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Bull station and semen production

– An unsung profitable venture in India

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Semen is the basic input in dairy farming as like seed in crop farming. Semen production in India is mainly done by government and private sector. Private semen production and processing farms are in limited numbers and concentrated mainly in certain areas. Fixed and variable cost for establishement of bull farm was higher. Even though the initial investment in the bull farm is higher, the farm income was comparatively higher than that of other dairy farm business. Establishement of bull farm will helps to increase the availability and accessibility of semen straw at the door step of dairy farmers which in turn helps to increase the coverage of AI in the country.

Keywords: Artificial insemination, Bull station, Semen

ARTIFICIAL insemination (AI) using frozen semen is a highly disseminated reproductive technology in the field of animal breeding not only in India, but also across the globe despite the advent of recent technologies such as ovum pick up, embryo transfer and cloning. The 50 semen stations in India, produced, 97.12 million semen doses during the year 2014-15 but the demand for semen doses in 2021-22 is estimated to be around 140 million doses. Moreover, only one-third of the breedable bovine population was covered by AI and the remaining two-thirds are either bred naturally or left un-bred. Therefore, maximizing semen production is the need of the hour, to meet out the requirements. According to 2014-15 data, government semen stations (50%), cooperative (15%), NDDB (25%), NGO and private (10%) semen stations contributed to the overall semen production, among which contribution of private semen stations was the least. The demand and profit are higher but the number of private semen stations is very less due to lack of awareness among the people. The success story of one of the private-owned bull semen stations in Karnal district of Haryana, is an eye opener

Fig. 1. Technician collecting Murrah buffalo semen in the farm

Shri Surjeet Guliya, aged 42, holding 4 acres of land, started bull semen production as entrepreneurship in the name of S.A.B. Semen Bank at Madhuban village, Karnal district of Haryana in 2016. In the initial stage, the semen unit was started with 5-6 bulls as subsidiary unit along with the main business i.e. commercial dairy farm; in order to diversify the farm business. However, over the period of time, he realized that the semen unit was making more profit as compared to dairy unit, so he gradually reduced the population of milch animals and finally converted the farm into a semen production

unit. At present, the bull farm maintains a diverse germplasm of exotic, crossbred and indigenous breeds of cattle and buffaloes for semen production such as Holstein Friesian, Jersey and their crosses, Gir, Hariana, Tharparkar, Sahiwal, and Murrah buffalo. Total herd size of this farm is about 35, among which 28 are in the semen production stage. The volume of semen production per bull varies with the breed, individual and ranging from 3-7 ml. In a week two collections per bull (two ejaculate per collection at 20 min interval) were performed by a technician appointed at the farm (Fig. 1). After the collection, technician checks/analyzes colour, volume, sperm concentration, mass activity and initial motility. The semen samples, which failed to fulfill the minimum standards of these parameters were discarded (20-40%) and other ejaculates were diluted with extender and filled within straws based on colour coding norms through filling and sealing machine in the lab. The straws were then processed for equilibration, manual freezing and finally plunged into Liquid nitrogen containers for storage. Post thaw motility of sperm was assessed after 24 hours of storage and then samples with >50% post thaw motility were permanently stored in Liquid nitrogen until sale.

Table 1. Fixed cost involved in the establishment of bull farm

Particular	Cost (₹)
Cattle shed	6,00,000
Buying of animal (12)	8,40,000
Chaff cutter (2)	30,000
Chaff cutter shed, Feed storage	2,75,000
Cryo-container	4,90,000 (55 litre *14)
AV (6)	42,000
Photometer	8,00,000
Filling and sealing machine	14,00,000
Microscope	1,50,000
Equilibration	40,000
pH paper	250
Micropipette	1,500
Incubator (*2)	55,000
Glassware	5,000
Water bath	25,000
Slide warmer	20,000
Generator/electricity	15,000
Total	**47,88,750**

Fig. 2. Labour preparing feed for bulls at the semen station

Fixed investment of the bull station and semen processing lab is higher than that of commercial dairy farm since the cost of semen processing equipments are high. S.A.B semen station is also not exceptional, which was started with the total fixed cost of ₹ 4,788,750, in which 63% of the amount was only utilized for the purchase of semen processing equipments (Table 1). The cost for the purchase of animals was relatively less for this farm, because they started with bull calves of their previous dairy venture and of nearby farmers. In order to reduce the cost, the owner did not establish bull exercise unit, in spite of that animals were allowed to walk around the paddock. In addition, he was using normal freezer instead of standard equilibration chamber or cold handling cabinet.

The farm incurring variable cost of ₹ 5,376,017/year (Table 2), in which the cost for the purchase of additional bulls was higher, since they bought only elite bulls based on their high lactation record, phenotypic characters and their records in dairy melas. Next to the purchase of bulls, cost of feeding was expensive, which includes concentrate, dry fodder and mineral mixture. Green fodders such as maize (African tall), sorghum, berseem were grown in his 4 acres of land according to the season (Fig. 2).

Table 2. Recurring expenditure of bull farm per year

Particular	Cost (₹)
Veterinary aid/ medicine (vaccine)	300,000
Losses due to resting animals during disease and loss of animals due to disease	260,000
Chemicals (buffers and extenders)	312,000
Liquid nitrogen	416,000
Feeding (concentrate, dry fodder and mineral mixture)	8,35,017
Equipments repair	40,000
Building/shed repair	50,000
Electricity	48,000
Addition/buying of animal (8-10)	18,00,000
Middlemen commission charge	5,00,000
Transportation charges for straw	85,000
Promotional activity (mela)	70,000
Labour (4)	6,60,000
Total	**5,376,017**

During the harvesting time of rice (Oct-Dec) and wheat (April-May), the farm owner regularly faced shortage of green fodder. He managed the shortage through making silage or purchase green fodder from outside fodder market at the rate of ₹ 2/kg

This farmer also spent significant money for promotional activities *viz*, pamphlets, internet advertisements and krishi/dairy melas. On an average

Table 3. Total income earned from the bull farm per year

Particular	Income (₹)
Sale of straw	7,260,000
Sale of adult bulls	140,000
Rewards in mela	50,000
Income from the semen collection and processing of outsider's bulls	525,000
Total gross income	**7,975,000**
Net income (Gross income-Variable cost)	**2,598,983**
Net income (per month)	**216,581**

the farm produces 10,000-11,000 straws/week. Straws produced at this farm are marketed mainly in the states of Haryana, Punjab, Gujarat, Rajasthan, Uttar Pradesh, Uttarakhand, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu through agents available in the respective states, who charges commission of ₹ 1-2/straw. The mode of transport of straws stored in liquid nitrogen container was through train. Medical expenses include, vaccines (hemorrhagic septicemia, black quarter, brucellosis, foot and mouth disease), periodical screening for brucellosis and treatment of sick and injured animals.

The selling cost of one straw is ₹ 13 excluding commission charges. Besides the straw production from their own bulls, the farm also collects and process other farmer's bull semen with a commission charge of ₹ 25/ straw. Every month, a minimum of 3-4 outsiders bull's semen were processed and the majority of those bulls were champions of many dairy mela. Aged bulls were usually sold to nearby farmers who can use those animals for natural breeding and injured or diseased animals were left as stray animals or given to gaushalas. He was utilizing the dung and urine of the animals as manure for fodder production. He participated and won prizes in various melas conducted in places including Haryana, Punjab, Rajasthan, Uttarakhand and Uttar Pradesh. On an average, two of his bulls bagged awards in dairy melas every year. Hence, he was getting the total gross income of ₹ 7,975,000/ year (Table 3). Since he was spending variable cost of ₹ 5,376,017/ year, his final net profit per annum was ₹ 2,598,983 with monthly income of ₹ 2.16 lakh.

Even though he ran a profiteering business, there is a hope for improving his income through own feed preparation, self made extenders and diversification strategies include biogas plant and vermicompost preparation. His farm can be eligible for registration under Central Monitoring Unit (CMU) by inculcating quarantine shed, hygienic practices, and standard equipment for equilibration, standard floor space requirements and bull selection techniques as per standard breeding soundness evaluation procedures. Adopting these practice and standards will help the owner to reduce the cost, which in turn increase the profit of his venture.

In spite of higher investment involved in the establishment of bull farm, profit is also significantly higher as compared to other dairy business. Though the net profit of semen station is higher than dairy farm, lack of awareness among entrepreneurs and farmers, requirement of technical skills for semen processing as well as the requirement of strategies for semen marketing makes the semen station relatively a complicated business. As this business requires more investment, it may not be suitable for small farmers with less capital but it may be a viable option for large farmers who can invest considerably good capital. As the AI coverage in our country is only 35%, the state and central animal husbandry department is developing strategies to create the awareness about AI among the dairy farmers for increasing its coverage percentage. Hence, the private semen stations may help in augmenting the availability and accessibility of semen straws at the door step of dairy farmers at reduced cost; and in turn it will increase the coverage of AI in our country.

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