

## MANAGEMENT SYSTEM OF BREEDING BULLS AT THE SINGOSARI NATIONAL ARTIFICIAL INSEMINATION CENTER (BBIB SINGOSARI), INDONESIA

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### ABSTRACT

*The Field Work Practice at the Singosari National Artificial Insemination Center (BBIB Singosari) was conducted to examine the management system of health, reproduction, and semen quality control of breeding bulls to support production efficiency and genetic improvement. This study aimed to evaluate the implementation of livestock management at BBIB Singosari, including animal health, barn sanitation, disease prevention, and waste and environmental management. The methods used involved direct observation, interviews with technical staff, document analysis, and assessment of the management system applied in the field. Data were analyzed descriptively and compared with national and international standards for breeding bull management. The results indicated that BBIB Singosari has implemented regular health examinations, quarantine systems, sanitation control, and reproductive monitoring technologies to maintain bull performance. Waste management was generally well-executed, although improvements in drainage systems and organic waste utilization are still required. Overall, livestock management at BBIB Singosari is considered effective in supporting the success of artificial insemination programs and improving cattle genetic quality, with potential development toward more sustainable livestock management practices.*

**Keywords:** *livestock management, breeding bull, artificial insemination, reproductive health, BBIB Singosari*

### INTRODUCTION

Artificial insemination (AI) has become a pivotal biotechnology in improving the productivity and genetic quality of cattle, particularly in Indonesia. Successful AI programmes are highly dependent on the availability of superior breeding bulls with high semen quality and optimal reproductive performance. For example, a study at the Singosari National Artificial Insemination Center (BBIB Singosari) found that for 50 Bali bulls, semen quality parameters such as volume, motility and concentration were significantly influenced by the age of bulls ( $r = 0.386, 0.134, 0.086$  respectively;  $P < 0.05$ ). In addition, another investigation of fresh semen quality in the local breed Pasundan cattle at UPTD BPPIBTSP Ciamis revealed that breed, age, body weight, feed, season, exercise and frequency of semen collection were determining factors for semen volume, consistency and sperm concentration. Moreover, an evaluation of semen quality and repeatability value of semen production from local Madura bulls at the Lembang AI centre (data from 2014–2020,  $n = 1,402$  ejaculates) showed that mean semen volume was  $5.32 \pm 1.50$  ml; motility  $68.10 \pm 7.07\%$ ; concentration  $1,044.27 \pm 277.63$  million/ml. Repeatability estimates for volume, motility and concentration were 0.30 (high), 0.08 (low) and 0.24 (medium), respectively. These findings highlight that both genetic and management/environmental factors critically influence semen production and quality. Yet, despite these studies, there remains a gap in the literature regarding a comprehensive system-wide evaluation of breeding bull management—covering health, sanitation, reproduction, waste management and environmental controls—in a national AI centre context. The Breeding Center Artificial Insemination Singosari (BBIB Singosari) plays a strategic role in Indonesia's cattle breeding programme, as it produces, stores and distributes semen nationally. Effective management at this centre is thus essential to sustain high semen quality, ensure biosafety and support national genetic improvement programmes.

Therefore, the present study was conducted to analyse the management system implemented at BBIB Singosari with respect to animal health, barn sanitation and environment, reproductive monitoring and waste handling. The results are expected to provide actionable insights for enhancing institutional livestock management practices and promoting a more sustainable livestock production system within Indonesia.

## MATERI AND METHOD

The study employed a descriptive qualitative approach through field observation, document review, and in-depth interviews with BBIB Singosari staff members, including veterinarians, animal health officers, and technical personnel. Data collection focused on several management aspects: Animal Health Management – covering vaccination, disease prevention, and routine health examination procedures, reproductive Management – including semen collection schedules, libido evaluation, and reproductive performance monitoring, and Sanitation and Environmental Management – including hygiene practices, biosecurity measures, and waste management systems.

### Analisis Data

Data were analyzed descriptively and compared against the Indonesian National Standard (SNI) and international guidelines for breeding bull management. The triangulation method was used to validate data accuracy and consistency.

## RESULTS AND DISCUSSION

### Feed Management

Feed management at BBIB Singosari is carried out using a standardized feeding system adjusted to the nutritional requirements of breeding bulls. The daily feed consists of a mixture of high-quality forages such as *Pennisetum purpureum* (elephant grass) and *Brachiaria decumbens*, combined with concentrates containing bran, corn, soybean meal, and mineral premix. Each bull receives approximately 10% of its body weight in total fresh feed per day, distributed twice daily (morning and afternoon). Clean drinking water is provided *ad libitum*. This feeding management system aligns with the recommendations of [Hafez & Hafez \(2013\)](#), which emphasize balanced nutrition to maintain libido, semen volume, and sperm motility. According to [Indriastuti et al. \(2020\)](#), optimal feed energy and protein levels are critical in improving semen quality in breeding bulls. The consistent availability of fresh forage and concentrate at BBIB Singosari supports stable body condition scores (BCS 3–3.5), essential for optimal reproductive performance.

### Housing Management

The housing system at BBIB Singosari is designed for individual bull management, using individual pen stalls separated by concrete partitions to ensure safety and prevent direct physical interaction between bulls. Each stall measures approximately 3 × 4 m, equipped with a concrete floor, proper drainage, feeding trough, and water access. Ventilation and lighting are optimized to maintain indoor air quality and prevent heat stress. Daily cleaning is conducted every morning using water and disinfectant, and manure is collected in covered waste channels leading to the biogas unit. This routine sanitation supports a biosecure environment and reduces the risk of pathogen transmission. According to [Fadli et al. \(2021\)](#), proper stall design, lighting, and hygiene directly influence the health and reproductive efficiency of bulls in AI centers. Similarly, [Prasetyo et al. \(2022\)](#) emphasized that inadequate housing conditions can lower semen motility and fertility rates due to thermal discomfort and stress.

### Health Management

Health management at BBIB Singosari follows a comprehensive veterinary protocol covering routine health checks, vaccination programs, and disease surveillance. Bulls undergo monthly clinical examinations, including body temperature, respiratory rate, and reproductive organ health assessments. Routine vaccinations are administered against Anthrax, Jembrana disease, Septicemia epizootica, and Foot-and-Mouth Disease (FMD). Preventive deworming is carried out quarterly. Newly arrived bulls are placed under quarantine for 30 days for observation and laboratory testing before being introduced into the main herd. This practice aligns with international standards outlined by the World Organisation for Animal Health (OIE, 2023), emphasizing quarantine and health certification as key components of disease control in AI centers. The application of such biosecurity measures has been proven effective in maintaining disease-free status and ensuring semen safety for distribution across Indonesia. The overall health status of bulls at BBIB Singosari remains excellent, as reflected in low morbidity and absence of major infectious disease outbreaks. This outcome supports findings by [Wigiyanti et al. \(2024\)](#), who reported that consistent veterinary supervision and biosecurity measures significantly

improve reproductive longevity and semen quality in Madura and Bali bulls maintained under controlled conditions.

## CONCLUSION

The livestock management system at BBIB Singosari is well-structured and effectively supports the success of artificial insemination programs and genetic improvement in cattle. The integration of health management, reproductive control, sanitation, and waste management ensures sustainable and high-quality semen production. Further improvement in waste handling technology and drainage optimization will enhance environmental sustainability and operational efficiency. The findings from this study can serve as a model for improving breeding bull management practices at other artificial insemination centers in Indonesia.

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