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Designing A Cattle Farm Based On Modern Architecture In Banyuwangi Regency

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ABSTRACT

Banyuwangi Regency is one of the regions with significant potential in the livestock sector, particularly beef cattle, which serve as a major contributor to local meat production. Despite its large cattle population and strategic position as a livestock distribution hub in East Java, existing livestock and cattle trading facilities in Banyuwangi are still predominantly traditional, lacking proper hygiene, efficiency, and compliance with animal welfare and sanitation standards. Problems related to inadequate housing infrastructure, poor health management, limited market access, and insufficient waste treatment remain major constraints that affect the productivity and quality of livestock. This study and design proposal aim to develop a concept for a modern architecture–based cattle farming and trading facility capable of addressing these issues. The design approach integrates four main perspectives: a functional approach to optimize cattle management and trading activities, an ecological architectural approach to ensure environmental sustainability, a socio-economic approach to improve farmer welfare and strengthen the local economy, and a contextual approach that aligns the design with the cultural and climatic characteristics of Banyuwangi. The proposed facility includes modern barns, veterinary health units, hygienic trading areas, educational spaces, feed storage facilities, and an integrated waste-management system. The results indicate that providing standardized, hygienic, and environmentally friendly livestock facilities can improve distribution efficiency, reduce disease risks, and enhance farmer productivity. Moreover, the integration of modern technology and zoning strategies based on animal welfare provides a better environmental quality for both livestock and facility users. Consequently, this design is expected to serve as a sustainable model for cattle farming and trading facilities while strengthening Banyuwangi's position as a regional livestock agribusiness center.

Keywords: *Cattle Farming, Modern Architecture, Animal Trading Facilities, Watershed, Animal Walfare, Sustainability*

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INTRODUCTION

Banyuwangi Regency is one of the areas at the eastern tip of Java Island that has great potential in the livestock and animal trade sectors. Its strategic geographical position — directly opposite the island of Bali and close to sea and land transportation routes — makes Banyuwangi an important distribution center in the movement of livestock commodities in East Java and the eastern region of Indonesia. However, behind this potential, there are a number of challenges that need to be considered. In the livestock sector, problems that often arise include the availability of quality feed, animal

health (infectious diseases in livestock), and the need for technology for processing livestock products that are still limited. In terms of trade, the challenges faced include a long distribution chain, fluctuations in the price of livestock, and the need for a hygienic and standard-compliant modern animal market. Along with the development of national and regional development, Banyuwangi faces challenges and opportunities to optimize its role as a strategic area by utilizing local potential and infrastructure.

Banyuwangi Regency is one of the areas in East Java, Indonesia that has great potential in the agriculture and livestock sector. Geographically, Banyuwangi has a large land area and a tropical climate that supports livestock cultivation activities such as beef cattle, dairy cows, goats, and sheep. Based on data from the Central Statistics Agency (BPS) of Banyuwangi Regency in 2023, the number of beef cattle population reached more than 130,000 heads and the goat population reached more than 90,000 heads (BPS Banyuwangi, 2023). This data shows that the livestock subsector has a significant contribution to the regional economy.

For this reason, the determination of strategic trade and livestock areas in Banyuwangi is very important. This is in line with the direction of regional development which emphasizes strengthening the local economic base sector, increasing competitiveness, and developing an organized and sustainable animal trading system. With good management, this strategic area is expected not only to improve the welfare of farmers, but also strengthen Banyuwangi's position as one of the centers of trade and animal husbandry in East Java.

RESEARCH METHOD

The method used in this study is quantitative research, which is a systematic investigation process to describe, explain, and predict the relationship between variables using measured data (Kelinger, 2000).

Data Collection Method

The data collection method in this study is in the form of a literature study. Data was obtained by examining various literature sources such as books, journals, scientific articles, and previous research that are relevant to learning motivation variables. Literature studies are conducted to obtain theoretical foundations, clarify concepts, and support research formulation.

Data Presentation Method

The data obtained is then presented through the form of graphics, photos, tables, and descriptions obtained from reliable sources.

Data Analysis Methods

After presenting the data, then the data enters the analysis and synthesis stage. The analysis is carried out by describing the problem based on its classification based on previously obtained data. Synthesis is carried out after the problem has been successfully analyzed so that the problem can find a suitable solution.

FINDING AND DISCUSSION

EXISTING CONDITIONS

Banyuwangi Regency has potential in various types of livestock. However, when it comes to the concentration of the amount of meat contribution, the most dominant

livestock is beef cattle which are able to produce 1,886,986 Kg in 2020. The production of livestock products in 2020 decreased compared to 2019, namely beef cattle, beef cattle production in 2020 decreased by 937,905 kg or by 33.20%. It can be understood that in 2020 the Covid-19 outbreak had an impact on various sectors of the economy. Beef cattle production in Banyuwangi Regency decreased very drastically in 2020, one of the reasons was due to the Covid-19 pandemic conditions which resulted in economic conditions.

Meat production in Banyuwangi Regency is dominated by chicken and beef production. Meanwhile, the smallest meat production is in the production of horse and pork meat. The following is data on the overall meat production achievement in Banyuwangi Regency:

Table 1 Existing Data

No.	Aspect	Description / Data	Source
1	Beef cattle population (2016)	115,386 head	Dinas Pertanian & Pangan Banyuwangi
2	Beef cattle population (2017)	116,274 head	Dinas Pertanian & Pangan Banyuwangi
3	Beef cattle population (2018)	119,834 head	Dinas Pertanian & Pangan Banyuwangi
4	Beef cattle population (2019)	126,451 head	Dinas Pertanian & Pangan Banyuwangi
5	Beef cattle population (2020)	128,609 head	Dinas Pertanian & Pangan Banyuwangi
6	Beef cattle population (2024)	116,784 head	Suaraindonesia.co.id (2024)
7	Beef cattle population (2025)	±82,093 head (2,865 ready for slaughter)	Naskah.id (2025)
10	Foot-and-Mouth Disease (FMD) cases (Jan 2025)	404 cattle infected, 4 cattle dead	Antaranews.com
13	Facility conditions	Simple cattle sheds (bamboo/wood), no separation between dirty and clean zones	Field observation analysis
14	Waste management	Not yet optimal, manure has not been processed into biogas/fertilizer	Field observation analysis
15	Technology implementation	Minimal (no temperature sensors, automatic ventilation systems, etc.)	Field observation analysis
16	Development potential	Large land availability, supportive climate, and government agribusiness programs	Pemkab Banyuwangi

Banyuwangi Regency which has leading sectors in the tourism, agriculture, livestock, trade and industry sectors. In Presidential Number 80 of 2019, East Java Province is divided into 8 Development Areas (WP) which include WP Gerbangkertosusila Plus, WP Malang Raya, WP Madiun and Surrounding Areas, WP Kediri and Surrounding Areas, WP Probolinggo Lumajang, WP Blitar, WP Jember, and WP Banyuwangi. WP Banyuwangi has the function of developing areas of agriculture for food crops, horticulture, plantations, livestock, forestry, fisheries, mining, industry, education, health, and tourism. There are several problems that exist in the existing condition:

Table 2 Problems of Existing Conditions

No	Problems
1	Supporting facilities such as feed areas, waste shelters, milking areas, and quarantine rooms are not adequately available.
2	Banyuwangi Regency has potential in cattle. Beef cattle production in Banyuwangi Regency has decreased due to FMD infectious diseases.
3	Livestock health maintenance and management are not optimal in small-scale farms and small stalls. So that the management aspect, the design of the enclosure, is very relevant for modern architectural research.
4	Local farmers face difficulties in accessing wider markets, both regionally and nationally, which can limit their income potential.

EXPECTED CONDITIONS

The purpose of building trade facilities in Banyuwangi Regency is prepared by considering the potentials and challenges faced by the region, as well as the development vision to be realized in the future. On this basis, various strategic issues are formulated as guidelines in directing optimal space utilization, encouraging economic growth, preserving the environment, and improving community welfare in a sustainable manner, including:

Table 3 Expected Conditions

No	Impact on Location	Remarks
1	Wider market access	Local farmers have wider market access and the selling price of livestock becomes more stable.
2	Modern Facilities Available	The availability of modern facilities increases the efficiency of livestock businesses so that farmers' income increases.
3	Banyuwangi Becomes a Livestock Center	Banyuwangi Regency has become a center for livestock trade in East Java and even regionally, with a faster and more organized distribution system.
4	Zones by function	The facility is equipped with healthy, hygienic cages, and animal health laboratories, thus reducing the risk of infectious animal diseases and maintaining community food safety.

5	Economic and Market Support	Encouraging the growth of the MSME sector based on processed meat products, giving a chain effect arising from one economic activity, namely the animal trade sector
6	Increasing Employment	The presence of large-scale facilities opens up many jobs for the surrounding community (farmers, traders, market workers, transportation services).

RESEARCH AND DISCUSSION

Object Description

Livestock facilities are facilities and infrastructure designed to support the optimal maintenance, breeding, fattening, and management of livestock. According to the Ministry of Agriculture of the Republic of Indonesia, livestock facilities include cages, feed and drinking places, quarantine areas, waste handling sites, and supporting infrastructure such as roads, warehouses, and animal health laboratories. This object not only functions as a place to raise animals**,** but also as an organized animal trade center so that it is able to ensure the quality of livestock, support efficient distribution, and improve the welfare of breeders and traders. According to Siregar (2016), it is explained that livestock is a human endeavor related to the maintenance, breeding, and production of livestock in order to produce food products, energy, and other derivative products, as well as support international trade. Therefore, livestock facilities must be designed to support animal welfare and productivity.

The facility is designed to comply with the following technical, biosecurity, and regulatory standards:

1. The cage area with a capacity according to the type of livestock.
2. Animal health facilities (clinics, quarantine rooms).
3. An animal market with a hygienic buying and selling system
4. Operational support facilities (feed warehouse, parking, administration room, education room).
5. Environmental management system (waste treatment, drainage, and green space).
6. Road circulation and lighting ventilation.

Table 4 Definition and Standards of Objects

Aspects	Standard A (High)	Standard B (Intermediate)	Standard C (Basic)
Cage per head (adult cows)	3–4 m²	2.5–3.5 m²	2–2.5 m²
Calf pen	2 m²	1.5–2 m²	1–1.5 m²
Flooring	Anti-slip reinforced concrete, optimal drainage	Simple concrete, standard drainage	Soil or boards, minimal drainage
Roof / Ventilation	Roof ≥3 m, maximum cross ventilation	Roof 2.5–3 m, standard ventilation	Roof 2–2.5 m, limited ventilation

Natural lighting	10–15% of floor area	7–10% of floor area	<7% of floor area
Feed & drink facilities	Separate place, easy to reach	A simple place, partly detached	Makeshift places, sometimes combined
Karanto area / isolasi	There are, separate from the main enclosure	There are, but limited	Rare or minimal
Markets / temporary shelters	2–3 m² per head, separate entry/exit lanes, maximum sanitation	1.5–2 m² per head, standard entry/exit path	1–1.5 m² per tail, medium path
Animal safety & control	Strong fencing, CCTV, routine surveillance	Medium fencing, manual surveillance	Minimal fencing, limited supervision
Hygiene & sanitation	Floor is easy to wash, high standard waste system	Floor is manually washed, standard waste system	Floors are difficult to wash, makeshift waste
Cow capacity per 100 m² (cut)	15–20 fish	12–15 fish	8–12 eggs
Distance from settlements/water sources	≥100 m	50–100 m	<50 m

Server Scope

A. Main Services:

1. Livestock Maintenance & Management: Provide cages, feeding areas, drinking areas, and maintenance facilities according to animal welfare standards.
2. Animal health: Health checkups, vaccinations, quarantine rooms, veterinary clinics, and disease control.
3. Animal trade: Organized livestock trading facilities (transaction areas, scales, temporary shelter areas, separation areas based on animal types and conditions).
4. Distribution and transportation: Loading and unloading facilities, vehicle lanes, and efficient and safe transportation systems for animals.

B. Support Services:

1. Education & Training: An educational space for farmers/traders related to livestock management, animal health, and livestock technology.
2. Social & Religious: Public facilities such as prayer rooms, toilets, canteens, and rest areas.
3. Security and cleanliness: CCTV, security posts, hand washing stations, vehicle disinfection, and sorted bins.

C. Support Services:

1. Waste management: Waste treatment plants (liquid and solid), drainage channels, septic tanks, and management of animal manure into compost or biogas.
2. Green open spaces: Vegetation to reduce odors, maintain air quality, and create regional comfort.

3. Clean water and drainage system: Rainwater reservoirs, and clean water networks for livestock and sanitation needs.

D. Support Services:

1. Local scale: Serving farmers and traders in a single sub-district/district
2. Regional Scale: To be an animal trade center that serves cross-regions (districts/provinces).

Capacity

Table 5 Capacity of Animal Trade Area

Facilities	Capacity	Remarks
Animal Buying and Selling Stalls	20–50 traders/stalls	Clear entry-exit paths, sufficient ventilation
Temporary Animal Shelter Area	50–100 heads	Based on the type of animal, comfortable & safe area
Animal Scales	1–3 units	Capable of weighing up to 500–1000 kg
Loading-Unloading & Transportation Area	2–4 trucks at a time	Wide and safe vehicle lanes for livestock

Table 6 Cage and Maintenance

Types of Animals	Cage Area per Tail	Maximum Capacity of the Cage	Remarks
Adult Cows	6–8 m^2/head	20–50 heads/cage	The enclosure is well ventilated, sufficient lighting
Baby Cow	2–3 m^2/head	30–60 heads/cage	Age-based separation area

Table 7 Capacity of Supporting Facilities

Supporting Facilities	Capacity	Remarks
Animal Health Clinics/Posts	1–2 veterinarians + treatment room	Can handle 20–50 animals per day
Feed Warehouse	50–100 m^2	Holds feed for 1–3 months of operation
Administration Room	10–20 people	Manager, transaction, and digital record officer
Education/Training Room	30–50 participants	Workshops, seminars, and training of farmers
Vehicle Parking	20–30 small vehicles + 5–10 trucks	For farmers, traders, and visitors

Function Characteristics/Specifications

Table 8 Environment and Architecture

Aspects	Explanation
Climate Comfort	Open design with cross vents and high roof, minimizes odors and heat.
Animal Welfare	Ensure that animals are stress-free, have enough room to move, and there is no direct contact between sick and healthy animals.
Sustainability	Utilization of rainwater, waste management into fertilizer/biogas, and the use of local materials.
Spatial Planning	Zoning based on function: healthy livestock zone, quarantine zone, buying and selling zone, and public zone.
Accessibility	Separate vehicle and livestock circulation lanes, The loading/unloading area is easy to reach.

Table 9 General Characteristics

Aspects	Features
Types of Activities	Maintenance, weighing, health checks, buying and selling, distribution, and livestock education.
Key Users	Farmers, animal traders, buyers (individual/industry), veterinary medical personnel, and government officials.
Ideal Location	Suburbs or agribusiness areas with easy transportation access, good drainage, and away from dense settlements.
Scale of Service	Regional or district – serving livestock and trade activities across sub-districts.
Design Approach	Functional, hygienic, environmentally friendly, and concerned about animal welfare.

Table 10 Main Function Characteristics

Zone	Function	Remarks
Zone A	Farm	Cage area, green open space area, feed warehouse, and waste treatment.
Zone B	Trade	Places to buy and sell, scales, and transactions.
Zone C	Animal Health	Health checks, quarantine, and vaccinations.
Zone D	Management & Public	Management offices, education rooms, prayer rooms, and parking areas.

Location Overview

Location: In Banyuwangi Regency, Kalipuro District, East Java.

Figure 1 Planning Location

Figure 2 Planning Location

Location suitability with the design function is the process of assessing site suitability for the purpose, activities, and technical needs of the facility to be designed. In this context, livestock and animal trade facilities need locations that are strategic, hygienic, safe, and accessible, while not disturbing the environment. Location Compatibility in Banyuwangi Regency:

Geographical Aspects

Banyuwangi has a flat to undulating topography in coastal and lowland areas, suitable for the construction of cattle cages and trading areas. It is ideal for facility construction as it facilitates drainage, livestock distribution, and mobilization of large vehicles.

Accessibility Aspects

The location of the facility near the main Genteng-Rogojampi-Banyuwangi route is very strategic for traders and consumers. Banyuwangi has a good district and national road network, including access to the port of Ketapang.

Social And Economic Aspects

This area has a concentration of cattle breeders, so the supply of animals to the facility is guaranteed. This facility can become a new economic center, while supporting the empowerment of local farmers through education and training.

Climate And Environmental Conditions

Banyuwangi has a tropical climate with an average temperature of 23–32°C, high humidity, and moderate to high rainfall.

Natural ventilation and a high roof are essential for regulating the temperature of the cage and the comfort of the animal**.**

Green open spaces and shaded vegetation can reduce heat and odor in market areas and stables.

Conclusion And Compatibility

Table 11 Conclusion and Compatibility of Banyuwangi Conditions

Aspects	Banyuwangi Condition	Compatibility with Facility Functions
Topography & Land	Flat to light wavy	Supporting the construction of stables, markets, and drainage systems
Transportation Access	District and national roads are good	Facilitate livestock distribution and trade transactions
Water Availability	Drilled wells, small rivers, PDAM	Meet the needs of hygiene, drinking livestock, and sanitation
Social Environment	Many local farmers, safe distance from settlements	Supporting livestock supply and minimizing social conflict
Climate	Tropical, moderate-high rainfall	Can be anticipated with cross ventilation, high roof, and green open space
Economic Potential	Animal and livestock markets are growing	Supporting local trade, education, and empowerment activities

Comparative Study

Cow Barn – Basel - Swiss

This cowshed is located around Basel in the foothills of the Jura. As agriculture needed a new orientation, the decision was taken to increase milk production and therefore new cowsheds had to be built. In this hilly location, the building must be in harmony with the landscape. In addition, the natural materials that can be found in the vicinity must be integrated.

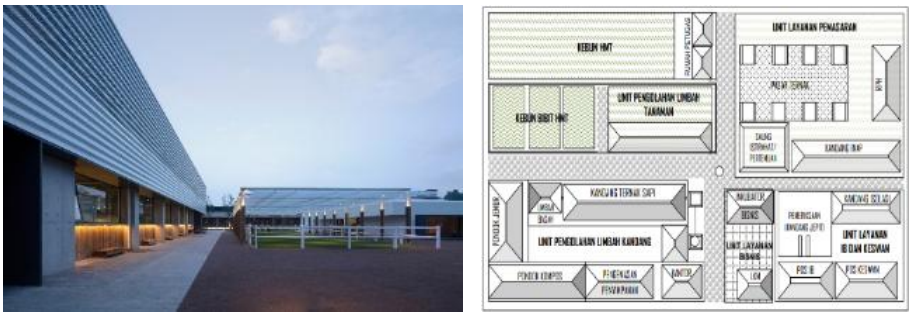

Figure 3 Cow Barn – Basel, Swiss

1. Architects: FAB - Forschungs- and Architektur
2. Arsitektur Lansekap: Stauffer, Schönholzer GmbH
3. Business Name: Cow Barn – Basel, Switzerland
4. Area: 2000 m2
5. Business Field: Cattle Farming (production and education)
6. Year Founded: 2005
7. Location: City of Basel, Switzerland

The Cow Barn in Basel is designed as a modern open and transparent farm facility, with the aim of:

1. Provides an ideal environment for livestock
2. Show the farming process to the public
3. Uniting production and education functions in one area

Structure:

1. Engineered timber main frame
2. Wide span without a central column
3. Flexible to changes in function

Material:

1. Local timber (structure & façade)
2. Lightweight metal roof
3. Anti-slip rough concrete flooring

Ventilation & Lighting System:

1. Cross natural ventilation
2. Large openings on the sides of the building
3. High roof with ventilation gaps

Figure 4 Cow Barn – Basel, Swiss

The project emerged in response to Europe's need for sustainable livestock that can coexist with urban areas and communities. The interior is characterized by a distinctive rustic, according to its function, with walls made of twigs that allow easy ventilation and lighting.Light penetrates into the interior

Logistik dan Loading

Cowsheds with curved strips. Curved cow tracks are more efficient for handling cattle because they take advantage of the natural behavior of cows. Cattle move through curved paths more easily because they have a natural tendency to return to their place of origin. In the computer-aided drawing section, there are drawings of the layout of the cowshed design for large and small farms and fattening grounds. There are also drawings of cattle loading tracks for trucks, diagonal cattle barns for cattle, and detailed drawings of single-row tracks and cow dyeing tubs

Figure 5 Road Access and Loading Ramp

Feed Management Unit

Onsite feed preparation unit - local feed production, and feed storage area.

Figure 6 Feed Storage

Daily Maintenance of Production Cages

Figure 7 Production Cages

Waste Management

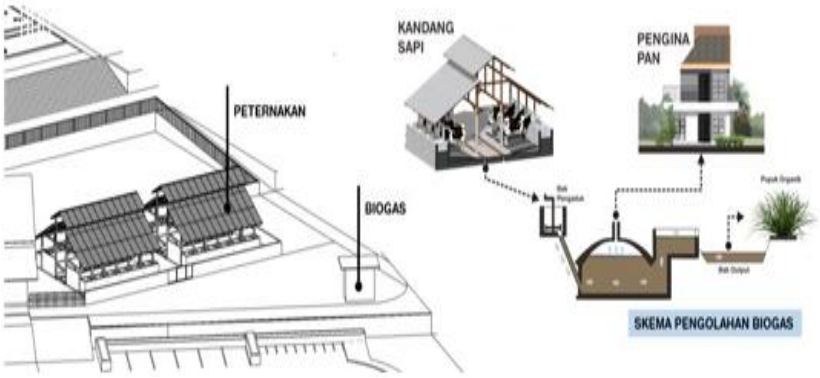

Figure 8 Compost Area

Object Characters

The design of this cattle farm facility is a modern livestock facility designed as an integrated area, which accommodates the main activities of beef cattle production (fattening) as well as supporting activities in the form of feed management, livestock health, and waste treatment, which are integrated with educational, recreational, and commercial functions for the community. Architecturally, the object of this design is arranged based on the flow of the cattle cultivation process, with an efficient, layered, and controlled arrangement of space and building mass, in order to ensure the comfort of livestock, smooth operations, and the application of biosecurity aspects. Buildings and areas are designed to be climate-responsive, utilize natural ventilation and lighting, and apply green architectural principles through the use of environmentally friendly materials and sustainable waste management systems, such as the use of animal manure into biogas and organic fertilizers. Apart from being a production facility, this building also functions as an educational agro-tourism facility, where visitors can gain

learning experience about the modern beef cattle farming system through observation lines, exhibition rooms, and supporting public facilities, without interfering with production activities. With this, cattle farming facilities are also a forum for education, and sustainable economic value improvement. This facility has several object characters, namely:

- Educational
  The beef cattle farm building with a mixed use concept functions as a learning space for the community, students, and farmers. Through educational channels, observation areas, and information media, visitors can learn about the process of beef cattle cultivation starting from livestock acceptance, maintenance, feeding, to waste management. Educational activities are designed without disrupting farm operations and still pay attention to biosecurity aspects.
- Adaptive
  This facility is designed to be able to adapt to the development of livestock technology and changing operational needs. The spatial and mass layout of the building is flexible and modular, allowing the application of new technologies such as automated feeding systems, sensor-based livestock health monitoring, and waste treatment into renewable energy. This adaptivity supports the long-term sustainability of the farm.
- Systematic
  Each beef cattle cultivation process is accommodated in a clearly organized and sequential arrangement of spaces, starting from the reception zone, quarantine, maintenance, to distribution. The separation of circulation between livestock, workers, and visitors is strictly implemented to improve work efficiency, maintain the comfort of livestock, and minimize the risk of pollution and operational disruptions.
- Innovative
  As a modern livestock facility, the building adopts the principles of innovation in livestock management and architecture. Innovation is realized through the application of green architecture, the use of ventilation and natural lighting, as well as a system for processing livestock waste into biogas and organic fertilizers. In addition, the concept of agrotourism provides added value by presenting an informative and interesting space experience for visitors.
- Solution
  The building of the beef cattle industry with the concept of agro-tourism is present as a solution to conventional livestock problems, such as low production efficiency, lack of waste utilization, and lack of public education about modern livestock. Through the integration of production, education, and commercial functions, this facility is able to increase the economic value of livestock while providing social and environmental benefits in a sustainable manner.

Basic Concepts

Based on the Character of the Object**,** the Character of the Perpetrator, and the Character of the Location, the Basic Concept can be formulated which is a reference in the planning and design of a Beef Cattle Farm Based on Modern Architecture in Banyuwangi Regency as follows:

1. Character of the Location (Banyuwangi Tropical Environment):
   Banyuwangi Regency has a humid tropical climate with high heat intensity. This condition demands a farm design that is able to maintain the stability of temperature, humidity, and air quality to support the health and productivity of beef cattle. In addition, the varied contours of the land and the potential of local vegetation can be utilized as natural shade elements.
2. Object Characters (Beef Cattle and Fattening System)
   Beef cattle have different environmental needs than dairy cows. The fattening process requires sufficient room for movement, consistent feed access, and stress-free cage conditions. In addition, waste management is an important factor because the volume of manure is relatively large in modern scale beef cattle farms.
3. Character of the Actor (Breeders and Modern Operational System):
   Livestock actors need a spatial system that is efficient, easy to supervise, and supports daily workflows such as feeding, health control, livestock removal, and cage cleaning. With the development of modern agricultural technology, farmers also need facilities for IoT integration, sensor monitoring, and automation**.**
4. Social Character – Environment (Environmental Sustainability and Comfort):
   The current demands of livestock emphasize an environmentally friendly system, minimal odor, efficient in waste management, and do not disturb the surrounding community. Therefore, the design must pay attention to air conditioning, sanitation, green vegetation zones, and the use of renewable energy.

Key Aspects of Basic Concepts

Based on these characters, four main aspects are formulated as the basis of the design:

1. Livestock Comfort & Health
   Aspects that must be considered are the welfare of slaughter cattle through cross-ventilation arrangements, natural lighting, standard enclosure density, and floor and drainage quality. The goal is to maintain health, reduce stress, and increase daily weight gain (ADG).
2. Space System Efficiency & Workflow
   Slaughter cattle farming requires a safe and efficient flow of livestock and human circulation. The arrangement of feedlots, feed areas, quarantine areas, and handling facilities must support the ease of daily operations and minimize the risk of accidents to livestock and workers.
3. Environmental Sustainability & Waste Management
   Modern farms must handle solid and liquid waste in an integrated manner, such as the use of manure for biogas, organic fertilizers, and water infiltration and filtration systems. Banyuwangi's superior vegetation can become a shade and odor reduction green zone.
4. Modern Technology Integration
   The application of technology such as temperature-humidity sensors, feed automation, digital scales, and CCTV makes it easier to monitor the development of

beef cattle. This technology supports the creation of productive, efficient, and more hygienic farms.

Formulation of Basic Concepts

Based on these four aspects, the formulation of the basic concept is carried out by combining each of the main aspects so as to produce relationships such as: Comfort & health of livestock, efficiency of the space system, environmental sustainability, modern technology: producing a modern farm concept that is comfortable for livestock, efficient for farmers, and friendly to the environment.

Main Basic Concept: "Modern Biophilic Feedlot"

Based on the combination of these aspects, the Basic Concept was obtained, namely: "Modern Biophilic Feedlot"

This concept is a combination of:

Feedlot : beef cattle fattening system with efficient space and controlled production

Biophilic : a design approach that maximizes the connection with nature through natural ventilation, shaded vegetation, and lighting

Modern : integration of clean, functional, and efficient technology and architecture

This concept aims to create beef cattle farms that are not only productive, but also provide optimal comfort for livestock**,** efficiency for managers**,** and minimal impact on the environment**,** according to the climate character and context of Banyuwangi Regency.

CONCLUSION

Based on the results of the study on existing conditions, the needs of farmers, regional potential, and technical standards, it can be concluded that Banyuwangi Regency has great opportunities for the development of livestock and beef cattle trading facilities based on modern architecture. Banyuwangi has a high livestock population, large land potential, strategic transportation access, and an economic position that supports the development of regional livestock centers. However, the current condition of the existing facilities still does not meet health, sanitation, animal welfare, and distribution efficiency standards. The main problems identified include limited cage quality, poor sanitation, disease spread, limited animal trafficking facilities, and lack of supporting technology. Traditional animal markets have the potential to become a source of disease transmission if they are not immediately arranged to modern standards. Through functional, ecological, socio-economic, and contextual design approaches, the design of modern livestock and cattle trading facilities is expected to be able to answer these challenges. The facilities are designed to prioritize animal welfare, biosecurity, waste management, distribution flow efficiency, and the use of modern technology as part of strengthening the Banyuwangi livestock sector. Therefore, the design of this modern beef cattle farm facility will function as a livestock breeding center, an animal trade center, as well as an educational forum that supports the sustainability of the regional economy, improves the welfare of farmers, and strengthens Banyuwangi's position as one of the centers of animal husbandry and trade in East Java.

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