Dairy Cattle Farming

Breed and Livestock Selection

The use of pure bred dairy cattle like Friesian and Jersey in this country has met with failure due to their physiology and low production caused by the incompatible climate. Crosses between the *Bos taurus* dairy breed with the zebu dairy breed is considered the best way to improve the productivity performance of the local dairy cattle. MAHFRIVAL is a synthetic dairy cattle breed created by the Department of Veterinary Services, Malaysia which takes into consideration the local environmental factors for optimal productivity. The MAHFRIVAL breed is created from the Friesian genetic source of North America and the zebu breeds of Kenya and Brazil that is the Sahiwal and Gir cattle. These breeds were selected for their dairy production characteristics from generations of good pedigree records which are proven to have high heritage rates for milk production. 60-75% Friesian blood as found in the MAFRIWAL M60 breed is considered suitable due to their characteristics of being easily managed, able to withstand the hot and humid climate, resistance to disease and adaptable to the local feed.

Livestock selection, based on the genetic potential, is important for dairy farm development. Genetic selection is a technique whereby the elite individuals are allowed to regenerate. This is applied to pass on the best genetic traits to the next generation for the improvement of farm productivity. Among the characteristics selected for are good feed conversion to milk production, adaptability to local feeds, freshness, disease resistance and lifespan.

DAIRY FARM DEVELOPMENT

Modern dairy farming include farm mechanization, fertilizing, concentrate feeding and increased yield from dairy cows.

Although many may construe increased milk yield per cow as a measure of success in dairying, the important factor is the gross margin in production. One can increase the margin by securing a better price for the milk or minimizing the cost or a combination of both.

High yielding temperate breeds can only produce under optimum environment and management, especially good feed and health are. Local crossbreds are better adapted of local climatic condition and can also contribute to good gross margins with available resources.

When establishing a dairy farm the following points must be understood and taken into account:-

- Choose a location suitable for the dairy shed
- Choose a suitable design for the dairy shed
- The right choice of pasture/fodder to be planted and managed for optimum yield

1. **Land Acquisition**

   The choice of land for dairying can be wholly owned, leased or on a temporary ownership from the local land office (TOL). There are a few factors which needs consideration when acquiring land for dairying.

   - The land must be well drained and not prone to flooding
   - Has good air circulation
   - Located away from other farms to prevent disease transmission and cross infection, while providing security against trespassing
   - The area must be located away from sources of pollution. Preferably located at least 300 meters away from housing and industrial areas
   - Should have good access roads. Paths and surroundings should be dry for ease of movements for the farmers and livestock
   - Land must be fertile for pasture/fodder planting
   - Near to clean water sources
   - As for as possible must be close to markets for milk to facilitate quick and easy milk delivery

2. **Pasture Development**

Land clearing precedes pasture planting and during this stage most of the trees must be removed leaving behind some shade trees at strategic locations. If the area is water-logged, proper drainage must be carried out.

- **Land Preparation**

  There are 3 stages in the land preparation, viz. Ploughing Harrowing and Rotavating. During each of these stages remaining ruminants of wood, roots and rocks would be removed to ensure the following:-

  - create good land surface for proper operation of machinery and implements for pasture development.
  - Improved soil texture, with proper aeration and water retention. This would ensure proper rooting of grass/fodder.
  - All weeds are removed

  Ploughing and harrowing are the initial exercises in the planting process. This would loosen and break up the hardened soil. By breaking up and exposing the soil to the sun, the unwanted weeds will be destroyed and eliminated from the land. The period between ploughing and harrowing may be 2-4 weeks. Harrowing will break the larger pieces of soil into smaller particles. The final step in land preparation before planting is rotavating which would break up the smaller particles into finer soil particles.

- **Liming**

  Liming is important to establish a favorable pH (acidity) of the soil. This is especially important for mixed pasture. The recommended rate is 2,000 kg. Per hectare, to increase the pH by 0.5. The rate of application will depend on the original pH of the soil and the recommended pH of soil for planting is between 5.0 - 7.0. Living will improve fodder production by:-

  - Ensure the availability of secondary elements and micro-nutrients for growth.
  - Minimise the presences of elements like Fe, Mn and AI which are normally present in acidic soil.
  - Create a suitable environment for beneficial microorganisms in the soil and improve the release of N and P.
  - Supply of Ca and Mg, which are low in the soil

- **Pasture Planting**

  It is recommended that planting be carried out before or at the onset of a rainy season. A proper irrigation or a sprinkler system may improve the growth of the fodder. The method of planting depends on the grass species selected for the pasture. There are 3 methods of planting, viz, by seeds, vegetative and using roots.

  a. **Planting from Seed**

     The amount of seed required for planting a hectare depends on the type of seed germination rate and the method used. If the germination rate is high, then the amount needed will be less and vise versa. The following table shows the various species of grass and their application rates.

     Rate of sowing of Fodder seeds

Seed	Sowing Rate (kg/hectare)
Grass spp	
Guinea	3-6
Para	3-6
Seteria	3-5
Signal	3-6
Humidicola	5-7
Ruzi	5-7
Legume spp	
Centro	3-5
Stylo	2-5
Puero	1-3
Calapo	1-3
Petai Belalang	4-6

  b. **Vegetative Planting**

     Cuttings, creepers or shoots are used in the event when the species of grass does not produce seeds, eg. Napier and MARDI digit. In this method, the cuttings, creepers or young shoots must be planted immediately. The cutting must be mature and should not be exposed to sunlight for too long. There are 3 ways of vegetative planting, viz. Upright planting, laying in rows and random planting.

c. **Planting from Roots and Rhizomes**

This method is suitable for non-seed producing species. A good example is Guinea grass, where the shoots can be divided on 1:10 ratio for planting. An acre of Guinea plants can be used to plant 10 acres if land using this method.

- **Fertiliser Application**

Proper fertiliser application according to recommended rates is crucial for optimal results whilst not affecting the grazing animals. Negative effects from fertilisers are urea poisoning and chemical residues in the milk

For that reason, livestock are only allowed to graze 14 days after fertiliser application. The rate of fertiliser application is dependent on the results of soil analysis or the types of vegetation. As a guide, the recommended fertiliser application rates are as below:

- **Chemical Fertiliser**

Fertiliser application is dependent on the type of management system:

Grass type and Management System	**Application Rate (kg/h/year)**
Pure grass	
Grazing system	150 – 200 N (326 – 435 UREA)
	40 – 60 P (199 – 298 TSP)
	50 – 100 K (100 – 200 MOP)
Cut and carry system	200 – 300 N (435 – 652 UREA)
	40 – 60 P (199 –298 TSP)
	100 – 150 K (200 – 300 MOP)
Grass mixed with Legumes	
Grazing system	40 – 60 P (199 – 248 TSP)
	50 – 100 K (150 – 200 MOP)
Cut and carry system	50 – 60 P (248 – 298 TSP)
	150 – 100 K (100 – 200 MOP)

- **Application schedule**

  The best time is during the rainy season or times of good irrigation. Avoid fertiliser application, especially urea, in the dry season, as Nitrogen in Urea will evaporate. Whilst wasting, and not obtaining optimal output, Urea applied in the dry season is not easily dissolved and are hazardous to grazing livestock.

- **Organic Fertilisers**

  A dairy cow with 420 Kg body weight can produce 19.32 Kg of faeces daily. It is rich in nitrogen, phosphorous and potassium (NPK). It may be used directly from the barn as fresh or dried fertiliser or composted. Its application is not limited and may be applied anytime especially after the grass is grazed or harvested.

3. **Infrastructure Development**

Building a dairy farm involves infrastructures like barns, sheds and stores for feed and medication. Cattle sheds not only facilitate livestock management but they also provide shade from rain and sun, providing a condusive environment for hygenic milk production. The sheds should also have facilities for watering and feeding the livestock. Detailed attention is required in the selection and construction of the cattle sheds and barns to facilitate:-

- Health and comfort of the livestock
- Security for the livestock
- Effective management
- Avoid pollution and other disturbances
- Production of quality, hygenic and fresh milk

Important factors to be considered in the infrastructure construction like cattle sheds:-

- Supporting beams and building materials should be erect, strong and safe
- Sheds should have good ventilation and maintain a cool environment in the building despite the hot tropical conditions. Roof-top water sprinklers may assist cooling.
- Roofs should be slopped so as not to trap rain-water. Zinc and asbestos may be used due to their durability and should exceed 3.5 meters in height to facilitate ventilation.
- Shed/Barn flooring should be concrete, non-slippery, easy to clean and rapidly dried with a slight slope to the drains. Floors to be at least 10cm thick. Perimeter drains with 3cm:1 meter slopes are required to drain

water to retention ponds. The floors and drains should be constructed at the same time.

- Feeding throughs, when used, should be big enough to contain sufficient grass. Water may be supplied in pails or special containers. For cattle sheds/barns without feed throughs, there should be sufficiently large space between sheds for the passage of tractors or trolleys which deliver the feed.
- Special enclosures for calves, stores for concentrates and other supplies should be available. Structures should facilitate future expansion.
- Sufficient fenced open spaces near or within the sheds are very useful for heat detection in female cattle
- Facilities to control livestock are required. Neck crushes for milking or treatment and artificial insemination. Structures and ropes to tie animals outside the sheds must be available.
- Milking sheds should be constructed to control cows during milking. Facilities for milking and cleaning of milk containers should be made available.
- All cattle shed should have electricity and clean water supplies
- Cattle shed should be constructed near farmers' houses to facilitate security monitoring of livestock and equipment.
- Pollution control ponds should be constructed in suitable locations to hold cattle shed washings and faeces for recycling as fertiliser.

4. **Bekalan Utiliti**

Ladang tenusu hendaklah mempunyai kemudahan jalan ladang yang baik, bekalan air bersih yang mencukupi dan kemudahan bekalan letrik di masa biasa dan kecemasan dan alatan perhubungan. Ini bagi menjamin susu hasil keluaran ladang dalam keadaan bersih dan bermutu. Susu merupakan bahan yang mudah rosak, langkah-langkah bagi menghindar ianya dari tercemaran melalui persekitaran yang kotor seperti air, peralatan dan berhabuk perlulah diakuri. Menyejukkan susu secepat yang mungkin ke tahap diantara 10^0C hingga 4^0C adalah penting bagi menjamin kesegaran dan ketahanan penyimpanan nya.

5. **Peralatan ladang, jentera dan kenderaan ladang**

Keperluan peralatan sesuatu ladang tenusu bergantung kepada saiz ladang tersebut dan keupayaan pengusaha. Bagi ladang yang kecil penggunaan tenaga kerja lebih menguntungkan dari penggunaan jentera, walau bagaimana pun ladang-ladang tenusu yang luas dan besar tidak dapat mengelak dari menggunakan jentera.

Peralatan penting yang perlu bagi sesuatu ladang tenusu yang besar adalah seperti dalam jadual 6 berikut:-

Jadual 6: **Senarai Peralatan Perlu Mengikut Aliran Kerja Ladang**

Perkara	**Alatan dan Jentera Keperluan**
1. Pengendalian lembu.	Tali dan pasong.
2. Pengeluaran susu.	Mesin memerah susu, tong-tong susu, tuala, baldi dll.
3. Pembersihan alatan susu	Detergent, berus dll.
4. Sanitasi kandang.	Detergent, penyapu, berus, penyoduk, hos air getah, mesin rumput dll.
5. Pemberian makanan.	Traktor, troli, alatan pemotong foder, mesin memotong foder, mesin pencampur makanan, baldi dll.
6. Pengangkutan pekerja dan barangan.	Kereta atau lori.

Feed

Dairy cattle requires feed for growth and milk production. It is important to provide a balanced and sufficient diet for optimal and high quality production within the shortest time possible. Farmers should be knowledgeable of locally available feed ingredients that are cost-effective and easily obtainable. They should also know about the nutrient contents of the available feed ingredients. The farmer should be able to balance the factors of body weight, production status, pregnancy and health of the livestock.

Water and minerals are also basic requirements for dairy cattle. The lack of minerals and vitamins will affect the health and physiological functions of the livestock. A growing dairy cattle may drink 10 to 30 liters of water a day, depending on the weather, body weight and dry matter intake.

Usually, a cow requires 6 liters of water per kilogram dry matter intake. Beef cattle may drink 21 to 30 liters of water per day. Each liter of milk produced requires 5 liters of water intake. The table gives a representation of the daily water intake requirements.

Milk production	Body weight		
	350 kg	400 kg	450 kg
	Water requirement (liter)		
0	48	55	62
8	59	66	73
10	62	69	76
12	65	72	79
15	69	76	83
18	74	81	87
20	77	83	90

Estimated daily water intake requirements according to milk production

Ref. : Feed Technical Report No. 2

Livestock Health

Malaysia is unique in its freedom from numerous livestock diseases. However, there are a few important diseases which frequently affect cattle in Malaysia like the Foot and Mouth Disease (FMD), Brucellosis, Johne's and Tuberculosis.

There are also other important diseases resulting from poor farm management like mastitis, mange and parasitic infestations. Wrong milking techniques and injuries to the udder may cause mastitis. Dairy cattle with mastitis may get permanent damage to the udders and need to be culled.

Bulls may also spread diseases through breeding, like brucellosis, trichomoniasis, Vibrio fetus and Leptospirosis. Examinations for freedom from these diseases are required for bulls brought into the farm.

There are various parasites that can bring losses to dairy farmers. The prevention of parasitic diseases through good animal husbandry is the most economical method of disease control. The haemonchus parasitic worm is the most important endoparasite that infects ruminants in Malaysia.

Pollution Control and Waste Control Management

Dairy farming produces a lot of waste that needs to be well managed to avoid environmental pollution. It is estimated that for each 100 Kg body weight, a dairy cow produces 4.6 kg od waste matter. Livestock waste is rich in nitrogen, phosphorous and potassium (NPK) which are plant nutrients that can enrich the

soil if properly managed. Proper waste management must be taken seriously to avoid environmental pollution and on the positive aspect, it can generate fertilisers for the pastures or sold as organic fertilisers. The table lists the sources of waste and its management and reuse.

Sources of Waste and Methods of Management and Reuse

TYPE OF WASTE	SOURCE	CONVERSION METHOD	USE
Solid and liquid	1. washings from cattle shed 2. spilt milk 3. chemicals 4. discarded food 5. faeces	1. separation of solid waste 2. sedimentation pond 3. oxydation pond 4. usage of technology 5. composting	1. organic fertiliser 2. water and fertiliser sprays for pasture 3. water for fish breeding 4. others

Livestock Breeding

Milk output from a dairy farm is dependent on the efficiency of maintaining the breeders. Only dairy breeders that have calved are able to produce milk. Good dairy breeds that have the genetic potential for high milk yields and fertile will make dairy farm management easier. Fertile cows have a heat period or breeding cycle of 19-21 days. During the heat period, healthy cows usually have a fertile period during which conception can occur and the cow becomes pregnant. Pregnancy is usually 273-291 days depending on the breed and weight of the calf. Good dairy breeders are bred again 60 days after calving.

Dairy cattle breeding can be carried out in two ways, using bulls or artificial insemination (AI). AI is widely used in this country. This technique allows quality genetic material to be distributed nation-wide to improve livestock quality.

- **Livestock Selection based on Breeding**

  The main purpose of culling is to allow the farmer to maintain good stock. If cattle with poor performance is maintained, their off-springs are likely to be poor performers also.

Culling can be carried out in the breeder group. Culling should be done at least once a year because maintaining such animals will incur more losses due to the costs of feeds and farm produce.

- **Criteria for culling Cows**

    - Too old (8-10 years). Old cows are usually incapable of calving every year and even when pregnant, the calf would not be strong.
    - Not good at feeding its calf either because of disease or individual characteristics or insufficient milk for the new born. Such cows will bring much problems if allowed to remain.
    - Seldom calves, less than a calf a year
    - Injured, diseased, lame or stunted
    - Always have problems calving, either difficulties in calving (dystocia), still births or leaves the calf after calving
    - Having dysfunctional teats

- **Criteria for culling Bulls**

    - Too old or unable to breed
    - Diseased, injured or weak and unhealthy, or unable to mount
    - Low semen production or have low quality semen
    - Likes to fight and injures other bulls
    - Injuries to the limbs, for example, lame or stunted limbs

  Choice for culling should be done with the consideration of the ability of the farmer and the size of the pasture. For medium sized farms (50-100 head), the rate of culling of 10% per year is reasonable. To maintain the numbers of breeder cows each year, about 10% of the female calves are selected (based on appearance, rate of growth and health) to replaced the culled cows.

Investment Economics in Dairy Projects

In the simulation for Dairy projects, calculations are based on a 30 Hectares farm having an initial stock of 100 pregnant breeders and 5 bulls

1. **Project Cost Estimates**

    a. **Development Cost**

    Stocking and infrastructure development of cattle sheds/housing will cover the main costs of farm development. Total investment, including first year operations costs, is estimated to be RM843,412. RM 224,248 is estimated for soil preparation, infrastructure and machinery. Cost of obtaining quality cattle breeds is estimated as RM422,500.

    b. **Operations Cost**

    Operations and maintenance cost (annual recurring costs) includes animal feeds, workers' and managers' emolument, maintenance and veterinary services. This is estimated to be RM189,264 for the first year. Expected cash flows estimate the cost increments to be 5% per annum in the calculations for farming operations costs.

2. **Income**

In estimating profit / income, the average market price is expected to be:-

Female breeder	RM4,000/head
Male breeder	RM4,500/head
Fresh milk market price	RM1.35 per liter
Live cattle market price	RM5.00 – 10.00 /head

In the first year of operation, an income of RM262,440 is expected. This sum can be raised to RM400,000 in the 5th year. Income is derived from sales of fresh milk and live animals. Side income from the farm includes sale of farm produce and fertilisers but these were not included in our cash flow. If this source of income is achieved, then it is an added bonus.

- Marketing

    The farm will produce fresh milk and live cattle for direct sales to the market. All sales from the farm should be in cash terms and not on credit or bank guarantees. Customers are chosen from distributors with a proven background. To get better prices, distributors should be from large towns.

3. **Financial Analisis**

   Financial analysis of this project proposal looks at the use of 4 general parameters that are normally used to evaluate projects - Net Present Value (NPV), Internal Rate of Return (IRR), Pay Back Period (PBP) and Benefit Cost Ratio (BCR). The project cash flow for 10 years is estimated. In this analysis, the cost of inflation was not taken into account.

   In the cash flow calculations, cash benefits are obtained in the 2nd year if no loans are used. This gives a payback within 3.9 years. With a discount of 15%, NPV is estimated to be RM398,276. Both these estimates are positive and is assumed to be profitable financially. i kewangan.

   IRR calculations on this project is 33% when the project operates without loans. Since the IRR is more than the minimum bank loan rate, the project is thus profitable from the financial and investment aspect. We note the PBP for this project is strong as it only take 3.9 years to recover the investment costs.

   Following the feasibility analysis, we can show the BCR is RM1.49 after 10% discount and is RM1.45 after 15% discount. This shows that the project can be carried out with profits to the investor.

4. **Sensitivity Analysis**

   The sensitivity analysis shows that the project is very sensitive to the sale price of the farm. This is reflected by the changes in financial factor and the return to investment period when the sale price changed by 10%. Changes in the cost of feed and labour cost do not indicate such sensitivities.

Good Animal Husbandry Practices - GAHP

Good animal husbandry should be the practiced in all farms to ensure safe food for human consumption. Dairy farmers should ensure that they follow the current dairy GAHP at every level of animal husbandry.

1. **Good Current Dairy GAHP Objectives are for the**:-

   - production of quality, pure milk with no additives
   - assurance that the product achieves the established food standards
   - promotion of the product that achieves the required specifications
   - customer confidence on the milk produced
   - prevention of biological residues and contaminants in the milk
   - avoidance of contamination with bacterial pathogens

2. **Monitoring**

Livestock monitoring is required to ensure improved levels of productivity and profits. Big farms require efficient monitoring systems to facilitate accurate management decisions. Such systems require accurate data and records. Data required for dairy farm monitoring are:-

- **Livestock identification**

  Livestock identification may be done through painted marks on the body, branding, tattoo, ear-mark, plastic collars, tags on chains and ear-tags.

- **Individual cattle records**

  Individual records are important for quick decisions. Such records should include:-

  - Name and identification number
  - Date of birth
  - Pedigree
  - Calving date and status
  - Calves born
  - Diseases and treatment given
  - Milk production

  Other records that should be kept:

  - Milk Production records
  - Artificial insemination records
  - Herd management
  - Health management
  - Pasture usage and grazing plan
  - Feed conservation plan
  - Concentrates supply
  - Farm financial management
  - Equipment in the store

  Good farmers will have all the records of each animal, covering all the events throughout the lifespan of the animal while on the farm. These records are important for decisions made during breeding, culling and

so forth. The usage of computers with suitable software applications will help in the monitoring of the farm's performance.

MILK MARKETING

1. **Local fresh milk marketing**

   There are 2 ways of marketing of fresh milk in this country. Firstly, the farmer sells directly to his customers or to an agent. Usually, this is carried out by traditional and small farmers. Secondly, the farmer sells through the Dairy Industry Development Centres (PPIT) of the Department of Veterinary Services (DVS), at the contract price with various incentives.

   Marketing handled by the PPIT is based on the total amount of milk collected at the centres and from the DVS farms. There are 2 methods of marketing used by the PPIT. Firstly, raw milk is sold to milk processing plants. Secondly, the PPIT processes and sells it to the local users as pasteurized milk, flavored pasteurized milk, yoghurt and ice-cream.

2. **Handling, Transport and Market price**

   Milk from the farm is a perishable product and thus it needs to be sent immediately for chilling and processing. The use of chilled tanks at the farms has allowed longer storage before milk is delivered to processing plants. However, fresh milk should be processed within 2 days of storage to ensure its quality.

   Milk is a heavy product but possesses a low value per product weight. This results in high transportation costs in addition to the requirements for chilling.

   Traditional producers market their milk directly to customers in nearby towns or through agents. The agents goes to collect the fresh, raw milk from the farms every morning. There are also agents who collect in the evenings as well. The price differs according to the locality. The producers' price is dependant on their offer to their customers, ranging from RM1.50 to RM2.50 per liter. During Hindu festivals, the price may be as high as RM4.00 per liter.

   Agents use a special tank placed on the back of their motorcycles to deliver to their customers. Using bottles or cups as measures, these agents sell raw milk to their customers in bottles or plastic bags. The price varies from RM2.00 to RM3.00 per liter. The major customers of raw milk are from the Indian community where it is used as a boiled drink or used in their cooking like "thairu" and "lasi". In this situation, there are no quality controls to protect the customers' rights. Under the Food Act 1985, it is an offence to supply raw

milk to the public.

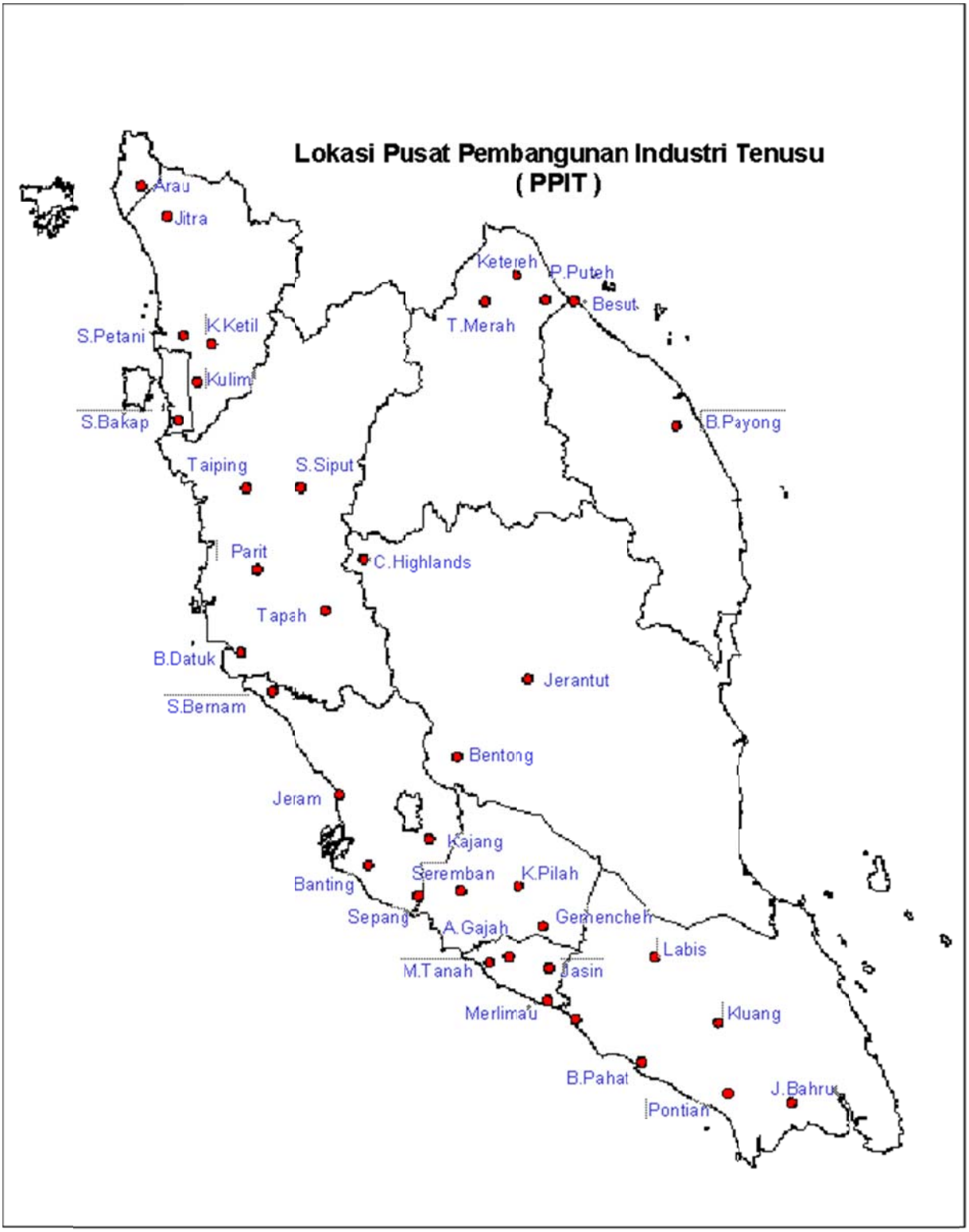
For the producers who sell to the PPIT, the price is determined by the grade of milk produced. The milk has to pass the platform test before it is accepted. The platform test involves:-

- Appearance
- Taste
- Smell
- Specific Gravity
- Alcohol
- MBRT (Methylene blue)

The price of the milk is further determined by laboratory analysis at the Veterinary Public Health Laboratory of the Department of Veterinary Services. This is done once a week and includes:

- Alcohol
- Specific Gravity
- MBRT (Methalene Blue)
- TDS (Total Digestable Solid)
- SNF (Solid Non Fat)
- Percentage of fat
- TPC (Total Plate Count) for bacteria contamination

After the quality tests, the milk is chilled to $2^{o}C$ - $4^{o}C$ prior to storage before delivery to processing plants or processed at the PPIT for local consumption.


Lokasi Pusat Pembangunan Industri Tenusu
(PPIT)
Arau
Jitra
Ketereh
P.Puteh
Besut
T.Merah
S.Petani
K.Ketil
Kulim
S.Bakap
B.Payong
Taiping
S.Siput
Parit
C.Highlands
Tapah
B.Datuk
Jerantut
S.Bernam
Bentong
Jeram
Kajang
Seremban
K.Pilah
Banting
Sepang
A.Gajah
Gemencheh
Labis
M.Tanah
Jasin
Merlimau
Kuang
B.Pahat
J.Bahru
Pontian

TERNAKAN LEMBU TENUSU MENGIKUT NEGERI, JANTINA DAN KUMPULAN UMUR

Bil	Negeri	Lembu LID				Lembu Kacukan Tenusu				Jumlah (ekor)
		Jantan		Betina		Jantan		Betina		
		< 3 Thn	> 3 Thn	< 3 Thn	> 3 Thn	< 3 Thn	> 3 Thn	< 3 Thn	> 3 Thn	
1	Kedah	7	1	19	22	619	71	793	1,140	**2,672**
2	Pulau Pinang	124	31	86	82	267	80	373	381	**1,424**
3	Perak	430	134	617	774	344	75	529	867	**3,770**
4	Perlis					17	6	32	28	**83**
5	Selangor					1,062	117	3,844	813	**5,836**
6	Negeri Sembilan	966	176	1,058	961	208	71	517	414	**4,371**
7	Melaka			3		568	90	942	973	**2,576**
8	Johor					1,057	185	1,732	2,370	**5,344**
9	Pahang					336	52	329	549	**1,266**
10	Terengganu					25	2	35	61	**123**
11	Kelantan	84	40	90	48	113	47	149	105	**676**
12	W.Persekutuan KL	21	6	46	16	14	3	42	13	**161**
13	Sabah									**6,033**
14	Sarawak									**125**
Jumlah Besar		**1,632**	**388**	**1,919**	**1,903**	**4,630**	**799**	**9,317**	**7,714**	**34,460**

sumber : bancian & sembelihan ternakan edisi julai 2007, bhgn perancangan ipph

DAIRY CATTLE FARMING

Cash Flow Estimate for a 50-Cow Farm

YEAR	0	1	2	3	4	5	6	7
A. REVENUE								
Milk		164,025	145,800	174,237	190,270	218,011	218,769	223,365
Cull Bulls		0	4,000	4,000	4,000	4,000	4,000	4,000
Cull Cows		0	0	8,465	9,243	12,709	12,753	13,021
Bull calves <12 mths		0	30,240	31,920	35,280	31,920	31,920	33,600
Heifers < 36 mths		0	0	0	0	22,680	2,700	3,000
Total Revenue		**164,025**	**180,040**	**218,621**	**238,794**	**289,321**	**270,142**	**276,987**
B1. FIXED COST								
1. Land Clearing, Preparation	25,500							
2. Pasture Planting	12,000	1,200	1,320	1,452	1,597	1,757	1,933	2,126
3. Stock Purchase								
Bulls		13,500	9,000	9,000	9,000	9,000	9,000	9,000
Female Breeders		200,000	0	40,000	0	0	0	0
4. Catlle Sheds, Yard & Store	25,000					2,500		
5. Fencing	29,394							
6. Milking Machines	20,000							
7. Waste Disposal, etc.	20,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
8. Miscelenous @ 5%	6,595	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Total Fixed Cost	**138,489**	**220,700**	**16,320**	**56,452**	**16,597**	**19,257**	**16,933**	**17,126**
B2. OPERATING COST								
1. Feed Purchases								
- Breeders		27,375	27,375	27,101	29,595	27,128	27,222	27,794
- Others		767	10,987	15,330	18,907	18,396	18,141	18,141
2. Minerals & Vitamins		1,018	1,786	2,102	2,459	2,334	2,318	2,338
3. Medicines		954	1,674	1,971	2,305	2,188	2,173	2,192
4. Other Administrative Expenses		6,360	6,678	7,012	7,362	7,731	8,117	8,523
5. Spares & Repairs		5,049	5,049	5,049	5,049	5,049	5,049	5,049
6. POL, Travel & Utilities		5,475	5,749	6,036	6,338	6,655	6,988	7,337
7. Detergents & Chemicals		1,200	1,260	1,323	1,389	1,459	1,532	1,608
8. Fertilizers, Seeds & Herb.		3,000	3,150	3,308	3,473	3,647	3,829	4,020
9. Artificial Breeding		3,000	3,000	2,970	3,243	2,973	2,983	3,046
10. Salaries & Benefits		34,800	36,540	38,367	40,285	42,300	44,415	46,635
11. Contingency @ 5%		4,450	5,162	5,528	6,020	5,993	6,138	6,334
Total Operating Cost		**93,447**	**108,410**	**116,098**	**126,427**	**125,851**	**128,904**	**133,018**
TOTAL COST (B1+B2)	**138,489**	**314,147**	**124,730**	**172,550**	**143,024**	**145,108**	**145,837**	**150,144**
C. Surplus/Deficit (A-B)	**(138,489)**	**(150,122)**	**55,310**	**46,071**	**95,770**	**144,213**	**124,305**	**126,843**
Cummulative Surplus/Deficit	**(138,489)**	**(288,611)**	**(233,301)**	**(187,229)**	**(91,460)**	**52,753**	**177,058**	**303,901**
Financing								
Amount Received	120,000	180,000						
Installments @ 4%	4,800	12,000	36,987	36,987	36,987	36,987	36,987	36,987
TOTAL COST (Incl. Loan Repayment)	**143,289**	**326,147**	**161,717**	**209,537**	**180,011**	**182,095**	**182,824**	**187,131**
SURPLUS / DEFICIT	**(23,289)**	**17,878**	**18,323**	**9,084**	**58,782**	**107,225**	**87,318**	**89,856**
CUMMULATIVE DEFICIT	**(23,289)**	**(5,411)**	**12,912**	**21,996**	**80,778**	**188,004**	**275,322**	**365,178**

Total Investment 452,636

FINANCIAL EVALUATION

	Without Loan	With Loan
IRR =	**18%**	**101%**
PAY-BACK PERIOD =	**5.6 Years**	**2.9 Years**

Discount Factor (df)	Net Present Value (NPV)	Benefit-Cost Ratio (BCR)
10%	86,887	1.20
15%	26,928	1.19