Minimum Standards and Standard Operating Procedures For Artificial Insemination

Minimum Standards and Standard Operating Procedures for Artificial Insemination Services

Preamble

As average breeding values of bulls used for artificial insemination are much higher than those for natural service, rapid genetic progress is achieved when one uses AI. Moreover, compared to natural service, while using AI, there is much less risk of transmission of venereal diseases and animals having detrimental recessive traits. Besides, AI is economical.

Proficient delivery of AI by service providers and AI technicians is judged by conception rates they achieve. To achieve maximum conception rates, it is necessary to follow certain essential protocols for delivering AI Services. Focus has to be on: genetic merit of bulls used; source and quality of semen used; maintenance of quality in transit, transfer, and storage; following correct technique in inseminating an animal; animal identification and complete follow up of each AI for pregnancy and calving etc. Failure to adhere to the protocols could lead to poor conception rate, and poor quality of new born animal.

This document provides detailed guidelines on standard operating procedures to be followed and minimum standards to be maintained for providing AI services to farmers.

1. AI Services at farmers' doorstep

The Minimum Standards aim at Quality AI Delivery at Farmers' Doorstep. AI services provided by a service provider shall be delivered preferably at the farmers' door step through Mobile AI Technicians located at strategic and logistically convenient locations. AI services should be provided to farmers in all villages and hamlets coming under the ambit of an AI Centre.

2. Breeding Policy

The AI service provider shall ensure that the AI technicians follow the breeding policy of the State and gather information relevant to breeding goals envisaged in the breeding policy.

3. Quality of frozen semen

Frozen semen shall be from frozen semen stations which have been following the minimum standards laid down by the Government of India for semen production and processing and graded "A" or "B" by the Central Monitoring Unit of GoI.

4. Semen storage and distribution

AI Service Providers should:

I. Store frozen semen doses in a well-ventilated, all weather safe storage area.

II. Ensure a proper and foolproof identification system for each semen container, canister, and goblet so that a bull's semen can be traced with ease.

III. While transferring semen doses, goblets should be well identified and precaution should be taken to see that each goblet has sufficient space for liquid nitrogen. Frozen semen should not be exposed above liquid nitrogen as it may cause irreversible damage to sperm viability.

IV. All transfers of semen straws into goblets should take place under liquid nitrogen, in a polystyrene / thermocole box.

V. Liquid Nitrogen should be replenished in both storage and distribution containers at regular intervals to ensure proper level of liquid nitrogen

VI. Details of semen doses supplied to various AI technicians at the time of dispatch should be recorded. After each dispatch, records redefining the position of remaining doses should be updated.

5. Liquid Nitrogen procurement, storage & delivery

Service provider shall have a bulk Liquid Nitrogen (LN) sourcing, storage and delivery facility.

A schedule of LN replenishment to all AI centres on fortnightly / monthly / quarterly basis, whichever is convenient depending on the field containers shall be worked out by each service provider and shall be adhered to in the interest of maintaining quality of semen. A log book shall be maintained for all such schedules at different locations/ starting points of supply routes.

The AI centre should have a bigger container for LN and FSD storage, preferably of 35 litre capacity, and a small portable LN container, preferably 2-3 litre capacity, to carry the FSDs to the place where the AI is carried out. The LN containers in the AI centre shall be protected sufficiently to avoid

damage to container. AI centre should have a dip stick with critical level marks and a ready reckoner for assessing the LN levels and quantity of LN in litres. Supply of LN should be either through portable LN tankers of 500 to 2000 litre capacity with gravitational flow or through the LN delivery pump and not by pouring LN from one container to another container.

6. AI guns, sheaths and AI accessories

Stainless steel AI guns from an agency whose AI guns are tested and approved by the testing stations identified by GoI shall be used for AI. AI sheath shall be from an agency whose AI sheaths are tested and approved by the testing stations identified by GoI.

AI accessories like forceps and scissors shall be made of good quality stainless steel. Thermos flask and thermometer shall be of good quality.

7. Engagement of trained AI Technicians

AI Service providers should ensure that they engage only those AI technicians who have undergone a training course in AI from a government recognised AI training institute and collect a copy of their training certificate at the time of appointment.

8. Standard Operating Procedures for AI Delivery

The Standard Operating Procedures that should be followed by AI technicians in carrying out AI and handling semen doses is given at Annex A. AI services providers should ensure that every AI technician has a copy of this SOP and he keeps it with him for reference whenever he goes for insemination work.

9. Animal Identification

Every animal receiving AI shall be identified with an Ear Tag with a unique number and a barcode. These numbers shall enable generation of reports concerned to the individual animal and the associated information through an information system.

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.

Figure. 1: Ear Tag

Figure. 2: Ear Tag Applicator

The specifications for the ear tag shall be: The male tag 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 with a minimum size of 55 x 65 mm. 12 digits are to be printed in two rows of six digits each.

The ear tag shall 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. 3: Ear Tagged animal

10. Complete follow up of all AI for pregnancy and calf birth

The service provider shall ensure 100% follow up of all AIs done by each AI technician. It is desirable to track AIs till calving and record all data related to pregnancy and calving including sex of new born calves. It is also important to generate relevant information and disseminate it to all concerned for monitoring and evaluation of AI services at all levels.

11. Conception Rate

Quarterly / annual targets for conception rate for cattle and buffaloes shall be fixed for each AI technician, depending on the breedable animal population in his ambit and age of the AI centre. Conception rates shall be calculated on First AI as well as on Overall AI basis for cattle, buffaloes and combined for both cattle and buffaloes at an individual animal level, supervisor level, regional level and for the organisation. Optimum targets for first AI conception shall be about 50% with ideal services per conception less than 2 AIs per pregnancy.

12. Supervision, Review of Activities and Communication

There shall be a hierarchy of supervisory mechanism. Every 20 AI technicians should have an AI supervisor. Every 60-65 AI centres should have a veterinarian to provide advisory services. A team of 200 AI technicians, 10 supervisors and 3 veterinarians shall form a region controlled by a Regional Officer. An effective communication network shall be in place for communication among the team members in a given area.

AI technicians, supervisors and veterinary officers of an area shall meet once in a month for a review of technical programme, business transactions as well as for scheduling the extension programmes. There shall be a monthly review meeting at regional level involving Regional Officer, veterinary officers and AI supervisors. Effective supervision is reflected in the accuracy of reporting, fixing the problems faced efficiently and effectively, acceptance of progress records by the system, promptness in business transactions and minimum backlogs.

13. AI Cost Calculations and Recovery

Service provider shall work out the cost of AI delivery at farmers' doorstep (and the collateral services of follow up visits for PD and calving as well as for advisory services) on monthly/quarterly/annual basis. A model AI Cost calculation is provided at Annex B. Every AI Service Provider should work out their cost of providing AI service and decide on charging for AI services.

Annex A

Standard Operating Procedures for Artificial Insemination and Semen Handling

General:

1. Keep the premises of the AI Centre clean and maintain all equipment, material and furniture properly.

2. Always keep the mobile phone available to respond to calls made by the farmers. In case there is likelihood of any delay, inform the farmer about expected time of visit.

3. Keep the breeding kit clean and before leaving the AI centre, check that the breeding kit has the following items:

    - Scissors
    - Thermometer/thaw monitor
    - Thawing Tray
    - Forceps
    - Sheaths with sheath container
    - AI Gun with container
    - Plastic gloves
    - Lubricant
    - Isopropyl alcohol/ surgical spirit
    - Tissue papers
    - Clean towel
    - Thermos-flask with hot water
    - Tags, pins and tag applicator
    - Apron

4. Be at the centre on the scheduled day and time of semen and liquid nitrogen delivery.

5. Promote AI services of the service provider in the assigned area.

6. Follow the tasks assigned from time to time by the supervisor /Area Officer.

7. While going for AI, always wear the uniform given by the service provider.

Semen handling:

1. Keep the liquid Nitrogen container in a location that allows easy withdrawal of semen doses & replenishment of semen and liquid nitrogen. The surrounding should be well ventilated, dry and dust free.

2. Clean AI gun, scissors and other accessories whenever they get soiled or at least once a week with hot water and air dry them. Sanitize the AI gun and the scissor with Isopropyl alcohol after drying. The AI Gun piston and the scissors should be wiped clean with water after each insemination. Surgical spirit and soaps are lethal to semen, hence should not be used to clean equipments.

3. Maintain the liquid nitrogen level above the straw level in the portable container.

4. Measure the liquid nitrogen level of 35 litre containers weekly with the help of measuring scale provided. Maintain the record of measurements to monitor the evaporation rate of containers.

5. Carry the required semen doses in the portable liquid nitrogen container to farmer's door step. Never carry semen straws in pocket/ thermos-flask / polythene bags filled with water/ice etc.

6. Maintain an accurate semen inventory to lessen the risk of semen exposure.

Insemination Technique:

1. After reaching farmer's place, first identify the animal, take the history of animal reported in heat from farmer and check past-breeding records.

2. Examine the animal externally and ascertain that animal is in heat. The best signs of heat are: clear, transparent, viscous and ropy vaginal discharge; swollen and congested vulva; hypersensitivity; increased activities/movement and mounting behaviour; frequent urination; bellowing; drop in milk yield etc. If external signs are not sufficient animal should be examined for uterine tone, etc., before insemination

3. Proceed with preparation of gun only when sure of heat.

4. Wash hands.

5. Have plastic gloves, sheath, gun, scissors, forceps, tissue paper, and clean towel ready before thawing semen.

6. Pour hot water from flask in the thawing tray and adjust temperature of water in the tray to 35 to 37 degree centigrade by adding cold or hot water.

7. Remove the semen straw from the container with forceps and not with hands. Before holding the straw by the forceps, cool its tips for few seconds. While taking out, raise the canister just high enough - not above the frost line. Remove the straw within 10 seconds.

8. Give a gentle jerk to the straw first to remove excess LN and quickly plunge it into thawing tray containing warm water at 35 to 37 degree centigrade for 20 to 30 seconds in the horizontal position.

9. Ensure that insemination gun and sheath also have temperature of around 37 degrees centigrade and not extremely hot or cold.

10. Take out straw from the tray and wipe the straw with clean towel. Note the bull number and batch number written on the straw.

11. Before loading the straw onto the gun, ascertain that air space in the straw is at the laboratory seal end.

12. Load the semen straw onto the gun and cut the straw at a right angle with a straight and sharp scissors just below the laboratory seal.

13. Take out the sheath by holding bottom of the sheath through a small hole at the corner of the sheath packet and place the sheath on the gun and secure the sheath firmly with o-ring lock. To ensure better hygiene, use individually packed sheaths instead of sheaths available in bulk packing.

14. Wear shoulder length plastic glove, preferably on left hand and hold the gun with right hand.

15. Ask the farmer to restrain the animal and hold the tail properly. Speak to the animal and make her calm down.

16. Lubricate the glove with the lubricant and lubricate the anus with gloved hand.

17. Gently put the gloved hand into the rectum by forming a cone with fingers. Clean the rectum by removing the faecal material.

18. Clean vulva with water and wipe with tissue paper.

19. Ask farmer to help spread the vulva.

20. Never allow gun's tip to touch external coat of the animal.

21. Insert insemination gun at approximately 30 degree angle till the gun reaches the fornix vagina to avoid entry of the gun into the urethral opening.

22. Hold the cervix firmly through rectum and slightly stretch it forward to unfold the vaginal folds.

23. Gently and smoothly pass the gun through the vagina to the opening of the cervical canal. Place cervix onto the gun, apply slight forward pressure on gun while manipulating the cervix slightly ahead of the gun.

24. Hold the external os of the cervix ahead of the gun's tip and negotiate vaginal folds and cervical rings to pass the gun through the cervix till the gun's tip reaches at internal os. Remember the process of passing the gun through vagina and cervix is the most difficult and delicate facet of insemination technique and perfection comes with practice and experience only, hence do not be impatient.

25. Feel the tip of the gun at internal os by gently moving the gun tip forward to ensure that the gun is in correct place (just at the entrance of the body of the uterus). Be certain the gun tip is not caught in a thin area between cervical rings or vaginal folds.

26. If the animal moves, STOP. Wait till the movement stops.

27. Hold the shoulder of the gun between your ring and middle fingers and push the gun piston with your thumb slowly (5 seconds) to deposit the semen at the entrance of the body of the uterus to allow semen to drain into the body of uterus. Gently remove the gun and check for abnormal discharge and a complete semen deposit.

28. Recheck semen ID – bull and batch number.

29. Properly dispose off the sheath, gloves and tissue papers. Clean the gun if needed.

30. Record breeding information in the specified format provided. Enter details of AI in PDA, if PDA is in use.

31. Blood on the gun tip and on the gloves indicate that too much force was used to pass the gun – be gentle and patient with the animal.

32. Ask farmer to release the animal and let her calm down.

Post Insemination Advice to Farmers

1. Ask farmer to keep the animal under observation for next 12-24 hrs.

2. If signs of heat persist even after 18-24 hrs, call for a repeat AI, otherwise observe for heat symptoms after 18-21 days and also after 36-42 days.

3. If animal does not repeat heat at 18-21 days intervals for two consecutive times, call AI Technician for pregnancy diagnosis after 2-3 months from the date of insemination.

4. Keep body of the animal cool by keeping animal in the shed and sprinkling water, if required.

5. If an animal does not conceive even after three consecutive AIs, farmer should be advised to get the animal examined by a veterinarian and follow his advice.

Post insemination follow-up:

1. Follow each and every animal inseminated after around 21 days to find out whether it has repeated.

2. Follow each and every animal inseminated for pregnancy diagnosis after 2-3 months and record the date and result of pregnancy diagnosis in the format provided and send it to the Area Office on a monthly basis. Enter details of PD in PDA, if PDA is in use.

3. During pregnancy diagnosis, corroborate the findings with date of insemination and in case of mismatch or otherwise also, ask farmer about the post AI events to know whether animal remained in heat for a long period or came again in heat after the insemination. If yes, after how many days? And whether farmer availed AI services of some other service provider or arranged natural service during the same or subsequent heat.

4. Follow each and every pregnant animal and record calving details of the animals inseminated in the format provided. Enter details of calving in PDA, if PDA is in use.

5. Maintain all records related to artificial insemination, pregnancy diagnosis, and calving and money transaction.

6. Advise farmers on proper heat detection, feeding, management and healthcare of animals as suggested by the experts. Also advise on the care and management of animal during advance pregnancy and after calving, including care and management of new born calves.

Annex B

COST OF ARTIFICIAL INSEMINATION

The following expenditure items may be considered while arriving at AI cost:

A. Variable Cost

1. Direct material:
   Cost of semen doses, sheaths, gloves, lubricant, etc.
2. Direct labour:
   Salary/Retainership/Commission/incentives to AI Technicians
3. Direct Overhead:
   Cost of liquid nitrogen used, cost of distribution of semen & liquid nitrogen

Total Variable Cost (1 to 3)

B. Fixed Cost

1. Staff salary
2. Administrative cost – Stationery, Telephone, Propulsion charges, uniform, AI kit etc.
3. Cost of promotion and extension
4. Cost of identification and ICT
5. Interest
6. Depreciation

Total Fixed Cost (1 to 6)

Total Cost = Variable Cost + Fixed Cost = (A+B)