

PN ARW 356
95/97

REQ No. Pakistan-2-006

**FEASIBILITY REPORT
ON
ESTABLISHMENT OF A CATTLE COLONY
AT TANDO MUHAMMAD KHAN ROAD
HYDERABAD**

Submitted to:

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May, 1992

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ACKNOWLEDGEMENT

Asianics wishes to acknowledge the support of Hyderabad Municipal Corporation in implementation of the project. The honorable Mayor (Aftab Ahmad Sheikh) briefed the Consultants about the Importance of the study. Various officials of the livestock department, Civil engineering department provided useful background information. USAID besides providing the financing for the study provided the necessary technical backstopping. Mr. Dennis J. Weller (Chief, USAID), Mr. Jawaid Akhtar and Mr. Ahmad Jamil reviewed a draft outline of the report and made several useful suggestions. Various Staff members at the Sindh Development Studies Center assisted with survey work for which we are grateful. We wish to acknowledge the support of several colleagues at Asianics who worked on the report.

STUDY TEAM

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EXECUTIVE SUMMARY

This study was designed to assist the Hyderabad Municipal Corporation (HMC) to make a decision to shift present buffalo population to the outskirts of Hyderabad city. The consultant was asked to evaluate the practicability of the idea and rework the cost estimates prepared by HMC. A team of three experts (livestock specialist, financial analyst and environmental engineer) carried out a detailed feasibility study of the site, made extensive field visits, and conducted a survey of the buffalo population and surrounding water bodies. The findings of the report suggest that there are nearly 22000 buffaloes in Hyderabad city. These buffaloes are a major environmental hazard (traffic blocks, smell, noise, accidents, manure) to city residents. Similarly the buffaloes have a negative impact on the major canals passing through Hyderabad. The estimated fuel loss due to traffic jams exceeds Rs. 2.19 million annually. Shifting buffaloes from present location to the proposed cattle colony is an idea with considerable merits. The consultant has reviewed the plan prepared by the Municipality and generally finds the design technically and economically feasible. However, several modifications need to be made, these include: reduction of planned roads, deletion of Bakra Piri from the plan, inclusion of a veterinary hospital, possible installation of a feed mill through private sector participation etc. A revised budget has been prepared based on 1992 cost estimates. The estimated cost is 70 million rupees. Which is 2.9% more than proposed by HMC. The consultant has carefully reviewed the benefits of the proposed change. Major gains can be realized in terms of time saved, reduced accidents, better and cleaner environment. Furthermore, given the large scale of dairy production, provisions of services like health cover, feed, water, milking and transportation etc. can be streamlined. In addition, octroi revenue collection will also be improved. An analysis of the gross margin showed higher returns on larger farms through better marketing practices. Cost of marketing is likely to increase as farmers will have to bring milk from Tando Muhammad Khan to the city. However, the consultant is of the opinion that through increased efficiency and reduced production costs (resulting from economies of scale and one roof operation) within 1-2 years there will be minor difference if any, in the overall price of milk between production in the city or in the colony. Actually if a cooperative arrangement could be encouraged to market milk, production at the colony could be more competitively priced. Additionally facilities of milk chillers, trucks, storage tanks etc should also be considered within a cooperative framework.

A long term financial analysis revealed that in the first year the overall net benefit is positive. If we were to take into account only the fuel and time saving the project would pay-off itself in around 20 years. The prime reason for the positive net benefit in the first year is that the animal herd already exists and no major capital investment is required. At a price of Rs. 8.00 liter an internal financial rate of 40% can be expected. The project is likely to realize a benefit cost ratio of 1:1.21 which is satisfactory. At a higher price of Rs 10 the benefit ratio is 1: 1.47. The consultant would like to point out that administrative arrangements on whose buffaloes get moved, what facilities and incentives are offered, basic ethnic questions of equitable participation be faced upfront.

To conclude the basic idea of shifting present dairy herd to Tando Muhammed Khan road is sound. The consultant recommends that such a colony be established with an upper limit of 14000 animals, even though a capacity of around 40000 animals exists. Suggestions made in the report be taken into account and to avoid cost over-runs the project be initiated without any further delay.

RECOMMENDATIONS

1. The engineering plan should be implemented based on the necessary modification proposed by the consultants expert engineer. Several roads have been deleted, new structures proposed, site office location changed, provision of an incinerator include etc.
2. Only buffaloes should be transferred to the colony and cattle avoid. The soil type is not suitable for cattle production and may results in foot rot disease.
3. While technically there is provision in the dairy colony to house over 4000 animals the consultant recommends that no more than 14000 animals be housed in the colony for health reasons. A separate quarantine arrangement should also be made available.
4. To encourage cost sharing the consultant proposes that the municipality build the facilities for a veterinary hospital and lease it to the private sector.
5. Original design does not include a feed mill. A feed mill has been proposed and preliminary cost estimates made.
6. Facilities of a weigh bridge should also be included.
7. Security reasons warrant that a police station be established near the dairy colony. Similarly facilities of a PCO should be made available.
8. A cooperative society should be formulated for the sale of milk. This private cooperative should be run on models of already several successful cooperatives operating in the city.
9. In the first year of the project octroi charges should be reviewed to ensure that milk is competitively priced and no major cost changes are made. Similarly, local population should be sensitized about the project so that adequate feed becomes available in the first year.
10. A calf rearing operation including calf fattening project should be encouraged. Surplus calves should first be put on fattening ration and later sold in cities. As there is sufficient space in the colony this enterprise can provide employment to over 500 peoples.



11. Manure will pose an environmental hazard. Facilities for manure disposal on sale basis should be looked into.
12. An incentive scheme for small produces to locate additional part time work in the area should be encouraged. As travel cost will increase for owners to travel to the colony steps should be taken to ensure that this does not negatively impact the gross margins from milk sales.
13. A milk testing lab should be established to ensure the quality supply of milk. The lab should have simple apparatus and will not require equipment of more than 50,000 thousand rupees.
14. Rules and regulations to control the quality of milk and feed and disposal of dead/diseased animals should be clearly stated and practiced.
15. Keeping in view the growth rate of human population and subsequent increase in milk demand, another colony for the housing of 14,000 animals is proposed by consultants.
16. The development of dairy colony out side the Hyderabad will reduce the traffic and pollution hazards in the city. Therefore, a tax should be imposed to provide neat and clean air, streets, roads etc. The income generated through this tax be utilized to compensate the farmers as settlement allowance.
17. To generate the interest of farmers, the "Baras/Wattans" will be allotted free of cost. But after 2 years they should be asked to pay tax which should be utilized for the maintenance and development of these houses.

The success of the new dairy cattle colony will largely depend on the procedures established for grass-root level are obvious economic and social benefits for them to move their herds to the colony.

I. INTRODUCTION

(a) Background to Study

At the time of independence, Sindh was surplus in milk and had the highest per capita consumption in the sub-continent (Zainuddin, 1984). Sindh was rightly known as dairy land of the sub-continent Indo-Pakistan with 22 oz. per capita milk consumption (Figure 1.1).

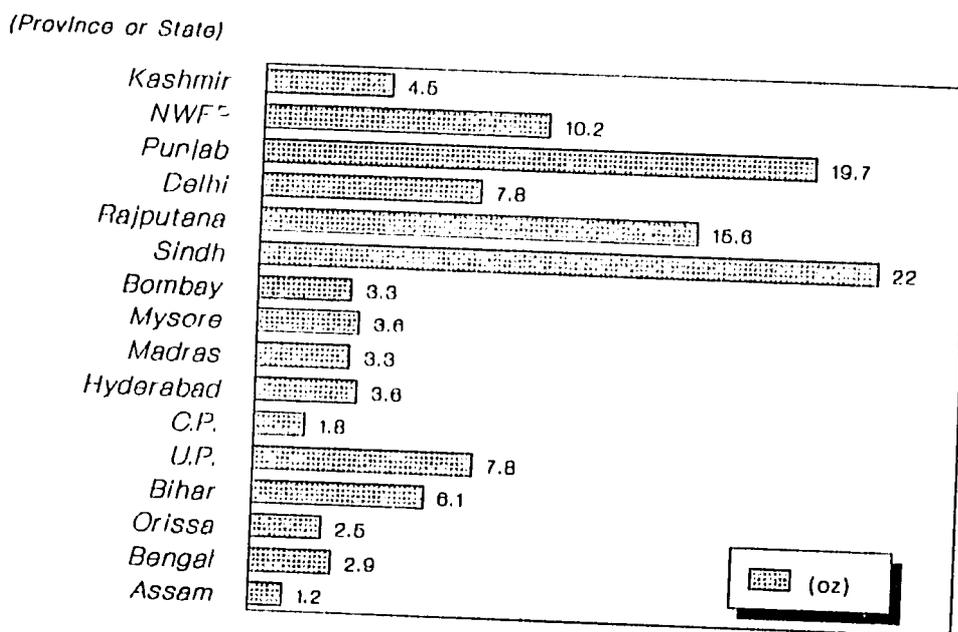
However, the situation has significantly changed and like other provinces, Sindh also faces acute shortage of milk, and the per capita consumption is only about 8 oz. Because of milk shortage the country spends huge amount foreign exchange on the import of milk products. Lack of effective planning in the livestock sub-sector, has not kept pace with rising demand of burgeoning population.

In Sindh, the people involved in raising livestock for milk and meat are considered most fortunate and are known as "Baghias". Thus livestock rearing in Sindh is considered to be prestigious profession. Nearly, 98% of the Sindh rural population rears livestock. Before independence commercial livestock raising was not practiced in the cities due to lack of demand.

After independence, the population of Hyderabad and Karachi increased rapidly due to migration and settlement of migratory Indian muslims, in these two cities. Being already over populated cities are being further burdened by migration of people from up country and rural areas. Owing to the ever increasing demand for milk and its products due to urban population expansion which has a higher per capita income compared to rural area, thus situation has attracted entrepreneurs to raise dairy animals in the cities. Consequently, city dairy farming started in the different residential areas of Hyderabad municipality which no doubt met milk demand and its products; but at the same time gave raise to many social and sanitation problems that disturb the common citizens life. This has forced the municipal committee of Hyderabad to implement a program to drive cattle out of city premises.

The continuous demand for milk and its products in the city supplemented with the higher demand from Karachi encouraged people to rapidly expand dairying. The construction of super high way provided new initiative to the dairy industry of Hyderabad city, by providing easy and quick access to the Karachi market. The export of milk to Karachi from the present cattle colony also created a gap in milk supply to

Figure 1.1: Daily Per Capita Consumption of Milk (including products) in 1941



Hyderabad. This is the prime motivation to establish clusters of dairy farms in various localities in the city.

Comparatively, low cost of milk production at Hyderabad and better transport facility has attracted people to establish more dairy farms in the city to increase milk supply to Karachi.

As a result of these new market initiatives and lenient view of the municipal authorities, city dairy farms are found in the residential areas which has created unsurmountable environmental problems.

The presence of huge buffalo population in the city and its movement to and from the sheds to water bodies located in different directions of the city create the following problems:

- Unsanitary conditions of residential areas.
- Encroachment of footpaths and streets.
- Hinderance to the traffic and pedestrians.
- Blockage of sewerage system.
- Accidents.
- Pollution and contamination of the atmosphere etc.
- Damage to electric and telephone poles and the vehicles.

Realizing the above mentioned and many other difficulties faced by the citizens of Hyderabad, the Government of Sindh has decided to explore the possibilities of another dairy colony on Tando Muhammad Khan road near to Hyderabad.

United States Agency for International Development (USAID) mission in Islamabad contracted the feasibility study to Asianics Agro-Dev International (Pvt) Ltd. This contract was implemented with assistance from the Sindh Development Studies Center (Jamshoro).

(b) Socio-economic Information on Hyderabad**i. Basic Data**

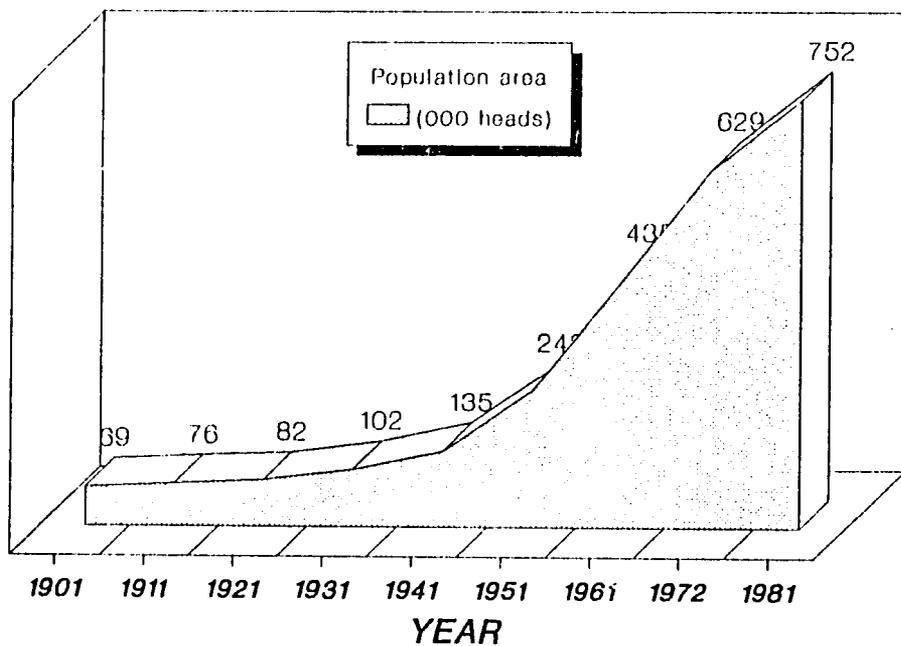
Population: Hyderabad is the second populous city of Sindh province of Pakistan. The population of Hyderabad increased at a rapid rate after the creation of Pakistan. The main reasons for rapid population growth in the city were: (i) migration of muslims from India, (ii) the industrialization which attracted labor force from up country and from the interior of Sindh. A few years back Hyderabad was the third largest city of Pakistan. Being an industrial city, Hyderabad is also an agriculture city with large agriculture and livestock production in its suburbs and at the same time is the largest market for agricultural commodities in the province. It occupies an important position in the province's commercial trade and is directly linked to other important trade centers of the country. It is directly linked to roads and railways with the districts like Badin in the south, Mirpur Khas and Tharparkar - a desert district in the south-east; Larkana, Dadu, Nawabshah, Khairpur, and Naushero Feroz in the north. In south-west it is directly connected with Thatta and Karachi. The markets of these surrounding districts have trade dependence on the city of Hyderabad.

Hyderabad's population according to the various census reports is shown in **Figure 1.2**.

Climate: Hyderabad is situated at 30 meters above the sea level, and lies between 17.28 N latitudes and 70. East longitudes south of equator and south of Pakistan. The city has a moderate climate except for a few days in summer when temperature rise above 40 degrees C, summer months are mildly warm with south - westerly wind making the nights very pleasant. The hottest month is May, with mean maximum temperature of 42 degrees C, and the minimum mean temperature becomes 10.1 C, in the month of January. Being less humid, the climate of Hyderabad is more dry than that of Karachi, hence it is favorable for buffalo raising. Due to conducive climate for milk production in summer people are also successfully rearing Holstein Frisian. The climate of Karachi is more humid in summer, hence Punjab buffaloes like Nili - Ravi do not perform well in humid hot summers.

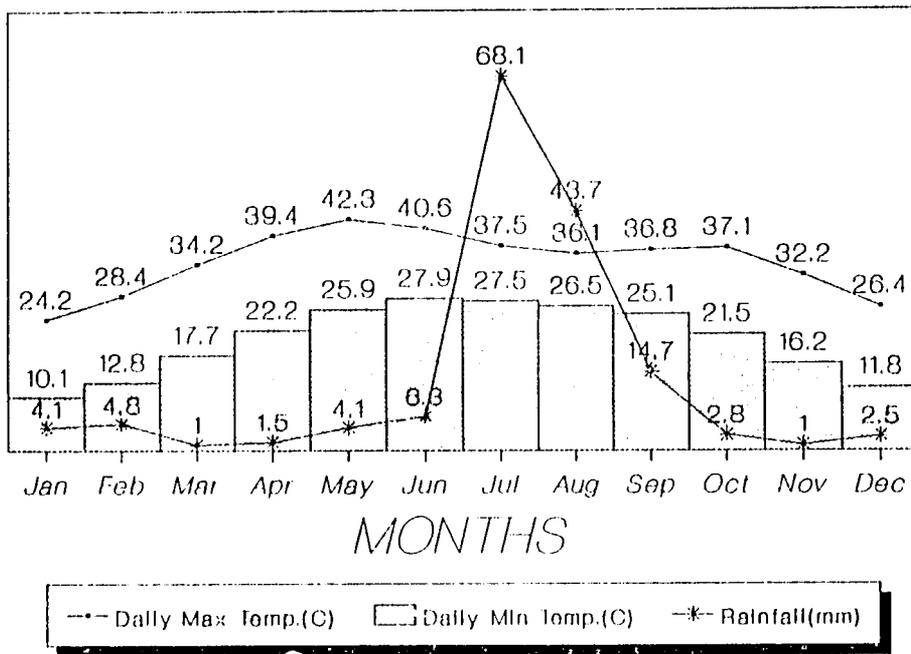
As shows in **Figure 1.3**, Hyderabad receives scanty rains except during monsoons i.e. from mid June to mid september; however, rain is concentrated in the months of July and August.

Figure 1.2: *Population of Hyderabad City*



Note: Estimated population of 1991 (1200-1500 thousands).

Figure 1.3: Climatic Data of Hyderabad City



ii) Major Development Problems of City

Hyderabad is still in early stages of development. The city is facing population growth problems mainly because of ethnicity and migration of rural people primarily due to security reasons. Because of clashes between certain sections of society like Mohajir vs. Sindhies, Mohajir vs. Punjabies and Pathans the city inhabitants are settling in different areas where new housing townships are developing. In search of safety, mostly Sindhi speaking population i.e. the original residents of the cities have left their ancestral homes and are settling on the outskirts of the city in townships. Thus, the most important development problem of the city is that of housing. In the new townships the demand for milk is high and dairy farming is rapidly expanding.

Another important problem is related to sewerage system and disposal. In the older parts of Hyderabad the sewerage system consists of open drains. The presence of cattle pose a permanent problem to the sewerage system as cattle owners use these drains to dispose manure, consequently drains remain clogged and result in over flowing, causing traffic problems and pollution. Similarly, in Latifabad manure and even day old dead and aborted calf carcasses are disposed in the gutter system resulting in frequent blocking and over flow of clogged gutters. The permanently over flowing of the open drain in the old city and that of gutter system in Latifabad and newly established townships damage roads and necessitate extra cost to repair road. Thus the presence of cattle inside the city is great problems in the physical and economic development of Hyderabad and has become a hindrance to the smooth flow of traffic moving towards market areas, hospitals, colleges, schools, universities and government offices and business centers.

(c) Dairy Economy of Hyderabad

Dairy farming is a labor intensive and round the clock job. Dairy farming play an important role in the economy of both urban and rural sectors of the country. The present structure of cattle raising plays a major role in the urban middle class economy, in Hyderabad and Karachi. In Hyderabad different sections of populations and ethnic groups (Sindhies, Mohajars, Baluchies and Punjabies) are dependent for their subsistence directly or indirectly on this important business. Some of the important sections of population, belonging to all four ethnic groups, that are directly or indirectly, dependent on this business, are described below:

1. **Owners of farms (wathans):** More than 556 owners alone or in business partnership are directly dependent for subsistence on this business.
2. **Labor working on farms:** Some small farms, and on almost all medium and large farms employ labor on monthly wage basis. Majority of the labor belongs to the surrounding rural areas of the city. A farm laborer is paid @ Rs. 800-1200 per month. Owners of large farms in addition to the salary offer one to two time meals and one kg. milk free of charges in case the workers stay on the farm.
3. **Creameries:** There are about 10 creamer shops that deal in skimmed milk and prepare butter, cream, and ghee of animal origin. A typical creamery owner employees 1 to 2 laborers on monthly.
4. **Halwaies (Sweet mart owners):** The halwai shops operate in various localities of the city. They sell milk and its products along with sweets. Large section of population do this business. In case of Halwai both a hired and family labor works on these shops.
5. **Milk shop owners:** Other category of shop keepers (non-Halwaies), who sell milk and some by - products have shops in different localities. Their livelihood also depends on milk sale.
6. **Milk vendors:** There are two types of milk vendors who earn from sale of milk. They are either foot path based or mobile vendors, selling milk door to door.
7. **Grain merchants** who sell various types of concentrate feed ingredients to dairy farmers. A large section of the population including from all ethnic groups is engaged in this business including the labor and commission agents etc. who are indirectly attached to dairy enterprise.
8. **Mill owners** who are operating oil extractors and floor mills etc. they sell by-products like: oil seed cakes, rice polishing and wheat bran and by- products of pulses etc. as concentrate feeds for dairy animals.

There is a large group of people (over 300) who deal in the business of fodder, they are agriculturists, fodder shop owners, fodder chaffing machine operators and laborer employed with them.

Various types of skilled workers do the jobs of installations and repair of chaffing machines, water pumping machines, and electricians etc. earn their subsistence wholly or partially from the business of dairy farming.

9. **Marketing agencies:** Those agencies involved in the marketing of milk, live animals, feeds and other services related to the business of dairy farming are also economically dependent on dairy farming for livelihood.
10. **Practicing veterinarians:** There are four veterinarians in private veterinary practice in the city who treat and vaccinate animals.
11. **Transporters:** They are involved at many stages in market process of milk and dairy animals. They transport milk, live animals, feeds etc. and earn their livelihood.

i. Milk Market and Market Practices

Milk market: There is no separate milk market in the city, such as exists for the sale and purchase of grains and vegetables.

Method of sale: Two methods of milk sale are commonly practiced in the city. Firstly, fluid milk is sold directly by the producer or farmer to wholesaler, dealer, contractor or retailer. Secondly, the producer and dealer or contractor enter into simple contract at the farm level by virtue of which the dealer purchases the already settled quantities of milk through out the contract period. In return the producer is bound to sell milk to the dealer or contractor.

In the other case according to the agreement made between the dealer consumer, the consumer has to go to the shop/supply point of the producer to make purchase. The system of payment is either on daily or monthly basis.

Hours of business: The hours of business follow the milking times which vary by season. Commonly, milking takes place during early hours and in the afternoon. Consequently, the peak periods of sale and purchase are in the morning and evening.

ii. Marketing Functionaries

Farmer or producer: In majority of cases it is the farmer who produces milk and sells it at his farm, and in few cases there are non farmers who are keeping buffaloes and produce milk for sale to supplement their income.

Cooperative societies: Presently, there are three cooperative societies in the city that operate the collection and distribution of milk, they have chilling plants of varying capacities. They supply milk to the Karachi market.

Creameries: There are ten creameries operating at different places in the city. They sell raw fluid milk, skimmed milk, cream and ghee.

Halwai shops (sweet mart shops): These are retailer shops that sell raw fluid milk, yogurt, lassi and other sweets made from khoa etc. These shops are mostly located at market places.

Milk shops: This is another category of milk sellers who sell only boiled milk, yogurt and lassi; but they do not deal in the sale of sweets. These shops are distributed in various localities called "Mohallas".

Milk vendors: There are two types of milk vendors for example the mobile milk vendors who sell milk to customers/clients at their doors. They use bicycles, motorbikes and rehras (horse driven carts). The other category of milk vendors is that of foot path based sellers who sell milk in nearby localities.

Contractors: They mostly supply milk to hotels, restaurants in the city or supply milk to the Karachi market. They are either farmers themselves or the middle men.

Methods of payments

Usually the methods of payments in this business depends on the contracts taking place among various agencies involved in the business. The mode of payment varies by contract. The varying types of payments are; weekly, fortnightly, and monthly. In some cases payments under open sale system are done on the spot.

(d) Terms of Reference

The consultant was provided with detailed TOR's by USAID, Islamabad. These TOR's were discussed with various officials of the Hyderabad Municipality to ensure a clear understanding. The TOR's listed below have been covered in various sections of the report.

TOR's

- a. Conduct a survey of whole of Hyderabad Municipal area to determine the number of cattle heads, water bodies (with break-up of kind), sheds (wathans and barras) in different localities of the city.
- b. Find out usual routes and times of cattle travel to the water bodies.
- c. Determine the hygiene of the existing water bodies being used by the cattle.
- d. Determine the impact of cattle travel pattern and route on mechanized vehicle traffic flow in qualitative and quantitative terms such as loss of time, excess fuel consumption in traffic jams due to cattle and extra maintenance cost due to minor accidents with cattle.
- e. Determine the unhygienic effects of water bodies on the milk and cattle and human health.
- f. Determine the impact on environment pollution within the urban center due to cattle.
- g. Determine in quantitative terms whether there will be any additional cost added to the price of milk due to transportation of milk from proposed new cattle colony to different parts of the city.
- h. Provide an independent cost estimate (91 million rupees had been proposed by Hyderabad Municipal Corporation (HMC) to shift the cattle heads from the city and in what period the investment made will be returned in terms of (i) removal of pollution from the environment, (ii) removal disturbances to the traffic, (ii)

saving of sweepers' salaries for cleaning the routes and city, (iv) removal of health hazards due to un-hygienic condition of sewage filled water bodies of the city.

- i. What will be the environmental pollution problems created after establishing the cattle colony at new site or proposed site and,

(e) Approach to the Study

The study was conducted by a team of multidisciplinary experts including an animal scientist, business analyst, environmental engineer and a survey assistant. Members of the team made extensive visits to the field site and met with concerned officials to discuss the pros and cons of the existing field site.

The survey work was split into two stages. The first stage involved visits to all localities where the animal scientist and surveyor conducted a physical count of the buffalos. They also followed buffalo herds to determine normal movement routes. The financial analyst worked with the engineer to survey various environmental aspects including traffic flow, water population etc. All staff members met concerned officials in the municipality to brief them on preliminary reaction to the field findings. The Project Coordinator and consultants also spent considerable time at the site and held elaborate discussions with key village informants. By following this approach the contractor has been able to generate basic data needed to fulfil TORs of this feasibility study.

(f) Overview of the Report

The report is organized in a manner that allows clear coverage of the TORs. Special attention has been given to the Husbandry and Engineering feasibility of the study which are covered in sections V. The last section of the report provides a revised design and cost estimates. The report concludes with a set of recommendations for consideration by the Hyderabad Municipal Corporation.

II. FINDINGS OF FIELD SURVEY

This section presents the results of the field survey carried out to develop estimates on the present population, survey common travel routes, water bodies and their distribution and similar concerns.

(a) Cattle/Buffalo Population

The information gathered through survey revealed that there are nearly 22000 dairy animals in Hyderabad city, located in various localities as shown in the map (Appendix-I). The population break up according to animal categories is shown in Figure 2.1.

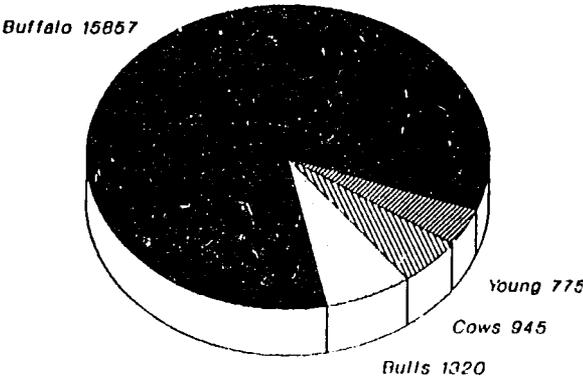
Analysis of Herd Size

Farms were categorized into small, medium, and large dairy farms according to the number of the animals per farm as follows:

- | | | |
|----|--------------|--------------------------|
| a. | Small farms | Housing 10 to 49 animals |
| b. | Medium farms | Housing 50 to 99 animals |
| c. | Large farms | Housing 100 and above |

The category wise farms with the number of animals on each farm and their percentages, is summarized in Figure 2.2. The total farms were 556, with average number of 33.75 animals per farm. Out of this total 447 were categorized as small, 94 as medium and 15 as large farms. In percentages the category of small farms formed 80.4%, medium farms 16.90% and large farms constituted 2.7% of the total farms surveyed (Table 2.1).

Figure 2.1: Population Breakup of Animals



Also there are 2400 buffaloes/cows
In about 60 Halqas

Grand Total : 21297

Figure 2.2: Categori-wise Position of the Farms

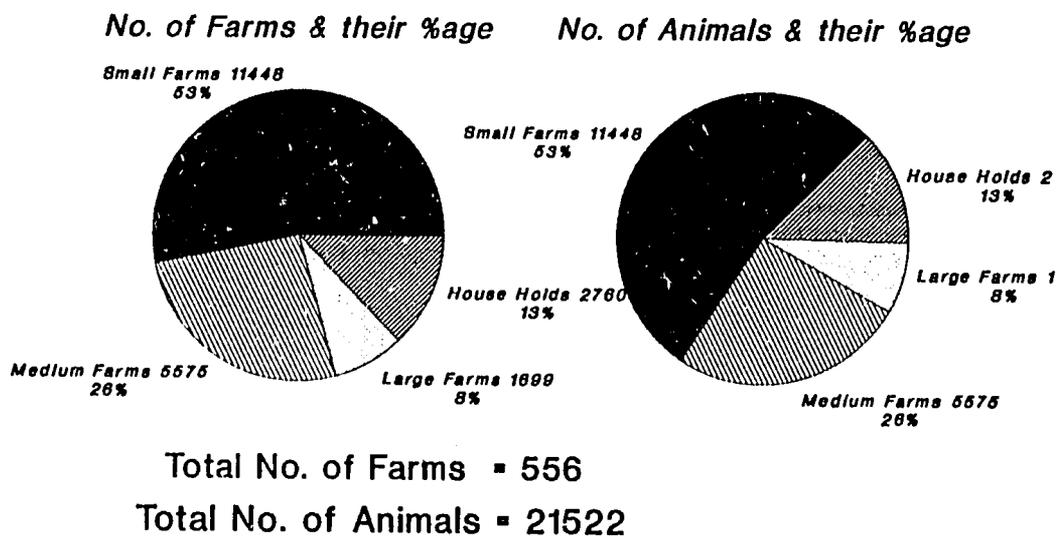


Table 2.1: Population breakup of cattle and buffaloes

a. Buffalo cows	15857	
b. Bulls(buffalo & cow)	945	
c. Young stock	1320	
d. Cows	775	
e. Total stock	18897	(in barras or wathans)
f. Buffalo/cows in houses	2400	(40 per Halqa there are 60 Halqas in the city)
Grand Total:	21297	(i.e. 22000 buffalo heads in round figures)

Source: Field Team Survey

(b) Animal distribution in various areas of Hyderabad

A detailed survey was conducted to cover possibly all areas of Hyderabad, Latifabad and Qasimabad including new townships etc. falling within the limits of municipal corporation of Hyderabad. The distribution of animals is described below:

Area No. 1: It includes Mirzan Para, Jataia Para, Dal Para, Islam Nagar, Mir-jo-Bagh, Chishtia colony, Gulshan Illahi, and right bank of old Phulele Canal in south of Kari Mori.

Total farms (baras) 20
 Total animals 1153
 Av. animals/farm 57.65 (20-75)
 Small farms 5 with 240 animals, Av. 48 (20-25)
 Medium farms 15, with 913 animals, Av. 60.87 (50-75)

Area No. 2: It consists of Pareetabad, Laloo Lashari, Halla Naka, Ghumanabad and Khoja colony on the eastern right bank of old Phulele canal.

Total farms	95
Total animals	2368
Av. animals/farm	24.92 (15-100)
Small farms	70, with 946 animals, Av. 13.51 (15-45)
Medium farms	22, with 1122 animals, Av. 51 (50-79)
Large farms	3, with 300 animals, Av. 100 (100)

Area No. 3: It includes Kari Mori West, Hyderabad, Amil colony, Shedi Goth, Jail road etc.

Total farms	22
Total animals	892
Av. animals/farm	40.55 (15-100)
Small farms	18, with 612 animals, Av. 34.33 (15-45)
Medium farms	03, with 165 animals, Av. 55 (50-65)
Large farms	1, with 115 animals, Av. 115 (115)

Area No. 4: It consists of right bank of old Phulele Canal, Liaqat Colony, Firdous Colony, Cattle Piri, Gaoshsla, Rishi Ghat, Makrani Para, Tando Wali Muhammad, Massan road.

Total farms	26
Total animals	700 (15-75)
Av. animals/farm	26.92
Small farms	24, with 595 animals, Av. 24.75 (15-46)
Medium farms	2, with 105 animals, Av. 52.5 (50-75)

Area No. 5: It includes Kalhora colony, Sahafi colony, Naatha town, and Hur camp etc.

Total farms	10
Total animals	345 (13-64)
Av. animals/farm	34.5
Small farms	6, with 136 animals, Av. 22.67 (13-44)
Medium farms	4, with 209 animals, Av. 52.3 (50-64)

Area No. 6: It includes Sarfraz colony, and Dadan Shah colonies etc.

Total farms	29
Total animals	889 (10-45)
Av. animals/farm	25.57
Small farms	28, with 716 animals, av. 25.57 (10-45)
Medium farms	1, with 50 animals, av. 50

Area No. 7: It includes Pathan colony and adjoining areas.

Total farms	26
Total animals	525 (10-65)
Av. animals/farm	20.19
Small farms	24, with 410 animals, av. 17.08 (10-47)
Medium farms	2, with 115, av. 57.57 (50-65)50-65)

Area No. 8: It includes old and new Wahadat colonies, Jatoi goth, Machi goth, Kachi Abadi, Roti plant etc.

Total farms	29
Total animals	1551 (10-100)
Av. animals/farm	40.81
Small farms	24, with 531 animals, av. 22.13 (10-45)
Medium farms	10, with 620 animals, av. 62 (50-80)
Large farms	4, with 400 animals, av. 100

Area No. 9: It includes Qasimabad, Nasim Nagar, Bhitai town, Marvi town, Do-aba etc.

Total farms (baras)	47
Total animals	1278 (15-118)
Av. animals/farm	27.19
Small farms	39, with 737 animals, av. 18.89 (15-39)
Medium farms	6, with 321 animals, av. 53.5 (52-65)
Large farms	2, with 220 animals, av. 110 (102-116)

Area No. 10: It consists Autoban road - Kachi abadi, Hussain Abad, Paryar village, Mir village, and Bengali colony.

Total farms	26
Total animals	928 (16-80)
Av. animals/farm	37.12
Small farms	21, with 548 animals, av. 26.09 (16-45)
Medium farms	4, with 255 animals, av. 63 (55-80)
Large farms	1, with 125 animals

Area No. 11: It includes Kacha Qila, Shah Maki road, Railway quarters etc.

Total farms	31
Total animals	1135
Av. animals/farm	36.61 (10-98)
Small farms	28, with 890 animals, av. 31.79 (10-45)
Medium farms	3, with 245, animals, av. 81.67 (55-98)

Area No. 12: It includes Ghareb Nawaz colony, railway station, Machi goth, Fateh Chowk, and Islamabad.

Total farms	15
Total animals	480 (15-45)
Av. animals/farm	32
Small farms	15, with 480 animals, av 32 (15-45)

Area No. 13: It includes Goro nagar, Tanks Nos. 2 & 3, Tando Tayab, Tando Thro, Mir goth, Afandi town and old power house.

Total farms	35
Total animals	1317
Av. animals/farm	37.63 (25-63)
Small farms	31, with 1103 animals, av. 35.8 (25-46)
Medium farms	4, with, 214 animals, av. 53.5 (50-63)

Area No. 14: It includes Bhatti goth, Alfazal town, New Phulele, Bachal Bhati goth etc.

Total farms	26
Total animals	1519
Av. animals/farm	58.33 (30-158)
Small farms	11, with 410 animals, av. 37.27 (30-40)
Medium farms	12, with 700 animals, av. 53.5 (50-63)

Area No. 15: It includes Latifabad unit No. 2.

Total farms	15
Total animals	502
Av. animals/farm	33.479 (16-40)
Small farms	15, with 502 animals, av. 33.47 (16-40)

Area No. 16: It includes Latifabad unit No. 4.

Total farms	24
Total animals	814
Av. animals/farm	33.91 (15-85)
Small farms	21, with 612 animals, av. 29.09 (15-35)
Medium farms	3, with 202 animals, av. 67.33 (50-85)

Area No. 17: It includes Latifabad unit Nos. 5,6,7 and 8.

Total farms	64
Total animals	2115
Av. animals/farm	33.05 (10-130)
Small farms	60, with 1800 animals, av. 30 (10-45)
Medium farms	3, with 185, animals, av. 61.67 (58-60)
Large farms	1, with 130, animals, av. 130.

Area No. 18: It includes Latifabad unit Nos. 9,10,11 and 12.

Total farms	16
Total animals	850
Av. animals/farm	53.3 (30-80)
Small farms	7, with 220 animals, av. 31.43 (30-40)
Medium farms	9, with 630 animals, av. 70 (50-80)

(c) Water bodies and their distribution

There are four important water bodies and ponds utilized by the city herds buffaloes for wallowing, these are briefly described below.

i. The river Indus

It flows from the south-west of the city and separates Hyderabad city from Kotri side and Jamshoro. This water body is utilized for wallowing by some buffaloes herds of Hussainabad.

ii. The old Phulele canal

The canals have been taken out of Ghulam Mohammed Barrage and passes through the city. Its designed discharge is 14825 cu. It remains dry during winter for a period of one month. The buffaloes use it for wallowing. During entering and leaving the canal, banks are extensively damaged. The movement of cattle herd, produces considerable dust which pollutes the atmosphere. This canal is utilized by buffalo herds of areas numbers: 2,3,4, some herds from area 5,6,7,11 and 12,13,14 and a few herds from area No. 15,16,17 and 18 (**appendix-1**), for wallowing. Most herds are trailed to the old Phulele covering important busy roads of the city (**appendix-1**).

iii. The new Phulele or Penyari canal

It also takes off from Ghulam Mohammed Barrage from Indus river. The designed discharge of this canal is 15025 cu and runs parallel to Phulele canal on the north eastern side of the city. It is also used by buffaloes for wallowing. This canal remain closed for a month during winter. This canal also flows on the north-east edge of the city, while crossing the city on way to Mirpurkhas, one crosses this canal after old Phulele. It is utilized for wallowing of some buffalo herds from area No. 1 and 14 (appendix-1).

While entering and leaving canals buffaloes damage canal bunds. The buffalo herds while going for wallowing to water bodies and on return damage electric and telephone poles, by rubbing against them and hinder the traffic.

iv. Akram Wah Canal

It is brick-lined canal with a designed discharge of this canal is 4025 cu. Due to brick lining of the canal & slopes being steep, buffaloes cannot use it for wallowing.

v. Ponds

There are numerous ponds small and large that are used by buffaloes for wallowing. The source of stagnant water is either rain water or the out flow of sewerage from the manholes and open drains. These ponds are mainly situated in industrial area (S.I.T.E.), near Agha Khan Hospital and on the western periphery of Hyderabad Gymkhana.

The above mentioned water bodies (river Indus and old and new Phulele canals) contain A-class irrigation water. The canals are non perineal and remain closed for sometime during winter. During closure the water remains stagnant at certain depressions already created by the wallowing buffaloes in the canals which become soiled due to waste (manure etc.) drained in these canals by the cattle owners. This creates great nuisance for citizens as stagnant water pools in the canal, soiled with buffalo dung and urine become breeding grounds for mosquitoes and create foul and obnoxious smell to residents. The water of these canals is used by rural population for drinking.

vi. Pools of water logged areas

At many places there exist large pools of water logging and depressions retaining unabsorbed rain water. These are used by grazers for wallowing of buffalo herds. Such pools are frequently encountered in the S.I.T.E. (industrial area), near Agha Khan hospital, and on the West of Hyderabad Gymkhana.

The incidence of water borne diseases is shown in Table 2.2. Most diseases reduce work efficiency and result in Major losses to the local economy.

Table 2.2: Water borne diseases in Hyderabad city (1990)

Type of Diseases	No. Of Cases			Age Group							
				<1		1-14		15-44		45+	
	M	F	Total	M	F	M	F	M	F	M	F
Typhoid	187	147	336	39	47	12	9	109	67	27	26
Shigellosis	393	125	318	5	3	32	21	87	62	69	39
Amoebiasis	287	86	373	3	4	5	2	247	69	32	11
Food poison	36	31	67	2	3	-	1	31	25	3	2
Echinococcosis	4	2	6	-	-	-	-	4	2	-	-
Other											
Helminthiasis	22	7	29	-	-	2	-	17	6	3	1
Simple and unspecific											
goitre	26	16	42	-	-	-	-	20	8	6	8
Other cestode											
infection	7	5	12	-	-	-	-	6	2	1	3
intestinal											
infection											
specified											
organism	58	37	95	-	-	2	-	46	22	10	15
Total	1020	458	1278								

(d) Time and routes followed by animals

Herds move from sheds to water bodies for wallowing between 7.30 am and 9.30 am, and return between 12.0 noon and 2.45 pm. Return time depends on the milking time. Afternoon milking time varies according to the season. Important routes followed by buffaloes herds during movement from sheds to water bodies and back are:

- Lower portion of National highway from Barrage colony to the bridge of old Phulele near Khoja colony.
- The upper portion of National way from Halla naka to the old Phulele bridge near Khoja colony.
- Hirabad road going to Kali Mori bridge of old Phulele.
- Massan road going towards Kali Mori bridge on the old Phulele.
- Bhurgiri road from back of civil hospital to its junction with the national highway near Midway hotel.
- The road coming from Kalhora colony to its junction with the national high way near Miran high school.
- The road coming from Hirabad post office to its junction with national high way near Miran Girls High School.
- The road from the junction of Sarfraz incline and police head quarters to the incline of Pathan colony passing from western back of civil hospital.
- The road passing from Goro Nagar, Afandi town leading to the Acchi Mori bridge of the old Phulele canal.
- The old Mirpur Khas road from Islam Nagar passing crossing leading to New Phulele (Penyari canal).
- The road passing the railway crossing of Tando Yousif.
- The railway station road passing in from Habib hotel.

-
- The station road coming from goods naka to Acchi Mori of old Phulele canal via back of the fort and Goro nagar.
 - Autoban road near Gidu.
 - Autoban road in the S.I.T.E. area near Fateh chawk.
 - The Hali road near rangers head quarters via Fateh chowk and S.I.T.E.
 - The main roads passing from Latifabad No. 12,11,10 and 4, and Shah Maki road.
 - The road joining Hyderabad and Latifabad near Latifabad railway crossing.

(e) Composition of major water bodies and hygiene aspects

River: The quality of water in Indus river is not much affected by wallowing. The contamination of water is slowly dissolved in flowing water and goes down stream.

Canals: The two canals i.e. Phulele and Penyari remain closed for a month during winter season. During the canal's closure period, the standing water in the depressions of the canal's surface caused by wallowing buffaloes becomes foul. Mineral and organic matter already in the canal water, added by the burden of buffaloes excrement, garbage thrown by the nearby community and other substances contaminate the water. The resultant effect is bad odor and source of mosquitoes breeding. Analysis of Phulele canal water samples are shown in Table 2.3.

Ponds: The ponds created by the waste/rain water in the depressions present another unhygienic sites in the city. The storm water mixed with the overflow of sewage water remain stagnant in the depressions. Some of waste waters remain in suspension, some go into solution, or become, so finely divided that they acquire the properties of colloidal (dispersed, ultra-microscopic) particles. Much of the waste substance is organic and useful to saprophytic micro-organisms i.e. organisms of decay. Therefore, the waste water in the ponds is unstable, biodegradable and generate offensive odors. It must be presumed that entire organisms are present in the water and buffaloes after wallowing can be source of contaminated milk unless otherwise they are washed properly.

Table 2.3: Chemical and Physical Analysis of Water Samples of Phulele Canal

S.No.	Characteristics	Results mg/lit. of Raw water	WHO Guideline value 1984	
			Desirable	Permissible
1.	Acidity			
2.	Alkalinity total	130		
3.	Appearance	Clear		
4.	Calcium	30	75	200
5.	Chloride	11	200	600
6.	Chlorine residual			
	a. Free	-		
	b. Combined	-		
7.	Color	Normal	5 units	50 units
8.	Conductance	-	-	-
9.	Hardness total	130	150	500
10.	Magnesium	13	50	150
11.	Odour	Normal	Un-objectionable	
12.	pH value	7.3	7.0-8.5	6.5-9.2
13.	Solids settleable	247.5	-	-
14.	Solids suspended	-	-	-
15.	Solids total	247.5	500	1500
16.	Solid Dis. Total (TDS)	-		
17.	Solids volatile	-		
18.	Taste		Un-objectionable	
19.	Temperature	25°C		
20.	Turbidity NTU	6.4	5	25
21.	Alum Dose	Nil		

(f) **Other quantitative estimates obtained through survey**

Methane production: Methane is produced by large ruminants during the process of metabolism. On metabolism of 100 g of feed carbohydrate digested 4.5 g methane is produced, in this way 7% of gross energy from food is lost as methane. A buffalo produces 30 liters of gas per hour during digestion. Thirty to 40 percent of these gases is methane and approximately 12 to 13 liters of methane is produced in 24 hours by a buffalo. In other words 250 tons of methane is produced by the total population of the buffaloes stationed in various localities of the city.

Production of urine: Nearly 32.48 tons of urine is produced in 24 hours by the present population of the buffaloes.

Manure production: Approximately 129 tons of dung is produced in 24 hours in the city by the present buffalo population.

Milk production: Nearly 93 tons of milk is produced in two milkings.

Fodder needs: Nearly, 242 tones of green fodder is required per day. Similarly, 242 tones of dry fodder like wheat straw will be required.

Concentrates needs: Approximately, 72.75 tons, per day is needed to feed nearly 22,000 heads of buffaloes.

III. ENVIRONMENTAL STUDIES

Economic development and environmental awareness are not contradictory goals. The interrelated nature of economic growth, natural resources use, and environmental protection is encompassed by the phrase "sustainable development" which describes those activities that promote long term sensible use of the natural resources.

Economic development, the ultimate goal which is to improve welfare, is dependent on the environment and natural resources to provide the goods and services which directly and indirectly generate socio-economic benefits. At the same time, however, development is often accompanied by significant adverse impacts on the environment.

Taking an example of Hyderabad city where around 10,000 buffaloes use various water bodies, by doing so they cross through main roads. This creates immense problems. At various roads traffic is affected due to these buffaloes. Fuel worth millions of rupees is lost due to traffic jams. Moreover, problems of bad smell lead to various viral infections.

A survey was carried to assess fuel losses due to traffic caused by the buffaloes. Routes followed by buffalos to various water bodies were identified. Normal timings followed by the buffaloes during morning and afternoon were noted.

(a) Impact of Cattle on Pollution

The environmental problem in Hyderabad city encompasses a wide range of ecological, hydrological and public health related aspects with an ever-growing population. The magnitude of accumulated environmental problems, owing to the legacy of ancient neglect and recent degradation is enormous and depressing. These problems, and their extent and magnitude have grave consequences for future city dwellers. Practical policies of resource management by the city corporation, inherent problem of marginal land development clearly require an innovative approach. Generally, the environmental problems may be classified into water related i.e. sewage disposal, solid waste disposal and air/noise pollution.

i) Traffic Jams

There are eighteen roads in the city that are traversed by buffaloes twice daily i.e. during morning and evening hours. Their timing to cross the roads are different in the evening depending upon the time of their milking, which vary according to the season. The traffic jam cause air and noise pollution coupled with loss of time and POL. According to survey conducted, it was revealed that on average 15.6 minutes are lost in each crossing and the amount calculated for the fuel used is approximate Rs. 2000/- a day. As the crossing is done by buffaloes twice daily, the total time lost comes to 31 minutes per day or 15 hours per month or 180 hours per year and Rs. 2000/- per day or Rs. 60,000/- per month or Rs. 2.19 millions per year.

It appears that there is enormous loss of time and money caused due to presence of buffaloes in the city. The financial implications due to loss of man-hours and extra fuel consumed is given **Table 3.1**.

Table 3.1: Financial Implication of Traffic Jam

Type of vehicle	Average No. of vehicles	Average time lost (min.)	Average P.O.L. consumption (lit.)	Cost of P.O.L. consumed per (Rs.)	Average No. of men in each vehicle	Man hour lost per day	Average wages of each man hr. per day (Rs.)	Total cost of man hour per day (Rs.)	Total cost of man hour lost per day	Man hour lost per annum	Financial effect per annum (Rs.)	Total hours* (hrs.)	Total financial effect** (Rs.)
Cars	22	15.5	1.57	18.8	4	1.02	41.6	42.43	61.23	306	18369	11016	661284
Rickshaw	13	14.0	0.7	8.4	2.5	0.58	20.8	12.13	20.53	174	6459	6264	221724
Bus	9	17.14	1.71	8.72	40	11.42	10.4	118.76	127.48	3424	38244	123336	1376784
Truck	9	16.6	2.08	10.61	4	1.10	10.4	11.44	22.05	330	6615	11880	238140
Suzuki Van	9	14.14	0.56	6.72	12	2.82	10.4	124.48	131.15	846	39345	30456	1416420

* Total effect for P.O.L. and man hours for 18 sites price daily per annum.

** Total man hours lost for 18 sites twice daily per annum.

ii. Noise Pollution

It is caused by:

- o Industrial units
- o Aircrafts
- o Music
- o Traffic

The noise produced by the two wheelers and other transport during the static running at each crossing is irritating and source of many problems. The remaining causes as outlined above are of secondary nature. The pollutants contribute to the following:

- o Loss of hearing
- o Loss of sleep
- o Excessive tiredness in the morning
- o Pupil dilation and blood vessel shrinkage
- o Increase in annoyance

The production of extra volume of noise during morning and evening hours is more than the normal. The presence of buffaloes is causing immense impact on peaceful living of the residents of the area particularly in the localities where the buffaloes movement causes traffic jams.

iii. Air Pollution

Air pollution is caused by omission of gaseous and particulate contaminants into the air from the exhaust of vehicles to receptors and in all, there are one or more classes of receptors, human, animal, vegetables, material structural or the atmosphere itself, that are adversely affected.

The air pollution problem faced by Hyderabad city is acute due to:

- a. Presence of industrial units i.e. Zeal Pak Cement Factory, Thermal Power Plant at Jamshoro, textile industries and processing factories.
- b. Transport especially rickshaw and smoke emitting buses.
- c. Disposal of animal excreta.
- d. Burning of animal, and vegetable products.

The loss of man hours due to air pollution is shown in table 3.2

Table 3.2: Loss of Man Hours Due to Air Pollution

S#	Description	Average No. of men got sickness	Average time lost (hours)	Average wages per hour	Average No. of day	Total financial effect per annum
1.	Each site	5	8	30	3	42200
2.	18 sites	90	144	30	54	388800

The tall chimneys of cement and power plant releases untreated gases from the burning of lime stone, gypsum and coal. The emission of smoke by rickshaw and buses during the static running when the traffic is blocked due to crossing of roads by the buffaloes is another source of air pollution. Smoke coupled with dust raised by the animal traffic causes many health problems especially infectious of the respiratory tract.

Quantitative Estimates: The quantitative estimates for consumption of extra POL and its cost due to traffic delays caused by crossing of buffaloes are at **Table 3.1 and Appendix-II**

IV. ECONOMIC ASPECTS OF DAIRY CATTLE IN HYDERABAD

The dairy colony project strives to develop a sustainable production system that is well integrated into the production, processing and marketing enterprises common in Hyderabad. Whereas all indication from the animal husbandry and technical side point to a practical idea that can be implemented within the resources identified, however certain socio-economic considerations must be kept in mind.

While shifting existing herd is the main objective one must keep the human side well in mind. The livelihood of over 5000 families is directly or indirectly tied to the dairy sector. These smallholder are maintaining livestock in cities at marginal costs. While, these systems may generate considerable environmental problems they are extremely efficient. First they utilize slack labor (women and children) which otherwise does not have a high opportunity cost. Second prevalent feeding systems efficiently utilize available feed resources at the disposal of the farmers. The marketing costs are negligible and the household's involved in this system have developed the necessary dairying skills that enable them to produce milk efficiently.

Shifting the buffaloes from existing barras has clearly distinct economic advantages. Bringing such a large production system under one roof will obviously reduce average production cost. Facilities of artificial insemination, veterinary medicine, transportation, security etc will become available to the producers. Furthermore, extension information can be shared and monitored more easily than if the herds were scattered as they are under present situation. All these factors promote economic efficiency. Important vertical and horizontal linkages can be established with the feed, processing, marketing and transportation functions. Such efficiencies obviously reduce cost.

The local economy of the areas will also receive a boost as additional employment will be generated. Cropping pattern in the area is likely to change in favor of fodder crops. This will contribute to the cash income of crop farmers. In summary the presence of a new dairy colony will improve the income, employment and economic welfare of the local populace.

A review of the benefits and costs associated with the project clearly signal a net benefit to be realized within a short period. The economic cost and return analysis presented in **Table 4.1** clearly shows that net benefits to farmers far exceed the initial investments. Since, few new animals are being purchased and only the existing herd is to be transferred there is every likelihood that the project is economically feasible.

Table 4.1: Cost and Return for 20,000 Buffalos at Hyderabad Colony

Price of Milk Rs 8/kg

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
INFLOW										
Sales	326.01	396.68	561.50	640.33	783.86	1047.21	1250.60	1530.85	1795.17	2355.30
Salvage value					1.30					35.61
Loan										
Total:	326.01	395.68	561.50	640.33	785.16	1047.21	1250.60	1530.85	1795.17	2390.91
OUTFLOWS										
Capital Cost										
Replacement Cost										
Operating cost	253.58	372.56	547.08	635.25	725.02	986.23	1202.33	1316.34	1591.66	1315.72
Tax										
Debt Servicing										
Total	253.58	472.56	547.08	635.25	725.02	986.23	1202.33	1316.34	1591.66	1315.72
NET BENEFITS	72.43	(23.12)	14.44	5.07	(60.14)	(60.98)	48.26	214.51	203.51	1039.59

IFRR = 40%

1:27

**Cost and return for 20,000 buffaloes at Hyderabad colony
(price of milk Rs. 8.00 per kg)**

Year	Benefit	Cost	HPV of Benefit	NPV of Cost
0	0.000	83.271	0.000	73.045
1	326.011	253.585	285.975	222.443
2	396.683	372.560	347.968	326.807
3	561.490	547.085	492.535	479.900
4	640.330	635.258	561.693	557.244
5	785.156	635.258	668.733	557.244
6	1047.210	725.018	918.605	635.998
7	1250.600	1202.339	1097.018	1054.683
8	1530.851	1316.342	1342.852	1154.686
9	1795.170	1591.662	1574.711	1396.195
10.	2390.920	1315.720	2097.298	1154.140
	9407.387	7612.367		
	NPV = 1647.698			
	BCR = 1.21			

User Charges and Cost Sharing

The Hyderabad municipality is incurring a high initial investment to construct the colony. Services in the colony should be sustainable and buffalo owners must be encouraged to both utilize and pay for these services. While in the initial 2 years sum form of subsidization may be necessary such incentives must be reduced and a viable cost recovery program put in place.

Marketing

A concern expressed during field visits by several consumers was that by shifting the dairy colony the cost of milk production would increase. The main reason expressed for this increased cost is the cost of marketing milk from the colony into Hyderabad. Various scenarios seem likely. First, octroi, transportation charges, loading and police bribe charges will increase. Such costs are normally not incurred when milk is sold in the city. A livestock farming is assumed to have a given set of resources land, labor and capital and decision making to utilize these resources in most efficient. Gross margin analysis is widely used to calculate output after deducting variable costs. Survey conducted in Hyderabad revealed that there are nearly 22,000 dairy animals in Hyderabad. The farmers are categorized into small, medium and large according the number of animals owned. The following distribution was noted.

Type of owner	Maximum No. buffaloes
Small	10
Medium	25
Large	50

Gross margin analysis was applied to assess the gross output. In this regard, small and large farms were visited in Hyderabad city and following data were collected to gross margin at each level (Table 4.2).

Table 4.3 shows the likely changes in marketing margin before and after the colony is shifted. Another likely situation which is expected is that at present feed costs in Hyderabad are high since most of the feed is brought from outside the city. With more efficient production in the vicinity to the colony the cost of feed will be reduced. If a feed mill as proposed in the feasibility is put in place the overall cost of production is likely to further be reduced. Under these conditions the consultants feels that there will be no significant differences in the price at which milk can be marketed in the city. In fact if cooperative arrangements can be encouraged, perhaps the milk sold by colony farmers will be more competitively priced then that produced in the city.

Table 4.2: Gross Margin Analysis

GROSS MARGIN	Farm Size		
	<i>Small</i>	<i>Medium</i>	<i>Large</i>
Sale of Animals			
- Culled animals (Culling at @ 10%)	6,000.00	18,000.00	60,000.00
- Young male Calves (@ Rs. 800) (Calving rate, 66, 70 and 75%, respectively)	2,400.00	6,400.00	29,000.00
- Young female Calves (@ Rs. 1000)	2,000.00	5,000.00	27,000.00
- Bulls replacement		4,000.00	16,000.00
TOTAL (a)	10,400.00	33,400.00	1,32,600.00
Sale of Animal Products			
- Sale of Milk, (7kg/animal @ Rs. 8/kg)	1,68,000.00	4,20,000.00	16,80,000.00
- Sale of Manure	2,000.00	5,000.00	20,800.00
- Values of Replaced females (Rs. 1000/Animal)	2,000.00	4,000.00	10,000.00
TOTAL (b)	1,72,000.00	4,49,000.00	17,10,800.00
TOTAL (a + b)	1,82,400.00	4,62,400.00	18,43,400.00

VARIABLE COST

- Cost of feed (Rs. 2.50, 2.75 and 3.00/Kg, respectively)	82,125.00	1,85,625.00	8,10,000.00
- Husbandry/Management cost	750.00	25,00.00	10,000.00
- Medicines	750.00	25,00.00	10,000.00
- Cost of Buffalo replaced (mortality @ 10%)	15,000.00	60,000.00	2,50,000.00
- Labor cost	8,000.00	30,000.00	1,26,750.00
- Cost of replaced Bulls	-	5000.00	20,000.00
TOTAL	1,06,625.00	2,85,625.00	12,26,750.00
TOTAL GROSS MARGIN	75,775.00	1,76,775.00	6,16,650.00
GROSS MARGIN/BUFFALO	7,577.50	7,071.00	6,116.50

Table 4.3: Marketing Margins for one liter Milk (1992)

Items	With project	Without project
A. Farmers price Rs./L	7.50	8.00
B. Marketing cost		
- Transport (Rs/L)	0.45	0.00
- Labor (Rs/L)	0.31	0.20
- Refrigeration/ice	0.13	0.00
- Octroi	0.05	0.00
- Tax	0.15	0.00
- Physical loss (1%)	0.08	0.00
C. Dealers margins/middle man's margin	0.75	0.00
Total	9.42	8.20
Police handling charges		

Sociological Considerations

Repeatedly concern was expressed during the field visits that how will so many diverse groups live under the same roof and harmoniously be involved in economic activities given the ethnic problem in Hyderabad. Some groups felt that the new dairy colony would be used to politically manipulate votes. Such apprehensions should be put to rest and the potential dwellers taken into confidence. Unless there is a feeling of mutual trust between the implementors of the program and those who will be moving to the new location the program is unlikely to succeed. How such assurance and trust can be developed lies in the basic philosophy of indiscriminate access to the resources and facilities that can be shared by those who will move to the new cattle colony.

Long Run Scenario

A later section includes the financial projections over a long term period. From an economic standard point the long term prospects for expanding the dairy industry in Hyderabad look highly favorable. By building the necessary infrastructure and developing the needed Management Information Systems that will enable rational decision making in the long run. Investment in such a modern system must also be looked into by HMC management. Without rapid access to input-output market data, health reconnaissance, economic and financial projections it is difficult to guide farmers to make good economic decisions. A strong extension component on latest dairy practices can have a high payoff. In fact since many lessons have been learned from the dairy colony experience in Karachi such mistakes must be avoided in implementing the Hyderabad Dairy Colony plan.

Financial Analysis

Based on herd projections the total benefits from the project were derived over a 10 year period. The projected income stream is based on a herd simulation model that has been developed at Asianics. The basic income generating parameters are milk, meat, manure and fuel saving due to reduced traffic hazards. Since savings from sweepers salaries are minor they have not been included in the calculations. The cost stream includes items such as land, construction, civil works, feed mill, feed, labor, medicines

etc. Table shows that the net benefit from the project would increase from 72.43 to 1039.6 million between years 1992 to 2001 respectively (Table 4.4).

B/C Analysis

A discounted benefit cost analysis based on various price assumptions was performed. At present farm-gate price of Rs 8 the benefit cost ratio is estimated to be 1:1.21 (Table 4.1), at a price of Rs 10 this ratio increases to 1: 1.49. Detailed tables are presented at Appendix-III.

Table 4.4: Projected Cost and income for period of 10 years.

(Millions)

Item	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
COST										
Investment										
- Land	1.64									
- Building & capital investment	68.63									
- Equipment	13.00									
- Livestock	0.00									
Total	83.27									
Net basis production costs										
- Feed cost	225.00	327.27	525.00	615.00	643.22	813.93	1050.00	1200.00	1425.00	1245.00
- Medicine	1.90	2.50	3.20	3.90	4.20	13.00	18.00	20.00	21.20	24.00
- Husbandry/Management	.95	1.30	1.60	1.90	2.10	6.50	8.70	9.70	11.00	12.00
- Feed mill manager	.015	.016	.017	.018	.019	.019	.012	.021	.022	.023

Cattle Colony, Hyderabad**Feasibility Study**

- Veterinarian	.42	.44	.47	.49	.51	.54	.56	.58	.60	.63
- Other and administrative	5.00	5.03	5.08	5.11	.14	5.18	5.22	5.26	5.30	5.62
- Labor, hired	25.00	36.00	40.00	48.00	57.00	142.00	125.00	87.00	134.00	345.70
Total	258.29	372.56	575.97	674.72	725.02	986.02	1177.49	1322.56	1597.12	1632.90

RETURNS

Sale of milk @ Rs. 8.00/Kg	322.00	383.00	548.00	582.00	702.00	976.00	1186.00	1402.00	1529.00	2018.00
Sale of Meat @ Rs. 30.00/Kg	.059	9.60	9.31	54.00	78.00	65.00	58.00	123.00	257.00	326.00
Sale of manure	.03	.05	.02	.02	.07	1.64	1.57	1.68	4.30	7.00
Fuel Saving	3.93	4.05	4.17	4.30	4.43	4.56	4.70	4.84	4.99	5.14
TOTAL	326.10	386.70	561.50	640.40	784.50	1040.30	1247.30	1531.50	1795.30	2354.00

In the consultants opinion the project is financially viable and worthy of support through public, private or donor funds. We have not estimated the bay-back period, but our analysis suggests that on grounds of improved environment of the city the project will have many secondary benefits that must be recognized even though they are difficult to estimate (these include reduction in respiratory diseases, fewer accidents and injuries etc). Given that cost over-runs occur in almost every budget period it is prudent that immediate steps are taken to implement this project.

V. REVISED CATTLE COLONY PROJECT

This section deals with the engineering and animal husbandry feasibility of the project. Comments are made on the technical design and suitable modifications are proposed. In addition to this each engineering components cost is reviewed and suitable modifications suggested. A comparison of cost proposed by HMC and ones worked out by the consultants engineer are compared. The section concludes with an overall set of recommendations to implement the project.

(a) Technical Considerations

i. Suitability of site

Hyderabad Municipal Corporation has selected a site comprising 215 areas of agricultural land, 12 km away from Hyderabad on Badin road. The site is situated between rail road and Phulele canal in a linear configuration. There are eight main factors to be considered when selecting a site for livestock buildings:

- o Soil mechanics
- o Access
- o Services
- o Climate
- o Security
- o Logistics
- o Expansion

Soil Mechanics: The required standard of the quality of soil depends upon its use and as the soil is being used for agricultural purposes, therefore, it is suitable for farm buildings and buffaloes. However, well drained, soils are preferable.

Access: Buildings must be related to vehicular access between and into them, to livestock handling routes and to fodder storage buildings from the highway. The proposed site will be connected adequately with the Badin road and there is a possibility to construct a railway station on the adjacent railway line. Selected site is surrounded

by agriculture lands, where presently people are cultivating sugarcane, with the establishment of cattle colony the cropping pattern will change due to the demand for fodder. The site falls in the maize and barseem growing area.

Services: The colony requires electric supply and livestock housing both water and drainage. Electric line passes through the land and two canals i.e. Phulele and Puneri canals flow on the eastern side of the proposed site. Even water can be obtained by drilling tube wells. However, the disposal of waste water would need more engineering studies.

Appearance: The proposed site when developed will have prominent buildings situated in attractive landscape. Color relationship as well as profile and texture both of roof to wall and new buildings to vernacular material and soil would be considered.

Climate: Climate is suitable as the area lies in the path of easterly winds from the Arabian sea. The site being away from the urban area will not pollute the city atmosphere.

Security: Vandalism and theft should be considered. Most buildings when constructed should be kept under supervision.

Logistics: The site is well connected by road and rail hence no logistics problems and because of its nearness to the city and a cluster of existing villages around the proposed site, the availability of the labor will not be a problem.

Expansion: The proposed site comprises 215 acres which caters for the need of expansion. Approximately a quarter of the area can be utilized for future expansion.

ii. Ideal requirements of dairy production

The ideal requirements of dairy production are:

- o Suitable site near to the market.
- o Easily accessible roads and suitable and cheap transport facilities for transport of milk and dairy animals.

- o Availability of water supply for both animals as well as human consumption and other farm operations.
- o Hygienic and suitably constructed pens for housing dairy animals and facilities to store concentrates and green and dry fodder. Dairy houses be constructed according to the existing climatic conditions of the area. Under the ideal management system of dairy farms, where most operations like: feeding, feed mixing, milking, watering, and cleanliness etc., are manually performed dairy farms be constructed in such a way as to make them easier and efficient for manual operations. Thus it becomes imperative that animal sheds be constructed in accordance with the recommended housing systems following either off the two housing systems i.e. "Tail-to-Tail" or "Face-to-Face", animal tying system giving due provision of feeding, milking passages and efficient drains. However, the Tail-to-Tail system of tying animals is better. This system of housing caters for different categories of the stock like milch stock, dry stock, and calf pens and a bull pen where natural breeding system is practiced.
- o Easy availability of fodder and concentrates and dry roughage and other inputs.
- o Cheap and trained labor in routine dairy operations.
- o All time availability of veterinary aid with sound disease control program with a veterinary hospital equipped with quarantine and disease diagnostic facilities.
- o It is becoming difficult and costlier to maintain breeding bulls on each farm, therefore, an artificial insemination center must exist in the dairy colony which may provide sound animal sexual health program alongwith efficient artificial insemination services.
- o Strict quarantine measures should be followed and any animal before it is brought to the farm from market or outside must be stationed in quarantine and vaccinated before allowing its entry in the farm.

iii. Pros and Cons of chosen site

The proposed site situated 12 km away from the main city has the following advantages and disadvantages:

Advantages

- o **Circulation:** Flow-line or circulation routes for material, men, machinery and stock together with spatial requirements have been planned.
- **Access:** Easily accessible from Hyderabad through road and rail connections.
- **Services:** Water supplies and electric power is available from nearby canals and electric lines passing through the site.
- **Environmental control:** It is possible to control the environment by better planning. Control in the case of livestock is to improve health or to reduce feed for maintenance.
- **Management:** Each enterprise will require its own set of buildings, through common storage and service facilities. The colony will have easy movement of livestock, feed which will facilitate milking of animals.
- **Labor force:** Cheap labor force is available in nearby villages, full time or part time.
- **Expansion:** The site offers enough space for expansion at a later stage - land is available for additional accommodation. Even the plot size are sufficient to house upto 40 animals in case of big plots and 20 animals in small plots.
- **Planning:** Livestock farm buildings have a complex relationship between management, production and layout systems. The proposed site can be planned in a systematic way integrating various planning processes, economic, mechanical and farmstead.

Disadvantages:

- **Marketing:** The proposed site is 12 km from the city, the owners of buffaloes may face problems and incur extra economic burden on the inputs and outputs of the products.
- **Communication:** The trading road upto the proposed site will be congested with the vehicles in transporting fodder from Mirpur Khas and Hala areas.
- **Security:** The colony will be spread over an area of 215 acres, therefore it will be subjected to theft and other security hazards. Livestock, fuel and other valuable will be risk.

(b) Revised dairy colony plan**i. Husbandry considerations**

The proposed slaughter house to be constructed in the premises of dairy colony should be shifted far away from the colony otherwise the colony cannot remain disease free. Similarly, the cattle market or bakra piri etc. shown in the proposed plan-map of the colony should not be constructed in the colony area, otherwise sick animals brought for sale in the market would spread infectious, contagious and parasitic diseases.

An electric incinerator be provided in the proposed dairy colony for burning carcasses of dead animals, otherwise dead carcasses of the animals may be found putrifying in the premises of the colony.

A feed mill is proposed for manufacturing compound feeds for milch and dry stock and preparing cheaper milk replacers and calf starter and fattening rations, in the place of slaughter house. During the survey farmers belonging to all three categories disclosed that they would purchase prepared feed provided it is available at a uniform rate through-out the year. According to farmers, prices of conventional concentrates show extreme seasonal variation.

ii) Feed Resources

Green Forages: Production and diversity of forages is controlled by number of factors viz., rainfall and its distribution, altitude, humidity, light intensity, and concentration of CO₂ and O₂ (g) in the atmosphere. Plants generally do not react to altitude, but do respond to day-length and environmental characteristics. Vegetation grows well in the suitable environment where it can utilize the solar energy, water, soil nutrients and gases most efficiently.

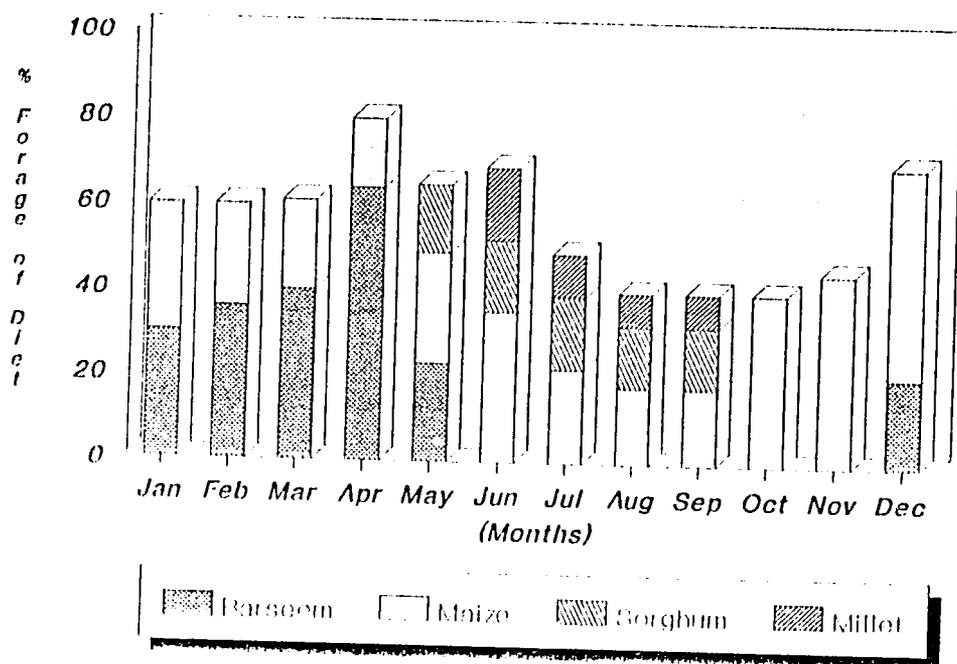
The photosynthetic output of plants is largely inhibited by their high degree of photo-respiration. In this respect, the forages can be roughly classified into two categories: i) those with little or no photo-respiration i.e. C₄ types of plants or summer (kharif) crops (maize, millet, sorghum etc.) and those with high rate of photo-respiration i.e. C₃ types of plants or winter (Rabi) crops (oat, wheat, barely etc.).

Summer forage crops include both legumes and grasses. Warm season cereal grasses (C₄) commonly available in and around Hyderabad are, maize (*Zea mays*), sorghum locally called as Jawar (*Sorghum* spp.) and millet. Whereas, winter or cool season is more luxurious than summer season, because it enjoys most of the productive and palatable forages (C₃) such as Egyptian clover, commonly known as berseem and Persian clover commonly known as shaftal.

Unlike other parts of the country, maize (corn) is available in Hyderabad around the year. However, during the months of July, August and September there is a shortage of fodder production due to heavy rains. Figure 5.1 illustrates the forage availability in Hyderabad year around.

Dry Forages: In addition to green forages/fodder, other important basic components of livestock ration, commonly used in Hyderabad, is crop residues. Among crop residues, wheat straw is the only dry forage abundantly used in Hyderabad. This substitutes more than 50% of the forage requirement in terms of volume and TDN.

Figure 5.1: Forage Calender Around Hyderabad City



Concentrates: Other than conventional and unconventional forages, farmers supplement their milking animals with concentrates. Most commonly used ingredients are cotton seed cake, mustard seed cake, wheat bran, rice bran and mung seed hulls. Supplementation of concentrates is practiced by the farmers to fulfill the requirements of their animals for CP and TDN. The concentrates are supplemented at the rate of 3 to 4 kg/animal/day.

The composition of the rations is as follows:

	GREEN FORAGE		
	Non Legumes	Legumes	Legumes and Non legumes
DRY	Wheat straw	Wheat straw	Wheat straw
	+	+	+
FORAGES	Conc.	Conc.	Conc.
	----	----	----
	100	100	100

The amount of forages and concentrates fed to the animals is based on the size and physiological conditions of the animals, level of production, and seasonal conditions. On an average, animals of 450-500 kg body weight, producing 6 to 8 L of milk are fed the following types of diets. The example of the least cost rations based on different forages is given in Appendix-IV.

Rations	Amount consumed kg/Head/day	TDN %	CP %
-----	-----	----	----
a) Maize green fodder	12.00	40.39	5.27
Wheat straw	5.00	9.76	0.98
Concentrate	3.50	12.80	2.56
Total	20.50	62.95	8.81

b)	Millet	12.00	36.60	5.40
	Wheat straw	4.00	8.00	0.80
	Concentrate	4.00	15.00	3.00
	Total	20.00	59.60	9.20
c)	Sugarcane crops	20.00	39.20	4.16
	Concentrate	5.00	15.00	3.00
	Total	25.00	54.20	7.16
d)	Berseem	15.00	43.13	11.87
	Wheat straw	6.00	10.00	1.00
	Concentrate	3.00	9.38	1.90
	Total	24.00	62.51	14.77

The quality of forages is generally effected by several factors, which include plant physiological condition, environmental characteristics, soil conditions etc. However, random sampling of green and dry forages and concentrates available in the market and (or) being in use is presented below in **Table 5.1**:

Table 5.1: Chemical composition of green fodder, wheat straw and concentrates

Ingredients	DM	CP	TDN
Maize	25.00	9.00	69.00
Berseem	14.00	19.00	64.00
Pearl millet	21.00	9.00	61.00
Wheat straw	90.00	4.00	40.00
Concentrate	90.00	15.00	75.00
Sugar cane tops	16.00	5.20	49.00

Nutrient intake of rations mentioned above, based on different forages is presented below in Table 5.2

Table 5.2: Approximate nutrient intake for different rations.

Ration	-----intake (kg)-----		
	DM	CP	TDN
A	10.65	0.854	6.23
B	9.72	0.911	5.68
C	9.7	0.945	5.92
D	10.2	1.020	5.53

Among green forages, maize being fed for a period of 8 months, millet for 1 month and berseem for 3 months to livestock. The practice of sugarcane tops feeding is rare and these are fed only by farmers who have their own land. Under existing conditions the consumption of total forages and concentrates based on current animal heads, is 1,69,000 tones/year (Table 5.3).

Table 5.3: Item wise consumption of total forages and concentrates, TDN and CP.

Items	Quantity (tones/annum)	DM	TDN	CP
Wheat straw	40,920	36828	16368	1637
Maize fodder	63,360	15840	43718	572
Millet fodder	7,920	-	-	-
Sugar cane tops	-	-	-	-
Berseem	29,700	4158	19008	563
Concentrates	27,060	24354	20295	409

Apparently animals are underfed especially for crude protein. Rations based on cereal grasses and sugarcane tops appeared deficient in crude protein. To obtain maximum production with the existing genetic potential, feed should be supplemented with concentrates like oil cakes. Moreover, the introduction of some perennial leguminous fodder in the area should be encouraged.

According to established norms crude protein at a level of 12.5% and crude fibre at a level of 17% at the minimum is sufficient for a medium milk producing animal. This is particularly important for the lactating buffalo cow where crude fibre below than 17% may seriously reduce the butter fat content in the milk.

Animals Heads

Buffalo cows	18,400
Bulls (breeding)	945
Youngstock	1,320
Cows	775

Total: 21,297

Nutrient Requirement*

Type of Animals	DM	CP	TDN	Ca	P
	(kg)	(g)	(kg)	(g)	(g)
	-----per head/day-----				
Buffalo	13	1300	7.28	44.8	32.4
Bull (breeding)	11	800	5.50	23.0	17.0
Youngstock	7	1000	5.00	28.0	20.0
Cows	11	1100	6.20	32.0	24.0

Calculated on the basis of body weight and level of production.

Unconventional Feed Resources

The strategic feed ingredients are:

- Sugarcane tops
- Poultry litter
- Molasses
- Slaughter-house by-products

Sugarcane Tops: Low in digestible nutrients, poor in protein but relatively balanced in minerals. As a green fodder, they contained necessary quantities of carotene (precursor of vitamin A), vitamin E and chlorophyll. At present in Hyderabad, the use of sugar cane tops is limited to very few farmers.

Poultry Litter: Good source of protein, Ca, P and other minerals. It can be incorporated into the dairy rations at a level of 20%. Poultry litter is available in the peri-urban area of the city in reasonable quantities.

Molasses: It is the main source of soluble energy, which can be used effectively by the rumen microbes. Since three sugar mills are located around Hyderabad within a distance of 17 kilometer, therefore its availability and accessibility is not a problem.

Slaughter House-by Products: Rumen contents and blood are the main by-products available at slaughter house. Blood is used to some extent as blood meal. However rumen contents are being wasted and are main source of nuisance. This waste can be used as feed ingredients. It has about 17% high quality crude protein and its TDN value is equivalent to the TDN value of alfalfa hay.

Need of Livestock Feed Industry: Keeping in view the positive interaction between livestock development and feed industry, it is highly desirable to establish a feed mill. Induction of feed mill will not only help in coping the current requirement of feed, based on animal heads, but will serve as a key in the establishment of incoming livestock heads. In addition, it is also the most speedy way to upgrade the current livestock potential. Examples for the complete rations are given in **Appendices-IV**

The main advantages of complete feed are:

- Uniform and balanced feeding.
- Improves feed efficiency.
- Reduces feeding management problems.
- Allows the addition of desired micro nutrients.

Calf Starter: For the protection of genetic potential of animals, it is imperative to discourage the slaughtering of young animals, especially the females. The basic concept in disposing off of young animals is to spare more milk for sale/human consumption. To overcome this situation, there is a need to introduce the use of calf replacer/ starter. Therefore, establishment of a pilot plant for the production of milk replacers is desired.

Milk replacers is defined as a mixed feed stuffs which dissolves in water or liquid skimmed milk and replaces the whole milk of the lactating animals for suckling baby.

iii. Engineering design modifications

Space requirements:

Livestock building: Space requirement for livestock of all species and ages are complex. In some cases, space will be divided into lying, dunning, feeding and circulation areas. The physiology of the animal have to be considered. The requirements for space, water, effluent output are given in the **Tables 5.4, 5.5 and 5.6:**

Effluent: Effluent storage and disposal must be given priority in the layout and design of buildings. Environmental control will improve the health of cattle and improve palatability. Improvement in this case will enhance milk yield. The effluent of cattle with 10% dry matter will be designed in such a way that the cost in construction of lagoons will be less. Lagoons should also be able to irrigate adjacent lands. Lagoons will be constructed 600-1000 mm deep to permit bacterial action plus evaporation.

Treatments: The usual aim of treatment processes is to separate solids from the liquids, so that fibrous manure can be handled as a solid and the liquid can have further treatment to make it acceptable for disposal into water courses without pollution. Complete treatment of liquids tends to be most expensive, therefore partial treatment of effluent is suggested.

Table 5.4: Space Requirement - Livestock

Type of Stock	Age	Type of Housing	Area/Head lying or pen	Area/Head dunning or loafing/feeding
Buffalo	Large	Loose yards	3.75-4.75 m ²	1.80-2.30 m ²
		Cubicle/Kennel	1200x2150 mm	2.80-5.60 m ²
Cow	Small	Loose yards	3.25-3.75 m ²	1.40-1.80 m ²
		Cubicle/Kennel	1050x2000 m ²	2.50-3.75 m ²
Calves	14 days to 3 months	Controlled environment	0.9-2.40 m ²	Partly open yards
	3-6 months	Semi controlled	1.80-2.40 m ²	Open yards
Bull	Mature	Pen & run yard	4.5 x 3.6 m	4.50 x 6.0 m

Table 5.5: Livestock Water Intake

Type of stock	Nominal consumption per head per day (liters)
Buffaloes (including cleaning)	150
Cows	100
Calves	25
Domestic (farm cottage)	120

Table 5.6: Livestock Effluent Output Daily Average

Type of	Animal weight Kg.	Total Quantity		DRY Matter Contents kg	BOD Kg	COD Kg	Organic Carbon Kg	Total Nitrogen Kg
		Urine liter	Feces liter					
Buffalo	500	90.5	44.3	4.72	0.50	7.46	1.87	0.22
Calf	160	7.2	20.4	2.72	0.35	3.00	0.63	0.11

iv. Types of problems created after shifting colony

Some of the problems to be created by shifting animals to the new site may arise as under:

- o Problems in transporting milk and live animals, because the proposed colony will be 12 km away from the city market.
- o Marketing problems.
- o Problems encountered in getting requirements of feed ingredients.
- o Availability of labor at the new site.
- o Higher monthly or daily wages.
- o Problem of water supply to the colony.
- o Problem of disposal of waste material which should not be drained in the fresh water of the canals that are utilized by the rural population for drinking purpose.

v. Optimal number of animals that can be housed

Nearly 40,000 heads of animals could be accommodated in the proposed plan. However, the consultant recommends that no more than 14000 animal herds be shifted initially to avoid health risks.

(c) Revised Planning of Cattle Colony

i. Revised Plan

The plan prepared by the Hyderabad Municipal Corporation has been revised keeping in view the following aspects:

Management: The overall livestock farming system, including the relation of buildings to access roads, labor and finance.

Production Technologies: Special requirements which will control plot layout e.g. nutrition policy, farm waste policy etc.

Labor Force: Personnel available full time or part time.

Work routine: Frequency of operation, method of performance.

Circulation: Flow line or circulation routes for materials, men and stock together with spatial requirements.

Volume: Critical space dimensions including by-products.

Equipment: Data for equipment.

Environmental Control: Physical environment, required degree of controlled environment, production of by-products and their physical attributes.

Services: Electric, water, drainage etc.

Cost: Investment criteria and constraints.

Roads: The network of roads in the colony was more than the customarily required standards. Therefore, the plan has been revised by deleting superfluous roads. Refer to the drawing of the colony.

Plots: Previously two plots were profused but now 4 plots have been combined to save on service connection and also to minimize road crossings.

Site Office: Site office which was located on North eastern corner of the colony has been shifted near to the main entrance.

Railway Crossing: Instead of two railway crossings, one crossing has been proposed for economy and security reasons.

Building Structure: Hyderabad Municipal Corporation has worked out the price of buildings on Rs. 120.00 per square foot basis. Whereas, the new proposed price structure has been based on Rs 200.00 per square foot. Therefore the cost of construction has increased but due to revision in the design of the Cattle Colony, the rise in the cost has been compensated by reduction in cost of roads. A comparison of the proposed and suggested cost of the colony by Hyderabad Municipal Corporation is at **Table 5.7**. The increase in cost over that proposed by HMC is only 2.9%.

Water Supply: Source of water has been proposed from the canal flowing nearby. Additionally provision in the estimates has been made for drilling two tube wells to augment the existing source. Underground water storage reservoir has been planned to supply water during the closure period of the canal.

Sewage System: Disposal of waste water and urine of the animal from the septic tanks has been planned to be collected by underground sewer lines. Partial treatment of effluent has been suggested for economy reasons through stabilization ponds.

Electrification: The design and cost of the electrification of the colony including street lights has been considered as suggested by the corporation. Hence no change in the cost incorporated. Normally WAPDA carries out electrification of colonies as deposit work throughout Pakistan.

Table 5.7: Comparative cost of the Cattle Colony Project

		Cost in million rupees	
		Revised	Original
Cost of Land		1.641	1.641
a.	Water supply system	9.9866	9.894
b.	Sewerage system	7.837	6.901
c.	Electric supply including street lights	11.92	10.92
d.	Road & roads structures	14.71	18.48
e.	Railway crossing	1.000	1.200
Residential Area			
a.	Staff colony	1.250	1.917
b.	Sweepers colony	0.909	2.197
Storage and Commercial Accommodation			
a.	Fodder stores	1.334	0.975
b.	Shopping centers	8.228	4.968
Amenities			
a.	Veterinary hospital	1.136	0.681
b.	Mosque	1.300	0.780
c.	Fire Brigade	2.000	1.200
Total		63.245	61.754
Add 10% cost escalation		6.324	6.175
Grand Total		69.569	67.930
Say		70 millions	

Amenity Buildings: Sites for the facilities like School, Police Post, Post Office and Hospital have been earmarked in the drawing but the construction will be carried out by the respective departments from their budget.

Layout of Cattle Colony

An area comprising 215 acres has been earmarked at a distance of 12 km from Hyderabad city on Tando Mohammad Khan road for its development into a Cattle Colony. The necessity to establish Cattle Colony was felt due to ever increasing population of buffalos in the city and insanitary conditions produced by them thereby polluting the whole atmosphere.

The proposed colony site is located between rail/road track and Phlahi Canal. The width of the site is less than the length. However, during planning of the colony this aspect was kept in mind. The area is fertile and predominantly sugarcane is grown. Due to excessive watering, some areas of land contains salts which have appeared on the surface.

The land is very close to the main road and is therefore accessible by road or rail. Entrance to colony has been proposed through a railway crossing for which an amount of Rs one million has been kept.

The colony has been divided into three phases connected by central road. Each phase has been provided with a commercial area for the benefit of the residents. Two types of residential plots i.e A and B with size 85'x67.5' and 70'x30' respectively have been planned. The disposal works have been kept on the South Western end of the colony ear a canal distributary called Gondar Wah. The partially treated waste water may be disposed off into this distributary. Water works have been planned on the western corner in the middle of the colony. Following types of accommodation, facilities and amenities have been planed.

1. Residential plots including animals space of sizes 85'x67.5' and 70'x30'.
2. Staff colony
3. Sweepers Colony
4. Fodder Stores

-
5. Veterinary Hospital
 6. Fire Brigade
 7. School
 8. Cinema
 9. Mosque
 10. Police Post
 11. Site Office
 12. Commercial Area
 13. Shops
 14. Incinerator

The detailed dimensions and quantity of the above type of accommodation are illustrated in the drawings at **Appendix-V**.

The plan prepared by the Hyderabad Municipal Corporation has been revised, updated and cost estimates prepared. The revised cost estimates are given in **Table 5.7**.

A typical design prepared for housing buffalos, based on the local environment and weather conditions, is shown in **Figure 5.2**.

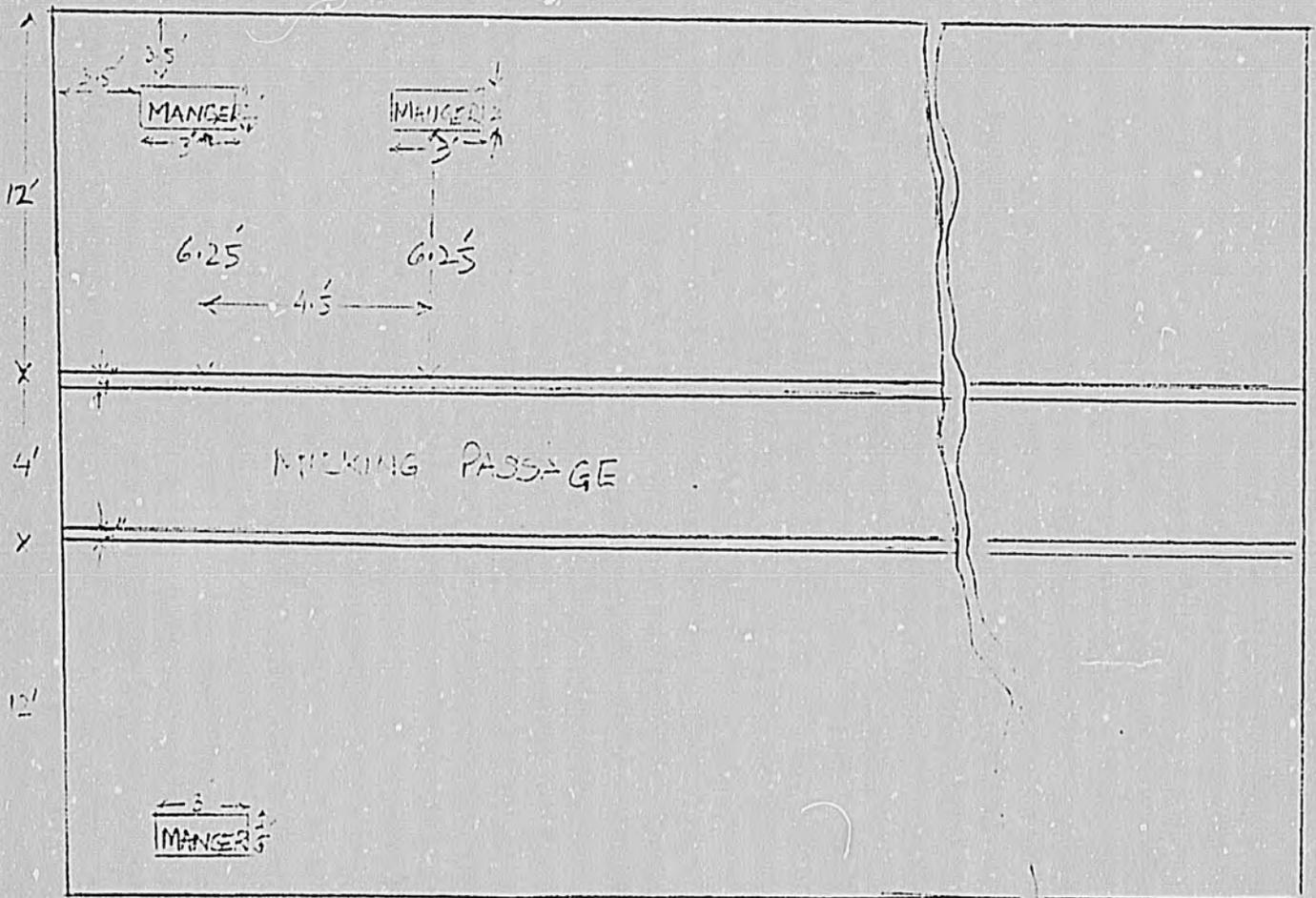
ii. Details of Engineering Design

Water Supply: Availability of potable water in the proposed cattle colony will pose problems. There are two sources of water available:

- Surface water from canals
- Ground water

Surface water: Phulele canal flow on the eastern side of the proposed site at a distance of approximately one km. The sample taken out from the canal indicate less contaminants (**Table 3.4**). This is not a regular source of water supply as it remains without water for a period of one month during winter season. Estimate of water and cost of construction of water works including delivery system is at **Appendix-IV**.

Figure 5.2: PLAN OF A CATTLE SHED



60a

Ground water: The information gathered from the locals and from irrigation departments, indicate the underground water is brackish and not fit for human consumption. It contains many salts and their removal is uneconomical. Therefore, there is no other alternative except to use canal water. During closure period additional storage facilities will have to be developed which will add to the cost of the project, i.e. treatment, disposal and reuse of waste water.

Sewage Disposal: Waste water disposal would be a major problem in the proposed colony. Presence of more than 22,000 cattle heads in a secluded area will produce 198,000 (90.5 x 22,000) liters of urine in addition to waste water used by the residents and washing of the buffaloes. The effluent which will be collected at the disposal works will contain the following intolerable and objectionable materials:

- a. Organic material, which might tend to decompose, producing malodorous gases in large amounts if waste water is allowed to accumulate.
- b. Numerous pathogenic or disease causing micro-organisms from human intestinal tract.
- c. Nutrients stimulating the growth of aquatic plants.
- d. Toxic compounds.

Therefore, removal of objectionable contaminants in waste water is a must to protect the environment. The local conditions prevailing in the area necessitate partial treatment of the waste water and disposing it either into the nearby fields or the distributary flowing on the boundary of the land. This will depend on the situation prevailing at that time.

Stabilization Ponds: It is suggested that stabilization ponds also called Lagoon or oxidation ponds which are used in rural areas should be constructed. The bacterial reactions include both aerobic and anaerobic decomposition. Waste organic in suspension are broken down by bacteria releasing nitrogen and phosphorus nutrients and carbon dioxide. Algae use these inorganic compounds for growth along with energy from sun light releasing oxygen to solution. Dissolved oxygen in turn taken up by the bacteria thus closing the symbiotic cycle. Oxygen is also introduced by recreation through wind action. Settleable solids decomposed under anaerobic condition on the bottom yield

inorganic nutrients and odorous compounds, for instance hydrogen sulphide and organic acids. The latter are generally oxidized in the aerobic surface water thus preventing their emission to the atmosphere.

Construction: Typical construction is two to three shallow pools with flat bottoms enclosed by earth dikes. Waste water enters through an inlet, flows between cells by valve crossing connecting lines and overflow through an outlet structure. Dikes are constructed with relatively flat side slopes to facilitate grass mowing and reduce slumping of the earth wall into the lagoon. A schematic layout of one stabilizing pond is shown at **Figure 5.3**

The effluent after partial treatment can be put into the distributary if allowed by the Irrigation Department. Alternatively the water can be sold to the adjacent farm land for growing fodder.

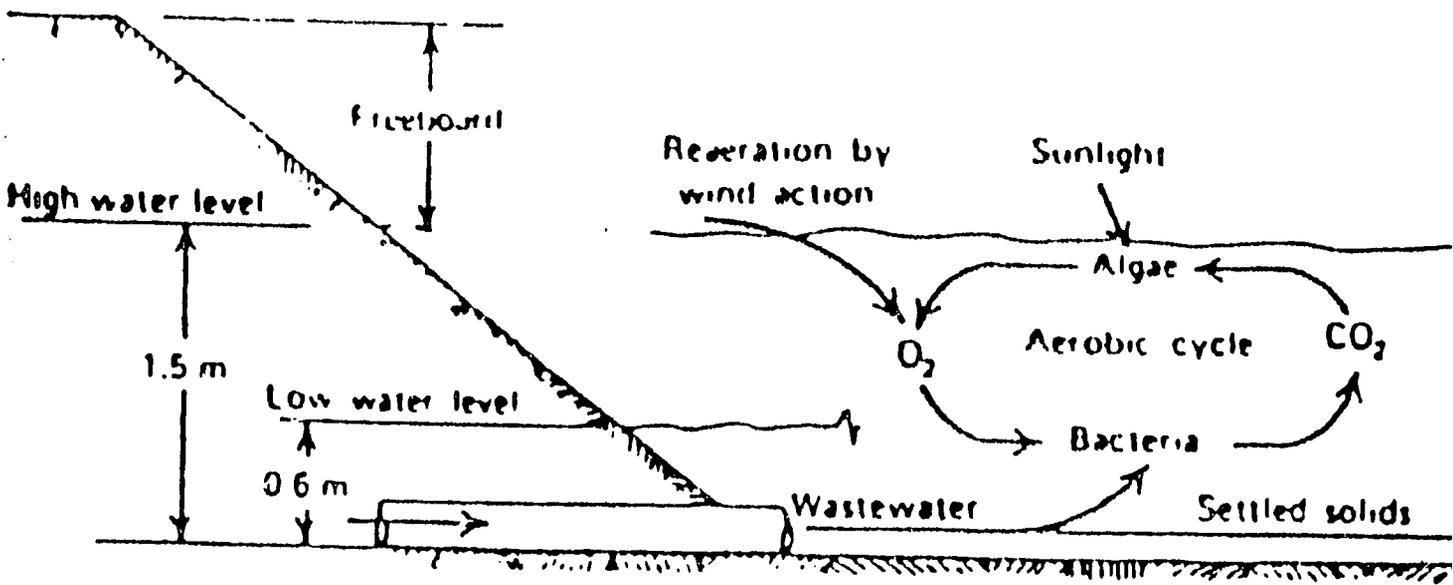
The revised estimates have been computed at **Appendix-IV**

Roads: Vehicular access from the Hyderabad - Badin round has been considered through one railway crossing as the cost of one railway crossing varies from Rs. 800,000.00 to Rs. 1,000,000.00. Critical dimensions for turning circle and turning radius for tractors, tractors plus attachments and tractors have been taken as a guide to design the roads. Two roads on the northern and southern side of colony have been omitted being superfluous. Therefore, revised cost for construction of roads has been prepared which is at **Appendix-IV**

Electric Supply: The cost of electrification of the cattle colony has been taken from WAPDA by the Municipal Corporation, Hyderabad, therefore, no change in the estimated cumulative cost has been proposed.

Buildings: The cost of buildings like shopping center, fodder stores, mosque, fire brigade and other structure have been worked out at Rs 200.00 per square foot area.

Figure 5.3:



Schematic of a facultative stabilization pond

Recommendations

Based on the overall analysis presented in this report the consultant makes the following recommendations:

1. The engineering plan should be implemented based on the necessary modification proposed by the consultants expert engineer. Several roads have been deleted, new structures proposed, site office location changed, provision of an incinerator include etc.
2. Only buffaloes should be transferred to the colony and avoid the cattles. The soil type is not suitable for cattle production and may results in foot rot disease.
3. While technically there is provision in the dairy colony to house over 4000 animals the consultant recommends that no more than 14000 animals be housed in the colony for health reasons. A separate quarantine arrangement should also be made available.
4. To encourage cost sharing the consultant proposes that the municipality should build the facilities for a veterinary hospital and lease it to the private sector.
5. Original design does not include a feed mill. A feed mill has been proposed and preliminary cost estimates made.
6. Facilities of a weigh bridge should also be included.
7. Security reasons warrant that a police station be established near the dairy colony. Similarly facilities of a PCO should be made available.
8. A cooperative society should be formulated for the sale of milk. This private cooperative should be run on models of already several successful cooperatives operating in the city.
9. In the first year of the project octroi charges should be reviewed to ensure that milk is competitively priced and no major cost changes are made. Similarly, local population should be sensitized about the project so that adequate feed becomes available in the first year.

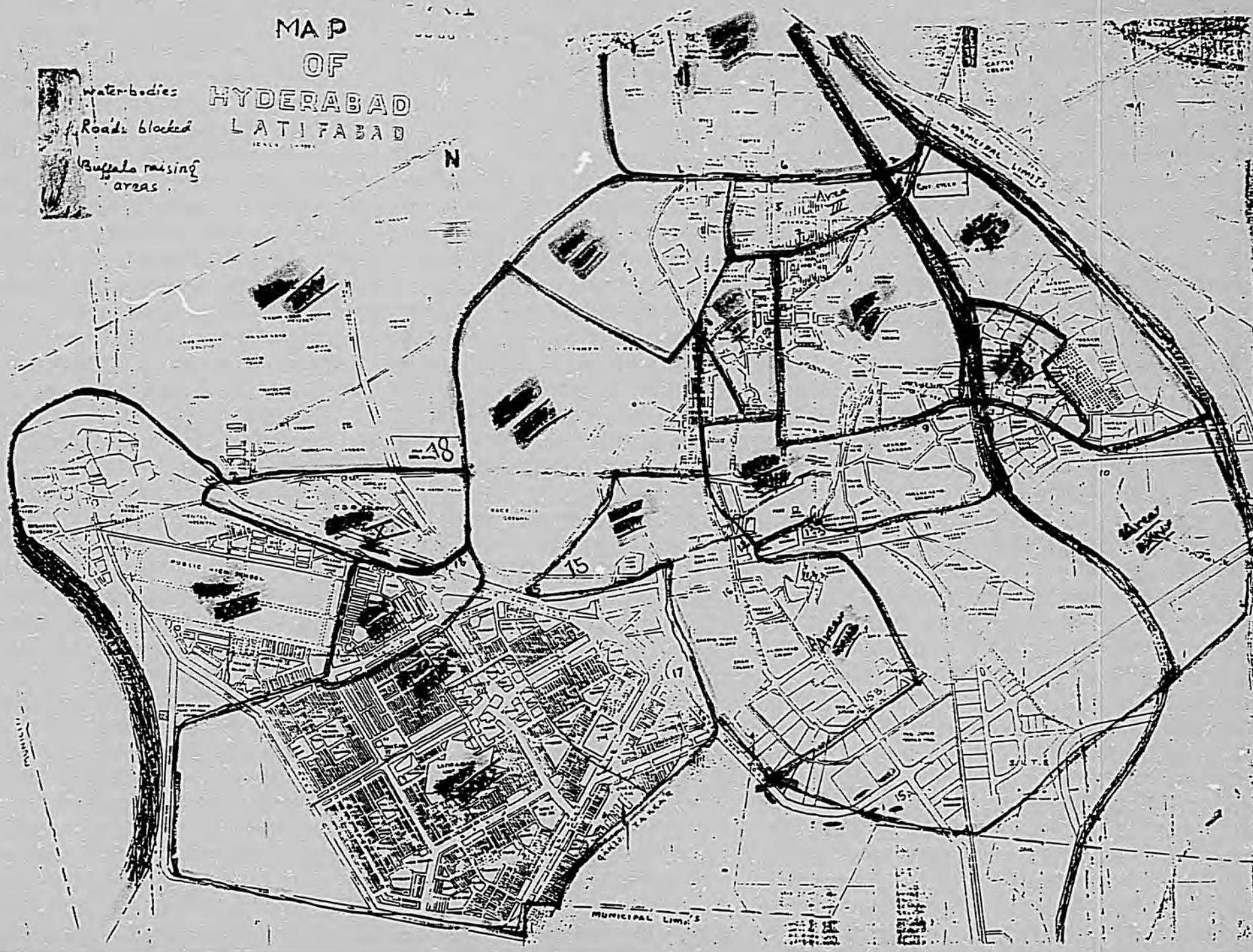
10. A calf rearing operation including calf fattening project should be encouraged. Surplus calves should first be put on fattening ration and later sold in cities. As there is sufficient space in the colony this enterprise can provide employment to over 500 peoples.
11. Manure will pose an environmental hazard. Facilities for manure disposal on sale basis should be looked into.
12. An incentive scheme for small produces to locate additional part time work in the area should be encouraged. As travel cost will increase for owners to travel to the colony steps should be taken to ensure that this does not negatively impact the gross margins from milk sales.
13. A milk testing lab should be established to ensure the quality supply of milk. The lab should have simple apparatus and will not require equipment of more than 50,000 thousand rupees.
14. Rules and regulations to control the quality of milk and feed and disposal of dead/diseased animals should be clearly stated and practiced.
15. Keeping in view the growth rate of human population and subsequent increase in milk demand, another colony for the housing of 14,000 animals is proposed by consultants.
16. The development of dairy colony out side the Hyderabad will reduce the traffic and pollution hazards in the city. Therefore, a tax should be imposed to provide neat and clean air, streets, roads etc. The income generated through this tax be utilized to compensate the farmers as settlement allowance.
17. To generate the interest of farmers, the "Baras/Wattans" will be allotted free of cost. But after 2 years they should be asked to pay tax which should be utilized for the maintenance and development of these houses.

The success of the new dairy cattle colony will largely depend on the procedures established for grass-root level are obvious economic and social benefits for them to move their herds to the colony.

APPENDIX - I

MAP
OF
HYDERABAD
LATIFABAD

water-bodies
Roads blocked
buffalo raising
areas



966

APPENDIX - II

Estimated Extra Cost of Petrol Consumption Due to Traffic Delays in Hyderabad City, 1992

Locality	Type of vehicle	No of vehicles affected	Km per lit.	Litre consumption for 60 Km	Km per hour	Cost without time lost per vehicle (in Rs.)*	Total Cost without delay (in Rs.)	Estimated time lost in minutes	Needed extra litres	Cost with time lost per vehicle	Net Loss rupees per hour
1	Bus	17	10	6	60	30.6	520.2	17	1.7	39.27	667.59
2	Bus	8	10	6	60	30.6	244.8	13	1.3	37.23	297.84
3	Bus	7	10	6	60	30.6	214.2	25	2.5	43.35	303.45
4	Bus	6	10	6	60	30.6	183.6	15	1.5	38.25	229.5
5	Bus	4	10	6	60	30.6	122.4	15	1.5	38.25	153
6	Bus	7	10	6	60	30.6	214.2	15	1.5	38.25	267.75
7	Bus	13	10	6	60	30.6	397.8	20	2	40.8	530.4

* Diesel per litre cost = Rs. 5.10

Estimated Extra Cost of Petrol Consumption Due to Traffic Delays in Hyderabad City, 1992

Locality	Type of vehicle	No of vehicles affected	Km per lit.	Litre consumption for 60 Km	Km per hour	Cost without time lost per vehicle (in Rs.)*	Total Cost without delay (in Rs.)	Estimated time lost in minutes	Needed extra litres	Cost with time lost per vehicle	Net Loss rupees per hour
1	Truck	16	8	6.9	55	70	1120	20	2.5	82.75	1324
2	Truck	18	8	6.9	55	70	1260	15	1.875	79.5625	1432.125
3	Truck	12	8	6.9	55	70	840	15	1.875	79.5625	954.75
4	Truck	10	8	6.9	55	70	700	15	1.875	79.5625	795.625
5	Truck	3	8	6.9	55	70	210	15	1.875	79.5625	238.6875
6	Truck		8	6.9	55	70					
7	Truck	18	8	6.9	55	70	1260	20	2.5	82.75	1489.5

* Diesel per litre cost = Rs. 5.10

Estimated Extra Cost of Petrol Consumption Due to Traffic Delays in Hyderabad City, 1992

Locality	Type of vehicle	No of vehicles affected	Km per lit.	Litre consumption for 60 Km	Km per hour	Cost without time lost per vehicle (in Rs.)*	Total Cost without delay (in Rs.)	Estimated time lost in minutes	Needed extra litres	Cost with time lost per vehicle	Net Loss rupees per hour
1	Car	27	10	6	60	72	1944	17	1.7	20.4	550.8
2	Car	20	10	6	60	72	1440	13	1.3	15.6	312
3	Car	19	10	6	60	72	1368	20	2	24	456
4	Car	10	10	6	60	72	720	15	1.5	18	180
5	Car	21	10	6	60	72	1512	15	1.5	18	378
6	Car	9	10	6	60	72	648	15	1.5	18	162
7	Car	50	10	6	60	72	3600	15	1.5	18	900

* Petrol per litre cost = Rs. 12.00

Estimated Extra Cost of Petrol Consumption Due to Traffic Delays in Hyderabad City, 1992

Locality	Type of vehicle	No of vehicles affected	Km per lit.	Litre consumption for 60 Km	Km per hour	Cost without time lost per vehicle (in Rs.)*	Total Cost without delay (in Rs.)	Estimated time lost in minutes	Needed extra litres	Cost with time lost per vehicle	Net Loss rupees per hour
1	Rickshah	13	20	2	40	24	312	15	.75	33	429
2	Rickshah	18	20	2	40	24	432	10	.5	30	540
3	Rickshah	15	20	2	40	24	360	16	.8	33.6	504
4	Rickshah	10	20	2	40	24	240	7	.35	28.2	282
5	Rickshah	10	20	2	40	24	240	7	.35	28.2	282
6	Rickshah	10	20	2	40	24	240	19	.95	35.4	354
7	Rickshah	15	20	2	40	24	360	24	1.2	38.4	576

* Petrol per litre cost = Rs. 12.00

APPENDIX - III

Cost and Return for 20,000 buffaloes at Hyderabad Colony

Price of Milk Rs. 7/kg

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
INFLOW										
Sales	286.11	348.98	510.99	582.23	695.75	925.20	1101.70	1226.75	1604.20	2103.21
Salvage value					1.30					35.61
Total	286.11	348.98	510.99	582.23	697.05	925.21	1101.70	1226.75	1604.20	2138.82
OUTFLOWS										
Capital Cost										
Replacement Cost										
Operating cost	253.58	372.56	547.08	635.25	725.02	986.23	1202.33	1316.34	1591.66	1315.72
Tax										
Debt Servicing										
Total	253.58	372.56	547.08	635.25	725.02	986.23	1202.33	1316.34	1591.66	1315.72
NET BENEFITS	32.53	(23.50)	36.09	53.03	(27.97)	(61.02)	100.64	98.58	12.54	823.02

IFRR = 4%

Benefit Cost Ratio and Net Present Value

Year	Benefit	Cost	HPV of Benefit	NPV of Cost
0	0.00	83.27	0.00	73.04
1	286.11	253.58	250.97	222.44
2	348.98	475.50	306.12	417.11
3	510.99	547.08	448.24	479.90
4	582.23	635.25	510.73	557.24
5	697.05	635.25	611.45	557.24
6	925.21	790.02	811.59	692.99
7	1547.47	1202.34	1357.43	1054.68
8	1226.65	1316.34	1076.10	1396.68
9	1604.20	1591.66	1407.21	1396.19
10.	2138.82	1315.72	1876.16	1154.14

NPV = 505.28

BCR = 1.07

Cost and Return for 20,000 Buffalos at Hyderabad Colony

Price of Milk Rs 10/kg

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
INFLOW										
Sales	407.02	492.68	698.49	785.33	958.85	1291.21	1547.47	1881.85	2177.64	2860.00
Salvage value					1.30					35.62
Total:	407.02	492.68	698.49	785.33	958.85	1291.21	1547.47	1881.85	2177.64	2895.62
OUTFLOWS										
Capital Cost										
Replacement Cost										
Operating cost	253.58	372.51	547.08	635.26	725.02	986.23	1202.34	1316.34	1591.66	1315.72
Tax										
Debt Servicing										
Total	253.58	372.51	547.08	635.26	725.02	998.23	1202.34	1316.34	1591.66	1315.72
NET BENEFITS	153.43	(120.18)	151.40	150.07	(233.86)	(304.98)	345.13	556.51	585.98	1579.90

IPRR = 75%

Benefit Cost Ratio and Net Present Value

Year	Benefit	Cost	HPV of Benefit	NPV of Cost
0	0.00	83.27	0.00	73.04
1	407.02	253.58	357.03	222.44
2	492.69	475.50	432.19	417.11
3	698.49	547.08	612.71	479.90
4	785.33	635.25	688.88	557.24
5	960.15	635.25	842.24	557.24
6	1191.21	790.02	1132.64	692.99
7	1547.47	1202.34	1357.43	1054.68
8	1881.85	1316.34	1650.79	1154.68
9	2177.46	1591.66	1910.21	1396.19
10.	2895.62	1315.72	2540.02	1154.14

NPV = 3764.40

BCR = 1.49

APPENDIX - IV

Composition of Complete Ration

Ration 'A'

Ingredients	%	DM	CP	TDN	Cost
Maize	25	6.0	2.25	17.25	12.50
Wheat straw	15	13.5	0.60	6.00	15.00
Cotton seed cake	20	18.00	4.20	13.00	56.00
Mustard seed cake	10	9.00	3.20	7.40	30.00
Wheat bran	10	9.00	1.60	7.40	25.00
Rice bran	9	8.10	0.90	6.30	13.50
Molasses	10	7.80	-	7.30	10.00
Lime stone + salt	1	0.90	-	-	1.00
Total:	100.0	72.30	12.75	64.65	162.0

Feeding instructions for ration 'A'

Live weight, kg/head	450-500
Milk production, L/head/d	8-10
Dry matter intake, kg/head/d	12-13

Dry matter from Forages

Maize Intake, kg/head/d	20.0
Wheat Straw, kg/head/d	3.0

Dry Matter from Concentrate, kg/head/d

4.5

Composition of Concentrate

Cotton seed cake	40.00
Mustard seed cake	15.00
Wheat bran	20.00
Rice bran	15.00
Molasses	8.50
Lime stone + salt	1.50
	100.00

Ration 'B'

Ingredients	%	DM	CP	TDN	Price
Millet	30	6.30	2.70	18.30	15.00
heat straw	15	13.50	0.60	6.00	15.00
Cotton seed cake	24	21.60	4.54	15.00	67.20
Wheat bran	10	9.00	1.60	7.00	25.00
Rice bran	10	9.00	1.00	7.00	15.00
Molasses	10	7.80	-	7.30	10.00
Minerals	1	0.90	-	-	1.00
	100	68.10	10.44	61.20	148.2

Feeding instructions for ration 'B'

Live weight, kg/head	450-500
Milk production, L/head/d	8-10
Dry matter intake, kg/head/d	12-13

Dry matter from Forages

Millet, Intake, kg/head/d	20
Wheat Straw, kg/head/d	4.5

Dry Matter from Concentrate, kg/head/d

4.5

Composition of Concentrate

Cotton seed cake	40.00
Wheat bran	25.00
Rice bran	20.00
Molasses	8.50
Lime stone + salt	1.50
	100.00

Ration 'C'

Ingredients	%	DM	CP	TDN	Cost
Sugar cane tops	35	5.25	4.20	21.00	17.50
Wheat straw	5	4.50	0.20	2.00	5.00
Cotton seed cake	20	18.00	4.20	13.00	56.00
Mustard seed cake	10	9.00	3.20	7.40	30.00
Wheat bran	10	9.00	1.60	7.40	25.00
Rice bran	10	9.00	1.00	7.00	15.00
Molasses	10	7.80	-	7.30	10.00
Lime stone + salt	1	0.90	--	-	1.00
	100.0	63.45	14.40	64.60	158.5

Feeding instructions for ration 'C'

Live weight, kg/head 450-500
 Milk production, L/head/d 10
 Dry matter intake, kg/head/d 12-13

Dry matter from Forages

Sugar cane tops Intake, kg/head/d 25
 Wheat Straw, kg/head/d 4

Dry Matter from Concentrate, kg/head/d

5

Composition of Concentrate

Cotton seed cake 40.00
 Mustard seed cake 15.00
 Wheat bran 20.00
 Rice bran 15.00
 Molasses 8.50
 Lime stone + salt 1.50

100.00

Ration 'D'

Ingredients	%	DM	CP	TDN	Price
Berseem	20	2.80	3.80	12.80	10.00
Wheat straw	20	18.00	0.80	8.00	20.00
Cotton seed cake	20	18.00	4.20	13.00	56.00
Wheat bran	15	13.50	2.40	10.95	37.50
Rice bran	15	13.50	1.50	10.95	22.50
Molasses	9	7.02	-	6.57	9.00
minerals	1	0.90	-	-	1.00
	100	73.72	12.70	62.27	156.0

Feeding instructions for ration 'D'

Live weight, kg/head	450-500
Milk production, L/head/d	10
Dry matter intake, kg/head/d	12-13

Dry matter from Forages

Berseem intake, kg/head/d	15
Wheat Straw, kg/head/d	6

Dry Matter from Concentrate, kg/head/d 5

Composition of Concentrate

Cotton seed cake	40.00
Wheat bran	25.00
Rice bran	25.00
Molasses	8.50
Lime stone + salt	1.50
	100.00

Rations Based on Unconventional Feed Resources

Ingredients	%	DM	CP	TDN	Cost
Urea Treated Wheat Straw	60	36.00	5.40	27.00	75.00
Poultry litter	20	17.00	5.00	13.00	06.00
Rumen Contents	10	02.00	1.60	06.00	03.00
Molasses	10	7.80	-	7.30	10.00
Total:	100.00	62.80	12.00	53.30	94.00

Price/kg= Rs. 0.94

APPENDIX - V

APPENDIX - V

APPENDIX - VI

COMMERCIAL AREA

Shopping Center No. 1

1. There will be low shopping centers in the whole area in each sector and a main market
- a. Total covered area of 27 shops in each center. = 32400 sq ft
- b. Cost of each shopping center at Rs. 200/- per sq ft. = Rs. 64,80,000/-
- c. Cost of two shopping centers = Rs. 1,29,60,000/-

Shopping Center No. 2

- a. Total covered area main market with 69 shops = 41400 sq ft.
 - b. Cost of shops @ Rs. 200/- sq ft. = Rs. 82,80,000/-
- Total cost of commercial area (1+2) = Rs. 2,12,40,000/-

Veterinary Hospital

Veterinary hospital will be constructed in the cattle colony to cater for the need of 22,000 cattle heads. The hospital will have doctor's room treatment room, sick bays and allied small structures. The total covered area will be 5680 sq ft.

Therefore cost of the hospital at Rs. 200/- sq ft. would be 5680×200 = Rs. 11,36,000/-

Mosque

Mosque will be constructed in the center of the colony with a total covered area of 65 sq ft. The cost of the mosque at Rs. 200/-per sq ft.

= Rs. 13,00,000/-

Fire Brigade

Fire brigade will have total covered area of 10,000 sq ft. The total cost of construction based on Rs. 200/- per sq ft.

= Rs. 2,00,00,000/-

Storage Accommodation

Fodder stores: It comprises 20 shops with a total covered area of 6000 sq ft. each enclosed by boundary wall 1420 ft in length.

a. Boundary wall 1420 ft. long = Rs. 2,13,000/-
@ Rs. 200 per running ft.

Sweeper's Colony:

A quarter comprising one room veranda & kitchen alongwith a lavotry and bath as proposed will be constructed. The total covered area is 505 sq ft. The cost of construction has been derived as Rs. 180/- per sq ft. of the covered area.

Total covered area of each quarter.	505 sq ft.	
Cost of each quarter at Rs. 180/- per sq ft. of built up area.	=	Rs. 90,900/-
Total cost of 10 quarters	=	Rs. 909,000/-

Staff Colony

Each quarter for the staff will comprise two living room, veranda, kitchen, toilet and bath room. The total cover area comes to 625 sq ft. The cost of construction has been worked out as Rs. 200 per sq ft. of built up area.

Total covered area 625 sq ft.		
Cost of each staff quarter at Rs. 200/- per sq ft. of covered area.	=	Rs. 125,000/-
Total cost of 10 quarters	=	Rs. 1,250,000/-

Revised Planning of Cattle Colony

Cattle colony plan has been revised keeping in view its functions and provision of essential services. The area is level used for agricultural purposes.

Ponds

The network of roads provided is more than the requirement thereby incurring additional cost. Blocks of 8 plots each has been taken as one unit. Roads are passing in front of each plot. The re-design has given net saving of Rs. 2.7 million. The roads on the boundaries of the colony has been omitted.

Commercial area

Commercial was planned on the northern side of the colony whereas the southern side had no shopping center. It has been proposed to have an shopping center in the middle of the colony to serve the population.

Site office

The site office was on the north-east portion of colony. It has now been sited on the beginning of the colony to cater for the need of residents or non residents.

2. Sluice valve

	<i>Diameter</i>	<i>Quantity in Nos.</i>	<i>Amount (Rs.)</i>
	3 inch	52	1,65,000.00
	4 inch	34	11,220.00
	6 inch	36	1,38,600.00
	8 inch	5	22,000.00
	10 inch	5	22,000.00
		Sub Total:	210,320.00
3.	CI fittings and specials	15,000 Kg	2,64,000.00
4.	Elevated reservoir	100,000 gallons	25,40,000.00
5.	Underground reservoir for storage of 0.2 million gallons		8,00,000.00
6.	5 x 1-1/2" dia 61 pipe for water service connection complete	Rft 30,000	6,60,000.00
7.	Misc. items	lump sum	2,20,000.00
8.	Pump house	" "	1,00,000.00
9.	Pumping machinery motor & allied equipment	" "	2,50,000.00
10.	Two tubewells of 1 cusec capacity each		9,00,000.00
		Grand Total	9,980,345.00

Estimate for Sewerage

1.	RCC Sewerage pipe		
	<i>Diameter</i>	<i>Length(ft.)</i>	<i>Amount (Rs.)</i>
	9 inch	5800	2,04,600.00
	12 inch	1600	99,035.00
	15 inch	1600	1,26,390.00
	18 inch	2000	1,26,390.00
	24 inch	1000	2,09,000.00
	30 inch	600	1,54,000.00
	36 inch	1500	5,04,600.00
2.	Laying of crush stone bedding and construction of manholes		4,49,50,000.00
			64,37,625.00
3.	Construction of anaerobic lagoons		14,00,000.00
		Total	78,37,625.00

Revised Estimated Cost*Cost in million rupees***Cost of Land****1.641**

a.	Water supply system	9.9866
b.	Sewerage system	7.837
c.	Electric supply including street lights	11.920
d.	Road & roads structures	14.710
e.	Railway crossing	1.000

Residential Area

a.	Staff colony	1.250
b.	Sweepers colony	0.909

Storage and Commercial Accommodation

a.	Fodder stores	1.334
b.	Shopping centers	8.228

Amenities

a.	Veterinary hospital	1.136
b.	Mosque	1.300
c.	Fire Brigade	2.000

Total	63.245
Add 10% cost escalation	6.324
Grand Total	69.569
Say	70 millions

Note:

Cattle piri and slaughter house has been omitted from the revised estimate because the provision of these facilities will be a source of disease in the cattle colony i.e. Rs. 14.168 million.

Estimate for Water Supply**1. AC pipes class 400 ft**

<i>Diameter</i>	<i>Length in feet</i>	<i>Amount (Rs.)</i>
3 inch	25000	7,96,500.00
4 inch	15000	5,89,625.00
6 inch	5000	5,50,000.00
8 inch	5000	11,09,900.00
10 inch	7000	9,09,000.00
Sub Total:		4,036,025.00

2. Sluice valve

	<i>Diameter</i>	<i>Quantity in Nos.</i>	<i>Amount (Rs.)</i>
	3 inch	52	1,65,000.00
	4 inch	34	11,220.00
	6 inch	36	1,38,600.00
	8 inch	5	22,000.00
	10 inch	5	22,000.00
	Sub Total:		210,320.00
3.	CI fittings and specials	15,000 Kg	2,64,000.00
4.	Elevated reservoir	100,000 gallons	25,40,000.00
5.	Underground reservoir for storage of 0.2 million gallons		8,00,000.00
6.	5 x 1-1/2" dia 61 pipe for water service connection complete	Rft 30,000	6,60,000.00
7.	Misc. items	lump sum	2,20,000.00
8.	Pump house	" "	1,00,000.00
9.	Pumping machinery motor & allied equipment	" "	2,50,000.00
10.	Two tubewells of 1 cusec capacity each		9,00,000.00
	Grand Total		9,980,345.00

Estimate for Sewerage**1. RCC Sewerage pipe**

	<i>Diameter</i>	<i>Length (ft.)</i>	<i>Amount (Rs.)</i>
	9 inch	5800	2,04,600.00
	12 inch	1600	99,035.00
	15 inch	1600	1,26,390.00
	18 inch	2000	1,26,390.00
	24 inch	1000	2,09,000.00
	30 inch	600	1,54,000.00
	36 inch	1500	5,04,600.00
2.	Laying of crush stone bedding and construction of manholes		4,49,50,000.00
3.	Construction of anaerobic lagoons		64,37,625.00
	Total		78,37,625.00

Estimate for Roads

	<i>Amount (Rs.)</i>
<i>Excavation and formation of embankments</i>	<i>19,50,000.00</i>
<i>Laying of sub base and base</i>	<i>94,60,000.00</i>
<i>Triple surface treatment</i>	<i>33,00,000.00</i>
Total	1,47,10,000.00

Need of Livestock Feed Industry

Keeping in view the positive interaction between livestock development and feed industry, it is highly desirable to establish a feed mill. Induction of feed mill will not only help in coping the current requirement of feed, based on animal heads, but will serve as a key in the establishment of incoming livestock heads. In addition, it is also the most speedy way to upgrade the current livestock potential. Examples for the complete rations are given in Appendix I to IV.

Facilities for the cattle feed mill

Land

The land of about one acre will be needed for this project.

Machinery

All the machinery needed is available in the country.

Market

The feed mill be able to cater the need of 22,000.00 buffalo present in the city. However the capacity can be increased to double when needed. The proposed price of the feed is Rs. 2.50/kg and will be sold directly to the farmers.

Assuptions

Number of shifts	Single (8 hr)
Operating period	300 days
Capacity	12.5 tonnes/h
Selling price	Rs. 2.5/kg

Machinery/Cost

Grinding section

Grinding section include, hopper, screen for hopper, heavy duty hammer mill with magnetic and belt cover, conveyer with gear foundation, gear box, elevators, mouth elevators, packing stand, packing hopper, packing valve, fan, filter, pipe line for fan and filter.

Cost of grinding section Rs. 4,25,000.00

Mixing section

This section includes feed mixer with gear and belt cover, liquid mixer with variable speed gear, pump, etc., micromixer with gear box and conveyer with gear box.

Cost of mixing section Rs. 4,25,000.00

Cleaning section

Includes, fan, filter, cyclone, air box, pipe line for fan and filter and three to five bends.

Cost of cleaning section Rs. 3,40,000.00

Miscellaneous section

Includes, hopper for lifter, screen for hopper, four lifters, rotary separator, main separators,

hopper for mixer, hopper for liquid mixer, packing hoppers, molasses heating reservoir, molasses pump, packing valve, main packing stand and packing clamps.

Cost of miscellaneous section Rs. 4,75,000.00

Fitting materials

Cotton wabbon for lifters, steel buckets for lifters, V-belt for plant, pipe line for molasses, accessories for pipe line, ring clamps, bend rings, erection pipes, pullies and coupling for machines and motors, belt fastener, motor lines, petti and packing trollies.

Cost of fitting materials Rs. 2,75,000.00

Electric motors

About 24 electric motors of various H.P and RPM.
Cost of electric motors Rs. 2,50,000.00

Electric panel board

One main electric panel board to control all operations with material like magnetic circuit breaker, magnetic contractors, timer, fuses, indicator lights, push button, on/off switches, amp and volt meters etc.

Cost of electric panel Rs. 2,25,000.00

Electrification

All sort of general electrification of three and single phase with all sort of wires, fitting material and labor etc.

Cost of electrification Rs. 2,50,000.00

Floor scale

Eight floor scale for 500 and 1000 kg per batch with all accessories.

Cost of floor scales Rs. 1,00,000.00

Weigh bridge

One weigh bridge of capacity 30,000.00 with dial indicator, plate form size 25'*10'

Cost of weigh bridge Rs. 3,50,000.00

Work shop tools

All sort of primary tools needed for feed mill.

Cost of tools Rs. 1,00,000.00

Transportation/Installation

Cost of transportation and installation of machinery.
Cost Rs. 1,00,000.00

Laboratory equipments

Equipment for the laboratory includes, Kjeldec apparatus, soxcelate apparatus, fiber analysis apparatus, oven, furnace and glass ware.

Cost Rs. 1,00,000.00

Working capital

Working capital required to run the feed mill.

Capital Rs. 25,00,000.00

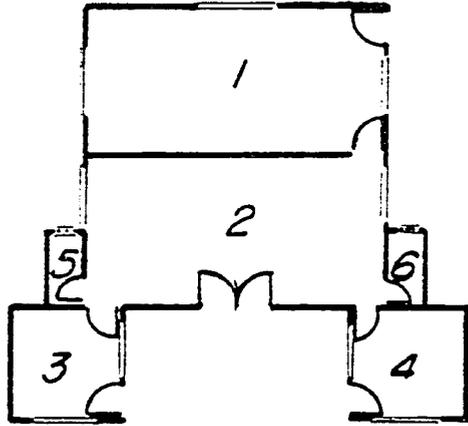
CIVIL WORK

	(Size)	(Rs. 000)
Main Machinery Hall	100'*80'	1200.00
Machinar Hall (First Floor)	60'*40'	360.00
Raw Material godan		
1	80'*40'	480.00
2	80'*40'	480.00
Finished goods store		
1	80'*40'	480.00
2	80'*40'	480.00
Office/Laboratory Block	40'*20'	120.00
Boundry wall	1800 R.ft	126.00
Water Tank No.2		80.00
Total		3806.00
Contigence 10%		380.60
		4186.60

COST OF THE PROJECT

	Rs. (000)
Civil Work	4186.60
Machinery/Instalation	3440.00
Working Capaital	2500.00
Total	10126.60

TYPICAL VET. HOSPITAL



- 1- Laboratory / Surgery room 40'-0" x 20'-0"
- 2- Dispensary 40'-0" x 20'-0"
- 3-4 - Offices 14'-0" x 14'-0"
- 5-6 - Bath 5'-0" x 8'-0"
- 7-8 - Quarantine sheds 30'-0" x 60'-0"
- 9 - Crush

