenital abnormalities.
- iv. It should also be ensured that the bull calves and their mothers are free from TB, JD and Brucellosis. TB and JD to be tested by Single Intradermal Test (SIT) and Brucellosis by ELISA.
- v. Bull calves sufficient to meet the requirement of semen stations shall only be procured and reared. Bulls for natural service shall be reared only if there is a firm demand from any of the agencies implementing such programmes.

j) Rearing of Male calves

Procured male calves would be tested for TB, JD and Brucellosis regularly till their disposal/ sale.

k) Information System

All data such as Animal registration details, AI details, results of Pregnancy Diagnosis, Calving details, Milk recording, Milk component testing, animal re-registration details, Animal movement details, Animal ear tag change/renumbering details etc shall be captured through INAPH (Information Network for Animal Productivity and Health) Application.

l) Extension Programmes

The project shall develop appropriate extension materials related to breed improvement, breeding, AI awareness, improved animal husbandry practices, calf rearing, milk recording for production of bull calves, etc., and conduct periodical extension programmes in the villages. The project shall organize regular infertility camps to address infertility problems of the cows/ buffaloes in the project villages.

m) Wherever possible, the project shall co-ordinate with other agencies that are involved in animal productivity enhancement programmes in the project area.

n) Farmers interest groups / village committees

- i. The project may organize village committees or farmers' interest groups in each of the village. The Project Management Committee shall determine the composition and functioning of these committees. It should be ensured that the group meets periodically and the minutes of the meeting are recorded.
- ii. The village groups shall render all possible assistance for the entire range of activities planned at the village level. The groups also shall aid in monitoring the progress of the programmes in their respective village along with the project staff and offer suggestions and help for programme improvement.

o) Animal Health Protocols for personnel in Project Areas

i. All personnel working in close contact with the animals namely: AI technicians, milk recorders & supervisors have an important role to play as primary reporters of any adverse health event(s) occurring in their area of operation.

ii. Disease reporting

The milk recorder or the AI technician who observes any abnormal health event like high mortality, high rate of abortions/ retention of placenta, mastitis, symptoms of diseases like FMD etc. in his/her area of operation would report the same to an identified / Government appointed Animal Health Officer of the area through his superior.

iii. Bio-security protocols for personnel: All AI technicians would need to follow certain hygienic practices that would minimize the spread of infection. The SOPs for the same would be developed.

B. Minimum Standards to be achieved

The programme shall ensure that the following minimum standards are achieved:

i. It would be ensured that semen from at least 5 bulls of high genetic merit bulls shall be used in the AI programme annually.

ii. Semen produced from a semen station graded “A” or “B” by DADF shall only be used.

iii. AI bulls should be changed / rotated among the multiplier villages at least once in every 3 years in order to keep inbreeding under control.

iv. All data related to pedigree selection programme shall be captured through INAPH (Information Network for Animal Productivity and Health) application.

- v. At least 80% of the calves that are tested for DNA based parentage tests shall have correct parentage as recorded.
- vi. Bulls whose dam's milk yield is more than the yield specified in the "Standards of Genetic Merit of Breeding bulls" in the Minimum Standards for Production of Bovine Frozen Semen prescribed by DADF shall only be used for AI.
- vii. Cows/ buffaloes selected for nominated mating shall have milk yield recorded for a complete lactation and have milk yield more than the yield specified in the "Standards of Genetic Merit of Breeding bulls" in the Minimum Standards for Production of Bovine Frozen Semen prescribed by DADF.
- viii. All bull calves selected through nominated mating shall have confirmed parentage through DNA testing.
- ix. Both bull calves that are procured and their dams shall be free from TB, JD, Brucellosis, and any physical deformities.
- x. Achieve 80 % of all physical targets and qualify in annual evaluation by an independent expert panel appointed by DADF.

Evaluation System for PS Projects

Guidelines

General:

The evaluation would be done by a committee (minimum of 4 members) constituted by the Management Committee of the respective project.

All the committee members would reach the district on the previous day of the scheduled dates (at least 2 full days) of evaluation.

A minimum of 3 committee members should be available.

Each member of the committee should score the agency level and field level activities (check list No.1.1, 1.2 and 2.1) and submit the score sheets to chairman for overall scoring (average of all the scores given by the members).

The evaluation of the PS Project shall be done in two phases

Phase 1: Surprise milk recording validation by committee

Phase 2: Qualitative evaluation of activities of the project

Phase 1

Surprise milk recording validation:

The Evaluation Committee (EC) shall obtain from the District Coordinator/ Project Coordinator the advance milk recording schedule for the particular month in which the Committee visit is scheduled.

The EC randomly decides the three milk recording centres and three farmers whose animals are scheduled to be milk recorded by the respective Milk Recorders (MRs) on that date. The committee divides into three teams and each team makes surprise visit to each of the selected village during

morning hours. The procedure of recording by the MR is checked as per the Check List.

Qualitative evaluation of the Project activities at EIA level

Activities mentioned in the checklist 1.2 should be evaluated by the committee at the union level.

Phase 2:

Qualitative Evaluation of activities at the field level

For selecting the village, initially select three supervisors from the Project at random and one AI Centre at random from each supervisor. From the selected AI centres, the committee shall select one village each.

Activities mentioned in checklist 2.1 shall be used at village level for evaluating the field related activities in all the three selected villages.

Fill Sl. No 2, 4 and 8 from information available at AI centre/ INAPH

Fill Sl. No 1, 3, 5, 6 and 7 at households/Farms.

Checklist 1.1: Surprise milk recording check (Total Marks 50) at 3 Milk Recording centre

Farmer Name:

Name of the Milk Recorder:

ID of Animal under Milk Recording:

Sr. No.	Item description	Answer	Marks assigned	Marks obtained
1	Milk recorder reached the household before/ at the time/ after the farmer started milking the animal	Before/ during/ after	7/ 5/ 2	
2	Animal under Milk recording is ear tagged	Yes / No	4/0	
3	Ear tag number matches with the tag number in Milk Recording Register/ PDA	Yes / No	5/0	
3	Milk recorder is carrying Milk recording register/PDA	Yes / No	2/0	
4	The milk recording Register/card is updated till the previous day/ data has been entered in PDA.		On 4-0 scale	
5	Milk recorder is carrying apparently clean Measuring Jar		On 4/0 scale	
6	Pen/ pencil available with the MR at the time of milk recording	Yes / No	2/0	
7	Milk recorder is carrying Sampling bottles	Yes / No	3/0	
8	Milk Recording card is present at farmer's house.	Yes / No	2/0	
9	Milk recording card with farmer is updated and filled up to date.		On 2-0 scale	
10	Measuring is accurate		On 3-0	

			scale	
11	Sample was collected after proper mixing of the milk.	Yes / No	2/0	
12	Sample bottle was properly labelled.	Yes / No	2/0	
13	Calf was not allowed to suckle? (Suckling only for milk letdown should be allowed)	Yes / No	3/0	
14	Awareness of MR about PS activities		On 5-0 Scale	
		Total	50	

If the milk recorder didn't turn-up for recording then zero mark is allotted for the whole session

Checklist 1.2: Qualitative evaluation of the Project activities at EIA level (Total 50 marks)

SN	Item	Criteria	Marks assigned	Marks obtained
1	Exclusivity of the officers assigned to the project	Exclusive with no other responsibilities	10	
		Exclusive but looks after some specific assignments in addition to the PSP work like attending infertility camps, health care programme etc. in PT area.	5	
		Looks after additional work allotted by the management from time to time in other than PSP Area	0	
2	Data Entry in INAPH (crosscheck any of the recent formats/registers with the transaction list)	Is updated till the last date of previous month for all centres. Up to activities done 10 days before in PDA center (including online center doing desktop data entry) and up to last but one completed month in Non PDA center (Who are sending formats)	10	
		Entry pending for activities done between 10-20 days for PDA center or 2 months (excluding this month) data entry is pending for few centres for Non PDA center.	5	
		Entry pending for activities done 20 days before for PDA center or >2 months (excluding this month) data entry is pending for few centres for Non PDA center.	0	
3	Timely Dispatch of the monthly reports (Check incidences of	All the reports are dispatched before the deadline set by the project (MR Schedule, DC Tour report, Supervisor advance tour programme and tour reports, DC Monthly report, Three Reports generated by DC from INAPH	5	

SN	Item	Criteria	Marks assigned	Marks obtained
	last three months)	Some of the reports dispatched after the deadline	2	
		All the reports submitted after deadline.	0	
4	Conduct of Fertility management camps in the villages. (Number of camps during last 6 months)	All AI centres covered at least once	5	
		> 80% and less than 100% centres covered at least once	4	
		> 60% and less than 80% centres covered at least once	3	
		< 60% centres covered	0	
5	Conduct of Farmer awareness programme (s) (Number of programmes during last 6 months)	All AI centres covered at least once	5	
		> 80% and less than 100% centres covered at least once	3	
		> 60% and less than 80% centres covered at least once	1	
		< 60% centres covered	0	
6	Supervision (assessment of at least 2 supervisors)	Carried out >5/ 2-3/< 2 morning milk recording supervisions during last month.	0-5	
		Cross verifications of field activities(regular / occasional/ rarely)	0-5	
		Analytical abilities (good / average/ poor).Use of INAPH application on Netbooks. Ask him to generate any three reports from INAPH system.(Transaction, operational and AIMS reports)	0-5	
		Total	50	

Checklist 2.1: Qualitative Evaluation of field level activities at 3 AI centres

(Activities in Sl. No 1, 3 and 5 to be carried out at households/Farms and rest at AI centre)

Sl. No	Activity Description	Method of evaluation	Criteria	Marks assigned	Marks obtained
1	Registrations and Tag application	Random check of 5 recent registrations from T01 formats / PDA and cross check the details	All correct	5	
			1 not correct	3	
			2 not correct	1	
			>2 not correct	0	
2	AI Follow up % for PD	Check % of AI cases of three to four months back, followed for PD	>90%/ 80-90% /<80%	10/5/0	
3	Checking correctness of pregnancy diagnosis	Check at random about 6 PD done cases from last 1- 2 months (positive and negative equally) and check for the correctness	All correct	5	
			Not tallying -1	4	
			Do -2	3	
			Do >2	0	
4	Calving follow up %	Check % of PD positive cases of eleven months back, followed for Calving	>90%/ 80-90%/ <80%	10/5/0	
5	Checking correctness of calving report	Check at random about 8 calving from last 1- 2 months (male and female equally) along with correctness of dam and daughter numbers	All correct	5	
			Not tallying -1	4	
			Do -2	3	

			Do >2	0	
6	Conduct of Farmer awareness programme (s)	Check for conduct of awareness programme(s) in the village during the last 6 months.	Yes/ no	5/ 0	
7	Conduct of Fertility management camp(s)	Check for conduct of Fertility management camp(s) in the village during the last 6 months.	Yes/ no	5/ 0	
8	Conception rate for AI done	Check for the overall conception rate for the AI done during the last 6 months from INAPH AIMS report.	>35%	5	
			25-35%	3	
			< 25%	0	
			Total	50	

Note: If ear tag is not available on the animal that is crosschecked- it is treated as wrong/ not tallying/ not followed-up.

All the three villages are scored based on the above mentioned method (Please use the working sheets attached). An average of the village scores is to be calculated and added to the above section

Summary of Scores

Section	Marks obtained	Max Marks
1.1 Surprise milk recording check		50
1.2 Qualitative evaluation of the Project activities at Agency level		50
2.1 Qualitative Evaluation of activities at field level		50

Summary of Findings:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Recommendations:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Name and Signature of the Evaluation committee

- 1.
- 2.
- 3.
- 4.

Additional blank sheets may be added whenever required.