

**Terms of Reference
For
Establishing Facility for producing Sex sorted semen
Doses of Indigenous Cattle and Buffalo breeds in West Bengal, India**

EOI No. (PBG SBS/GEoI No.1/2017-18)

Issued by
Paschim Banga Go Sampad Bikash Sanstha(PBGSBS)
LB-2, Sector-III, Salt Lake City, Kolkata- 700106, West Bengal, India
Tel No. +91-33-23350715, Fax No.+91-33-23350712
Email: ceopbgsbs2003@yahoo.co.in

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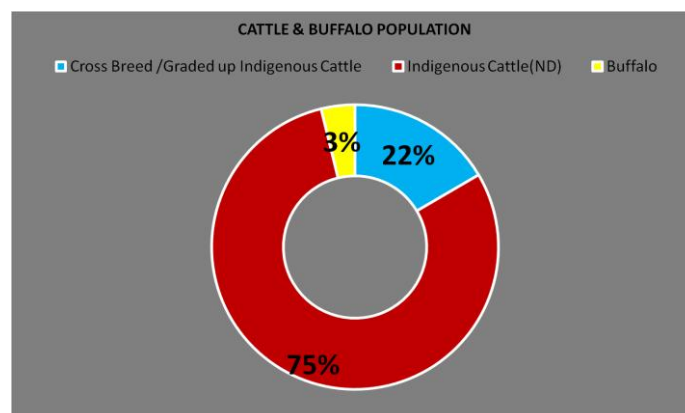
1. Background

India is the largest milk producer in the world. Milk production was estimated at 155.5 million tons in 2015-16; about 49% contributed by buffaloes, 48% by cows and the remaining 3% by goats. The past long-term growth in milk production in India has been significant compared to the total world milk production. In the last one decade the compounded annual growth rate in milk production in India has been about 4.8% against about 2% globally. The demand for milk in India is constantly growing. The demand for milk is expected to cross 200 MMT by 2021-22.

The country has a very large population of cattle and buffaloes; according to the Livestock Census 2012, the country had 76.69 million adult female cattle and 56.59 million adult female buffaloes. The country is bestowed with rich bio-diversity. There are uniquely identified 40 cattle breeds and 13 buffaloes breeds. Centuries of natural and human selection have resulted in genetically diverse breeds fitting into a wide range of environmental conditions and human needs each characterized by its unique adaptive and productive traits.

At present, some 110 thousand AI centres are in operation – 68 thousand are operated by the state government, 21 thousands by the cooperatives and another 21 thousand by NGOs/private. These centres together in 2015-16 carried out 67 million inseminations; 40.5 million by the state government/ other agencies, 15.8 millions by the dairy cooperatives and 10.7 million by NGOs and private. Through this huge network, however, about 30 percent of the breedable cattle and buffaloes are bred through AI at present and the remaining 70 percent are still bred through natural service. The overall conception rate of AI is assumed to be around 35% in the country. A massive drive has been initiated to cover the majority of breedable cattle and buffaloes under AI. There are 53 semen stations in the country producing about 100 million doses. Nine of these semen station are with cooperatives, 37 with state and central governments, 4 with NDDB's sister organization and 3 in private.

West Bengal State is having annual milk production of 51.83 Lakh MT which is ranked 12th in the Country and per capita availability of Milk 145 gm/day. As per the 2012 census the breed wise Bovine distribution is as follows:



- PBGSBS has in house capacity to produce 5.5 million Frozen Semen Doses from its State of the art production facility at Haringhata, Salboni & Beldanga.
- PBGSBS has strong work force of more than 6000 expert Inseminators comprised of Vets & Para-vets & Private AI Worker. Another 1389 AI Private AI Workers are in queue for starting their work. The State perform 3.8 million Artificial Insemination in Bovine during 2016-17 and has a target of 6.2 million Artificial Insemination in 2017-18

The detailed Breed wise composition of female herd in West Bengal is as follows:

Type of Bovine	Total Female (million)	Breedable (million)	No. of animals in milk (million)
Crossbred	2.36	1.77	0.99
Indigenous	7.97	5.18	2.92
Buffaloes	0.22	0.13	0.09
Total	10.55	7.08	4.00

In India context use of sexed semen is very relevant. First, many states in India have banned cow slaughters, consequent to which many unwanted male calves survive limiting feed and fodder resources to productive cows. In many situations, male calves are just abandoned and their welfare is severely compromised. Applying sexed semen can solve this problem to a great extent. Second, the technology can help in increasing the supply of replacement heifers, leading to higher milk production. Increased production of heifers may also help in increasing the herd strength much faster at lesser cost and with no risk of introducing diseases compared to when one has to purchase animals from other farmers. Increased availability of heifers may also provide an additional opportunity to farmers to sell surplus heifers to other farmers. Third, the technology can speed up genetic improvement by enhancing the efficiency of both progeny testing and embryo transfer and IVF programmes. Fourth, dead, dying or damaged sperm cells are eliminated in the sorting process ensuring only viable sperms. This helps the sexed semen more successful in low dosage. Fifth, by producing a female calves using sexed semen, there could be less difficult births compared to male calves (dystocia). This is particularly useful for maiden heifers. Sixth, higher productivity may also help in reducing methane gas production from animals mitigating impact of climate change and helping in reducing overall global warming.

Considering the relevance of the sexed semen technology in India, the Government of India, has decided to establish semen sexing facilities for indigenous breeds of specified standards at top 10 Semen Stations in India. As per grading of CMU during 2015, Salboni Semen Station of West Bengal stood 2nd and eligible for establishment of Semen sorted facility under NMBP.

2. Objectives and expected results

The state Government of West Bengal wishes to engage a indentified service provider to create facilities to sort semen at its semen station located at FSBS SALBONI from raw semen ejaculate harvested from indigenous bulls of cattle and buffaloes to produce semen doses having gender specified sperms (either X or Y bearing chromosomes). The specific objectives include:

1. To produce sex sorted semen doses from raw ejaculates harvested from bulls of indigenous breeds of cattle and buffaloes with the following specifications:
 - a. Purity of Primary gender: Not less than 90% (should be supported by appropriate laboratory test)
 - b. Concentration : Not less than 2.1 M per dose
 - c. Packed in 0.25 ml straw
 - d. Post thaw motility: Progressive motility of minimum 50% at 0 hr and 30% at 3 hr post thaw
 - e. Intact Acrosomes: Greater than or equal to 50%
 - f. Field conception rates across herds not less than 92% of the conventional semen under similar conditions
2. To create sex sorted semen dose production facilities at FSBS SALBONI to produce a minimum of 200,000 gender specified sex sorted semen doses per year.
3. To promote the use of sex sorted semen doses in the country.

3. Scope of the work

The service provider will carry out sorting of semen to produce desired sex sorted semen doses of Indigenous cattle and buffalo breeds, whereas the PBGSBS semen station located at Salboni will provide raw ejaculates of specified specifications to the service provider. The details on the activities to be carried out by the service provider and the semen station are given below:

3.1. Scope of work for Service Provider

The Service Provider will:

1. Set up and maintain a sexed semen sorting laboratory with the necessary equipment at its own cost;
2. Hire, train and compensate the appropriate personnel necessary for the purpose of processing of sorted semen;
3. Put in place an appropriate information system to evaluate the semen sorting process objectively.
4. Make available sex sorted semen doses of required specifications and number as mentioned under objectives and expected results.
5. Transfer of technology after completion of project and making provision for training of PBGSBS personnel on this technology.
6. sell the machine with all accessories to PBGSBS after completion of project as per mutually determined price as well as in accordance with existing financial rules of Govt. of West Bengal.

3.2. Requirements to be met by the semen station

The Salboni semen station will:

- I. Provide adequate lab space as per the specification provided by the Service Provider to accommodate their equipment and be responsible for:
 - Initial set up of the lab including laboratory work benches
 - Liquid nitrogen requirements for the lab on cost basis
 - All maintenance and upkeep of the laboratory, including liquid and solid waste disposal
- II. Make available to the laboratory uninterrupted supply of water, electricity, internet, telephone connection, general air conditioning, and temperature controlled storage room for

consumables. However the recurring cost thereon will be met by the Service Provider periodically.

III. Provide raw ejaculates of bulls meeting the following specifications:

- Semen is diluted for motility analysis via microscopic inspection
 - Minimum motility of 70%
- Microscopic evaluation for Abnormalities(maximum allowed):
 - Primary Abnormalities(head deformities): 15%
 - Secondary Abnormalities (mid piece and tails) :15%
 - Total Abnormalities- not to exceed : 25%
- Concentration of sperm will be determined via nucleo-counter:
 - Concentration should be approximately: 1 Billion (1.0×10^9) sperm/ml, with a minimum of 3 Billion sperm per sample
- Nonviable count: Not to exceed 20%

IV. Buy the specified number of primary gendered straws that meet the agreed quality specifications given under objectives and expected results at an agreed price during each contract year.

4. Logistics and Timeline

The Project will be implemented in two stages: Stage-I: Setting up semen sorting facilities to produce 200000 sex sorted semen doses at Salboni FSBS, and Stage II: Production of sex sorted semen doses of indigenous breeds of cattle and buffaloes;

The first stage is to be completed in three months. Having satisfied with the results, production of sex sorted semen of Indigenous cattle and buffalo breeds to commence and 200000 (two lakhs) sex sorted semen doses to be produced in first year.

5. Monitoring and Reporting

The service provider will provide the following to the concerned End Implementing Agency(i.e. semen station):

- Monthly progress report on technical and financial matters
- Problems and constraints encountered
- Planned activities for the ensuing month
- The progress will be reviewed every quarter by a Project Review Team and the observation there on to be complied by the service provider

6. Documents to be submitted

The Service Provider will have to furnish their particulars including, name of contact person, address for communication, e-mail address, telephone numbers, information indicating that they are qualified and interested to perform the services as mentioned above.

In this context, the following documents/information needs to be submitted along with EOI:

- I.Details of similar assignments(already completed/ongoing)
- II.Copies of Certification & accreditation credentials
- III.Reference (including email and telephone numbers) of at least three major customers.
- IV.Availability of required machinery/ technology/manpower.
- V.Financial credentials
- VI.Indicate tentative schedule for completion of the job specified above

In addition, applicants must provide two clearly labeled electronic / softcopies of the prequalification documents.

Failure to provide any of the listed documents or information shall negatively affect the qualification to participate in the tendering process. Notwithstanding the submission of this documentation, PBGSBS is neither committed nor obliged to include any agency on the tender list or awards any form of contract to any agency and/or associated agencies.

Please note that this is not an invitation to tender. Full tender document will be provided only to the agencies who have been successfully pre-qualified through this EOI and suitable to provide this service/execute the project.

Interested agencies having relevant experience and expertise as required for the above job and willing to provide services/execute the job, are invited to submit their EOI at our e-mail id: ceopbgsbs2003@yahoo.co.in within **25.08.2017**, followed by hard copies and two clearly labeled electronic / soft copies of the same through courier / post superscribing “ Expression of Interest No. PBGSBS/GEoI No.1/2017-18 “TO PROVIDE FACILITY FOR SEX SORTED SEMEN” at the following address:

Paschim Banga Go Sampad Bikash Sanstha (PBGSBS)

LB-2, Sector-III, Salt Lake City, Kolkata- 700106, West Bengal, India

PBGSBS reserves the right to (a) accept or reject any / all EOIs submitted parties (b) cancel the process at any time without any liability and assigning any reason thereof.

Sd/-
Chief Executive Officer