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# ANNUAL REPORT 1976



DEPARTMENT OF VETERINARY SERVICES  
AND ANIMAL INDUSTRY

Laporan Tahunan JPHPTS

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INTRODUCTION

Sabah is one of the 13 States of Malaysia and is situated between  $4^{\circ}$ - $7^{\circ}$  North of the Equator and between  $115^{\circ}$ - $119^{\circ}$  Longitude East at the Northern tip of the island of Borneo in the Malay Archipelago.

Sabah has a total area of 29,338 square miles and it has a coast line of about 900 miles bordered by South China Sea in the North and the West and the Celebes Sea in the East.

1.1 Climate

Climate in Sabah is tropical but pleasant with little variations in temperature from month to month. Average temperature may vary from about  $74^{\circ}$  in the early morning to about  $88^{\circ}$ F at mid-day and on an exceptional hot day the temperature may be slightly over  $90^{\circ}$ F. The night temperature are usually about  $72^{\circ}$ F.



## 1.2 Rainfall

Rainfall in Sabah is influenced by monsoons and monthly average rainfall varies from 3.20 inches to 16.37 inches depending on locality. The highest being in the South West and the lowest in the interior. Rainfall data for 1976 is given in Appendix I.

## 1.3 Communications

Communication has been a problem in Sabah due to rugged terrains and coastal swamps but with newly built roads one could travel from Kota Kinabalu in the West Coast to Kudat in the North, to Sandakan in the East and to Keningau in the Interior. There is also a light rail of about 96 miles from Kota Kinabalu to Tenom in the Interior. But communication by air and sea still plays a very important role in Sabah and river communication in the interior specially in the Sandakan Residency is common. However, further improvement in communication is expected during the Third Malaysia Plan (1976-1980) when one could travel by road from East to West and North to South.

#### 1.4 Population

The total population of Sabah based on the 1970 census is six hundred and fifty three thousand two hundred and sixty four (653,264) of which sixty seven percent (67%) are indigenous people comprising of Kadazans, Bajaus, Muruts, Malays and other indigenous races. About twenty one percent (21%) are Chinese, about six percent (6%) are Indonesians and about 6.7% are either consisting of Philipines, Sarawakians, Indians Pakistanis, Ceylonese, Eurasians and Europeans.

#### 1.5 Livestock Economy

Economically animal Industry plays an important role in Sabah. According to our estimates which are based on slaughter figures, family planning budget survey of 1958/1969 and import figures, the total turnover figures for the three major industries i.e. bovine (cattle and buffaloes) pig and poultry are over sixty nine million nine hundred thousand ringgit (\$69,900,000.00). Out of this the poultry and pig industry accounted for over sixty one million ringgit (\$61,000,000.00) which is more than the State 1973 total revenue from palm oil, cocoa and coconut industries.

The recorded annual slaughter figure for cattle and buffaloes for 1976 was eight thousand five hundred and fifty nine (8,559) which is estimated to represent about seventy five percent (75%) of the total number slaughtered. Thus the total number slaughtered was eleven thousand four hundred and twelve (11,412). For the same year two hundred and sixty three (263) animals were exported. So the extraction rate is about 9.9% per annum based on the estimated bovine population of about one hundred and seventeen thousand (117,000) in the State in 1976.

The official figures for pigs slaughtered in Government slaughter houses in 1976 was seventy three thousand six hundred and sixty eight (73,668). This is estimated to represent about seventy percent (70%) of the total number of animals slaughtered. Based on one hundred and eighty pound (180 lb) per pig at a farm gate price of two hundred ringgit (\$200) for 132.4 lb the total turnover of the pig industry in 1976 was around twenty eight million four hundred and fourteen thousand eight hundred ringgit (\$28,414,800.00). For the same year, only 32.32 tons of pork at the cost of one hundred and forty seven thousand one hundred

and thirty seven ringgit (\$147,137) was imported, which is only relatively small.

Between 1964-1976 the import of day old chicks and ducklings was from fifty nine thousand and sixty seven (59,067) to two million four hundred and ninety three thousand six hundred and twenty (2,493,620) an increase of about 4,221.68% while import of frozen poultry was from two thousand seven hundred and seven (2,707) cwt to six thousand nine hundred and twenty nine (6,929) cwt. an increase of only 155.96% and the import of table eggs dropped from 8.5 million in 1966 to one million two hundred and ninety four thousand seven hundred (1,294,700) in 1976 a drop of about 84.76%. Statistical data for the livestock economy are presented in Tables I to X.

## 2 DEPARTMENTAL POLICY AND STRATEGIES

The policy of the Department has been the expansion and improvement of animal industries generally and cattle industry in particular with a view to attaining self-sufficiency in meat and also in poultry and eggs by 1985. To achieve these objectives the following strategies have been adopted by the Government.

- (a) To continue and intensify the existing programme of expansion and improvement of the livestock projects in general and the cattle industry in particular in Sabah.
- (b) To further promote wider participation of livestock farming by the private sector.
- (c) To improve services and facilities for the livestock farming community.
- (d) To intensify research in modern and economic techniques in livestock industry.
- (e) To impart up-to-date knowledge and ideas to the livestock farming community through extension, information services and education.

(f) To intensify collection of information and data of veterinary and animal husbandry importance for future planning and to revise these information and data from time to time so that it is up-to-date with the current development tempo.

### 3. STAFF AND TRAINING

#### 3.1 Staff

The year 1976 has been an eventful year for this Department as it had achieved autonomy and gained full departmental status with effect from 1st January, 1976. Prior to 1976, this Department was only the Animal Husbandry Branch of the Department of Agriculture, Sabah.

When the Department was established, the whole staff of the Animal Husbandry Branch became the staff of the Department of Veterinary Services and Animal Industry, Sabah. Even before the separation, the Animal Husbandry Branch was experiencing acute shortage of qualified, skilled and semi-skilled staff.

The Department is grossly understaffed as far as both qualified and semi qualified staff are concerned. The following is the managerial and executive staffs of the Department for 1976.

<u>Designation</u>	<u>Name</u>	<u>Qualifications</u>
Director of Veterinary Services & Animal Industry	Dr. Vincent Lee Thien Pow, A.D.K.	B.V.Sc. (Queensland) M.R.C.V.S.
Senior Veterinary Officer (2)	Dr. A.J. Bacon  Dr. Lai Kong Nam  Dr. M.D. Edwards  Dr. M.M. Kehoe	M.A.Vet.M.B. (Cantab), M.R.C.V.S., D.V.S.M. (Edinburgh)  B.V.Sc. (Madras) D.V.S.M. (Edinburgh) M.R.C.V.S.  B.V.M. (Edinburgh) M.R.C.V.S., D.V.S.M. (Glasgow)  B.V.M. (Dublin) M.R.C.V.S.
Veterinary Officer (Research)	Dr. Ian Macadam	M.R.C.V.S., B.Sc. Ph.D Dip Bact.
Animal Husbandry Officer (4)	Chew Chong Tai  Daniel Chin Tung Foh  Michael Ng Cheng Teck  Wasli Mohd. Said  Ibrahim Mokhtar	B.Sc.Agric. (Taiwan) M.R.Sc. (U.N.E.) M.R.S. (N.Z.)  B. App. Sc. (Q.A.C.)  B.Sc.Agric. (Canada)  AQAC (Qld)  Bachelor of Applied Science (Aust.)

<u>Designation</u>	<u>Name</u>	<u>Qualifications</u>
Senior Assistant Veterinary Officer (3)	Dr. B.T. Hoole	G.V.Sc. (Calcutta)
	Dr. S.V. Rajah	G.V.Sc. (Calcutta) Dip in Dairying (N.Z.)
	Dr. M.K. Nayar	B.V.Sc. (Hydrabad)
Assistant Veterinary Officer (11)	Dr. S.D.M. Paulraj	G.V.Sc. (Calcutta)
	Dr. William Corera	B.V.Sc. (Madras)
	Dr. Vernon Skinner	B.V.Sc. (Madras)
	Dr. R. Rajenthiran	B.V.Sc. & A.H. (Bombay)
	Dr. Loh Huck Keng	B.V.Sc. & A.H. (Bombay)
	Dr. R. Balachandran	B.V.Sc. & A.H. (Bombay)
	Dr. Mrs. Leela Nayar	B.V.Sc. (Hydrabad)
	Dr. Solomon Wong Yuk King	B.V.Sc. & A.H. (Bombay)
	Ag. Sahak Ag. Salleh	DAPH (MARA)
	Dr. Ng Yau Lay	B.V.M. (Taiwan)
	Assistant Animal Husbandry Officer (9)	Haji Omar Ali Christ
	Anthony Chang Kon Fatt	Dip Agric. (Serdang)
	Petrus L. Yong	A.Q.A.C. (Qld)
	Pang Shuk Min	Dip Agric. (Serdang)
	Chang Thien Foh	Dip Agric. (Serdang)
	Jerome Lucas Daim	Dip Agric. (Serdang)
	Anthony Danggok	Dip Agric. (Serdang)



### 3.2 Training

The shortage of skilled manpower particularly in the Veterinary and livestock fields, has become a constraint to the development. In view of the accelerated development that have taken place in the State, this Department conducts an in-service training at Kepayan on veterinary and Animal Husbandry aspects to staffs of the Department. In addition, similar training but of a higher level are also arranged for the Department staff to go to Kluang in West Malaysia. This training will equip the staffs with knowledge necessary for their duties in the development of projects and in extension work to the farmers, thereby helps to solve the problem of inefficiency and low production in the smallholder sectors who lack the knowledge on technology and modern animal husbandry technique.

#### Training in 1976 in Kluang

1. Encik Epun Lima
2. Encik Thomas Chea
3. Encik Jeffrey Wong

#### TRAINEES - 1976 in Kepayan

1. Cik Naimah Untong - J.A.H.A.
2. Encik Ronald Fung - A.H.A.
3. Encik Justin Patrick - J.A.H.A.

TRAINEES - 1976 in Kepayan

4. Encik Kwong Kwai Weng - J.A.H.A.
5. Encik Jumahat b. Taripin - J.A.H.A.
6. Encik Arkin b. Hj. Garai - A.H.A.
7. Encik Rusli b. Ahmad - J.A.H.A.
8. Encik Peter Kuimin Sikuah - J.A.H.A.
9. Encik Noin b. Tunong - P.J.A.H.A.
10. Encik Linggam b. Sibi - J.A.H.A.
11. Encik Rasmi b. Linggam - J.A.H.A.
12. Encik Fredoline James Dawayan - J.A.H.A.

4. FUNCTIONS AND SERVICES

The functions and services rendered by the Department can be broadly classified into :-

- (i) Animal Production
- (ii) Animal Health

4.1 Animal Production

The Government has placed great emphasis on animal production by the generous allocation under the

Third Malaysia Plan (TMP) for livestock development projects in the State. This Department has put up many more projects to the tune of nearly M\$30 million ringgit compared to Second Malaysia Plan (SMP) allocation of a mere M\$4.5 million ringgit only. With the six folds increase in financial allocation for the TMP, the number of development projects have been correspondingly increased to two folds totalling 18 in number including one with a token vote of M\$10.00.

Though allocation were late in coming in 1976, being the first year of the TMP, satisfactory progress has been achieved in spite of all odds.

##### 5. GOVERNMENT FARMS

By the year 1976 there were four established Government farms in the State. During the Second Malaysia Plan considerable progress was made on the development of cattle and pastures. Other than the farm at Mile 16, Tawau the rest of the Government farms are on marginal soil basically on the skeletal and strongly weathered red lateratics soils. In Tawau area the soil is derived from basic extrusive

rocks which have weathered into fertile volcanic soils of a friable and porous nature, generally suitable for the development of various plantation crops.

The Chartered Company in the early 1920's established a meagre cattle station at Sebrang, Keningau. In 1958, existing as a Branch of the Department of Agriculture, this Department took over the development of the station. Improvement of the station however only took place in 1963 when breeding programme and upgrading of the local cattle including pasture investigations were carried out. Towards the First Malaysia Plan, there was a great demand for cattle for breeding while the supply from the Sebrang Livestock Breeding Station was inadequate.

Thus, the Roak Farm was started in the First Malaysia Plan with the aim similar to Sebrang Farm to multiply and then to provide good quality breeding stock for the rakyat. The farm is on an open grassland towards the Paradise Army Camp near Rosok about twelve miles from Kota Belud. The Rosok Farm was also established as a pilot farm in mind to

show the intending private livestock farmers that the open grassland namely the lallang (*Imperata cylindrica*) can be opened up into cattle farm with minimal clearing cost, and that oversowing and establishment of improved pastures are feasible.

To prove the feasibility further, the Krah Swamp/lowland of Timbang Menggaris was proposed as a cattle Multiplication Station on 300 acres of land in association with the set up of an Agricultural Vocational School at Timbang Menggaris. On this farm there is basically a herd of Kelantan cattle, imported from Peninsula Malaysia in 1971, which is being upgraded by the use of Brahman and X-Friesian bulls. The offsprings are sold to the smallholder farms for breeding. To that effect, during the Second Malaysia 'Plan' period two privately owned cattle farm on commercial scale with imported Drought Master type of cattle have been established in the Bengkoka-Kudat Peninsula region utilizing area of similar vegetation as those found in Rosok and Timbang Menggaris Farms.

With the increasing area in Sabah being developed and planted with perennial tree crop notably cocoa and oil palm there is an awareness for the Agriculture diversification. Besides in terms of land utilization there is no comparative economic between land development into plantation and into grazing land. Hence the Cattle Breeding Station at Mile 16, Tawau was started in 1971 with this object of investigating the potentials, problems and technique of developing prelogged jungle land.

With the initial work in Tawau, and in 1972, a consultant from New Zealand ANZDEC, was commissioned to carry out a study on the beef potential, in Sabah and the economic of the utilisation of prelogged jungle.'

The Pilot Commercial Beef Project was implemented originally at Tingkayu in Semporna Peninsula as a large scale commercial project; to develop the beef industry on prelogged jungle, to be financed through Federal Loan. However the project was shifted to Sook on an area of twenty thousand

acres (20,000) of open grassland and tropical rain forest. The reason for the shift is that the land at Tingkayu is better made use of for tree crops. Work at Sook started in 1977 with the fencing of open grassland and subsequent improvement of pastures. The cattle breeding stocks were imported from Australia.

Interests in the buffalo arose and the development of the buffalo as a meat animal was highlighted during the Third Malaysia Plan. Again the original proposal for the buffalo project was to be established at Telupid but it was transferred to Sook in the Interior Residency next to the Pilot Commercial Beef Project. The Buffalo Multiplication and Research Centre was started in November, 1976 on an area of two thousand five hundred (2,500) acres. The object of this project is to establish research work and to develop the buffalo as a primary meat animal and to improve subsequently the buffalo of the kampong smallholders; to explore the potential of the buffaloes in conjunction with better utilisation of the available resources and subsequently to further increase their role as sole

supplier of meat in Sabah; to confer benefits to the rural farmers towards improving their socio-economy, adequate intake of protein of animal origin by proper management and husbandry to enhance better productivity of the buffaloes.

5.1 Livestock Multiplication Centre,  
Timbang Menggaris

(a) Background

The number of cattle in Sabah is limited and the availability of them for breeding is poor. To improve this the Timbang Menggaris Station has been established as a Multiplication centre to provide good quality breeding stock for the rakyat. The farm is located to the Agriculture Vocational School about 16 miles from Kota Belud Town. From the junction at about Mile 50 on the Kota Belud-Kudat Highway the farm is about 2 miles to the left of the Highway.

(b) The Project

The project covers an area of one thousand(1,000) acres consisting of three hundred(300) acres Block



I at Timbang Menggaris and one thousand(1,000) acres Block II at Rosok where upgraded bulls and heifers are produced for the rakyat for breeding. In addition, the project provides research on cattle and pasture so that data obtained there-from can be applied to areas of similiar climate, topography, natural vegetation and soil types.

(c) Achievement

Calves born :	Block I	-	108
	Block II	-	115
			---
	Total		223
			---

Issued or sold : Bulls on loan

Kampong	-	3
Individuals	-	2

Sold for breeding :

Bulls	-	67
Cows	-	1

Transferred to Livestock Breeding Station Sebrang

Heifers	-	33
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For further details see Annex I Annual Report 1976 on Rosok.

5.2 Livestock Breeding Station, Sebrang, Keningau

(a) Background

The Station is about three (3) miles from Keningau Town, across the Pagalan River and to the left hand side of the Keningau-Nabawan Road. The Sebrang Cattle Station has been actually operating as Cattle Research Station only since 1963. Initial work was concentrated on beef animals with the upgrading of local cattle with exotic breeds. Such improved animals were distributed through the private sector and to kampongs.

In conjunction with the development of improved cattle, work on the development of suitable pastures and other forms of feeding and husbandry has been carried out, such as feed lotting, and the development of silage and hay.

Plate SI



Cattle at Feed-lot Sebrang  
Farm, Keningau.

(b) Project

The production of beef type of animals of improved quality will continue but breeding of the main herd on the farm will however be turned to the dairy animal, to produce suitable milking animals for smallholders production in

conjunction with the Dairy Project and also to form a nucleus of milking herd.

(c) Achievement

Calves born - 241

Issued or Sold

(a) Sold for breeding

- i) Bulls - 7
- ii) Heifers - 5

(b) Issued free to projects

- i) Bulls - 4
- ii) Heifers - 7

(c) To Kampongs and Rural Development

- i) Heifers - 7

(d) On loan

- i) Bulls - 17

(e) Sold for slaughter

- i) Bulls - 51
- ii) Cows - 1

For further details see Annex II Annual Report 1976 on Sebrang Livestock Research Station.

5.3 Livestock Breeding Station, Tawau

(a) Background

Most of the cattle in Sabah are kept

in the marginal land of the West Coast and Interior, which has little utilisation for other crops. To study the utilisation of pre-logged jungle for conversion to pasture and cattle, the Livestock Breeding Station at Tawau in the East Coast was established. The Station is located Sixteen (16) miles from Tawau Town, at Mile 16 of Apas Road.

Plate TI



Clearing of Pre-logged jungle  
for conversion to pasture

(b) Project

This is the development of the jungle area to pasture for cattle. Breeding of cattle is being carried out to produce improved breeding stock for the farmers, and in particular improved bulls for the cattle under coconut subsidy scheme. Insemination is now being carried out with Friesian to produce a dairy type animal, which will be utilised in the dairy project amongst the cattle under coconut smallholders.

(c) Achievement

Calves born	- 79	<u>Sold for breeding</u>	
		Bulls	
		(a) for farmers	- 4
		(b) for cattle under coconut subsidy scheme	- 3
		<u>Loan to projects</u>	
		Bulls	- 2
		<u>Sold for slaughter</u>	
		Bulls	- 25

For further details see Annex III Annual Report 1976 on Mile 16, Tawau.

5.4 Pilot Commercial Cattle Project, Sook

(a) Background

This project is the result of the feasibility study on the development of a beef industry in Sabah carried out by consultants from ANZDEC. The mission reported good potential for the establishment of beef industry in Sabah and selected three sites as being most suitable viz: Telupid, Tingkayu and Sook Plain.

Although it was decided to implement this project in Telupid the Department has to abandon it due to high stands of commercial timber for which logging licence had been issued. So steps to implement this project at Tingkayu was taken and initial work in clearing the land was undertaken but due to some reason or other decision was made to shift the project to Sook Plain towards the latter part of 1976. The project is about twenty seven (27) miles from Keningau. It is located on the right hand side of the Keningau-Nabawan Road.

(b) Project

There are about five thousand (5,000) acres of open grassland covered with a lalang on the Sook Plain available for this project, and a further five thousand (5,000) acres of secondary jungle behind this which will have to be converted to pasture. However, as the lalang is grazed out over-sowing of improved pasture species is necessary with *Stylosanthes* as the oversown legume. Breeding heifers from Australia will be imported to stock this project.

Plate SB1



Typical Grassland of Sook Plain before improvement



5.5 Buffaloes Multiplication and Research Centre, Sook

(a) Background

The buffalo is found widely throughout Sabah, particularly on the West Coast and Interior associated with padi cultivation. However, buffalo meat still forms eighty five percent (85%) of the beef market, and this is a very important by product of the padi industry. With the development of the rice industry, the change to double cropping and use of tractors, the role of the buffalo has changed, and now there is a declining population, as the buffaloes are sold for slaughter.

The buffalo should now be farmed as a meat animal, as it's primary role. It is a better utiliser of rough grazing than cattle and gives a larger carcass. Very little improvement is given to the buffaloes in Sabah and in particular their productive performance in relation to cattle is not known. The buffalo project is located adjacent to the Pilot Beef Project

on the Sook Plain. The entrance road is about five hundred(500) yards from the Bridge of Tiulan River, which forms a junction to the right of the Keningau-Nabawan Road.

Plate B1



Buffalo at Multiplication and Research Project Sook

Plate B2



Buffalo at Feedlot for  
Growth observation trial

(b) The Project

The purpose of the project is to build up the number of breeding female buffaloes, to counter the decline in number at the Kampong level. In addition research will be carried out to determine the performance and production of the buffaloes in Sabah in relation to calving interval, growth rate, optimal economic age for slaughter etc. Attempts will also be made to

improve the performance of the Sabah buffaloes by selection and breeding and by introduction of semen from overseas for artificial insemination to give higher milk yield and better calf growth.

5.6 Cattle Under Coconut Subsidy Scheme

(a) Background

There are about one hundred and thirty thousand (130,000) acres of coconuts in Sabah mainly scattered along the coast. Income from coconut is low, and the coconut farmers are one of the poverty groups in the State. There is great potential for improvement by diversifying within the coconut plantations, either with cocoa where the soil is suitable, or cattle. This project is to aid in the development of the large area of unused potential grazing in the coconut area by assistance in improvement, to increase the meat, and or dairy production from such areas, but also to

raise the standard of living  
of the farmers.

Plate CCl



Cattle Under Coconut - an  
integration to increase level  
of farm income

(b) Project

The project provides assistance to farmers, at the rate of \$40/acre for those under fifty(50) acres, and \$30/acre for holdings over fifty (50) acres. Such assistance is not paid in cash, but it is in the form of material assistance, barbed wire, building of handling facilities, payment for weeding and slashing etc.

5.7 Dairy Cattle Project

(a) Background

Proposals for the establishment of a Dairy Project have been included in TMP, and a total of six hundred thousand (\$600,000) ringgit has been provided from Federal funds.

The original proposals call for the development of a dairy unit at the Mile 16, Station Tawau, with production of dairy type calves from the cattle by Artificial Insemination. There is also an extension to small-holder sector, particularly in cooperation with the cattle under coconut subsidy scheme, to produce dairy type animals by AI for these smallholders.

Eventually a Milk Collecting Centre will be established, to process and market the milk produced by the smallholders, as well as the Dairy Unit at Mile 16.

(b) Project

It is proposed to accelerate the development of the dairy project

in Sabah during the remainder of TMP and through the Fourth Malaysia Plan, with particular emphasis on the smallholder sector.

5.8 Goat Breeding Centres

(a) Background

Goats are found widely throughout Sabah, and more particularly amongst the coastal Islamic population where it is the preferred meat. The quality of the Sabah goat is poor, and they are small and few in numbers. The proposals are to increase the number and quality of the goats in Sabah.

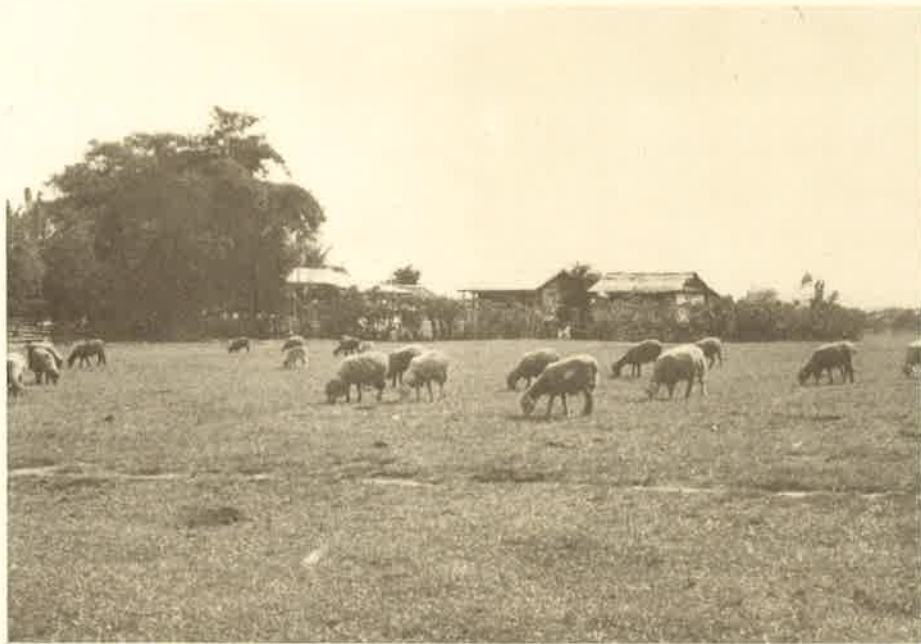
Plate G1



Anglo-Nubian Crossbred at the Goat Multiplication Centre

Sheep have been found in the Interior in Ranau, Tambunan and Keningau for many years. In addition to goats in areas, improvement by crossbreeding and development of the sheep is also envisaged.

Plate SP1



Locally-born sheep at Baginda,  
Keningau

(b) The Project

Four major goat breeding centres have been established, to act as multiplication centres, to provide



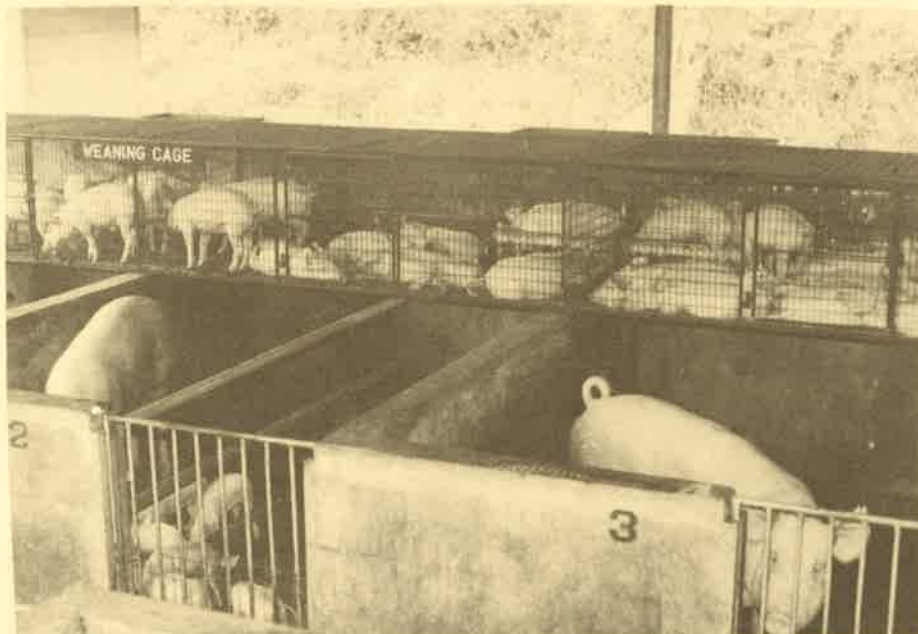
goats for the rakyat. These are at Lahad Datu, Ranau, Kudat and Keningau. One further centre at Tuaran will be established for dairy type goats, to be used in crossbreeding, to give a goat with an enhanced milk supply for the feeding of the kids. One of the many problems in goat is kid mortality, often associated with poor nutrition.

#### 5.9 Pig Multiplication Unit

##### (a) Background

One of the factors contributing to the success of the Pig Industry in Sabah is the introduction of exotic breed by this Department in the 1960's and the shift from the use of inefficiently local pigs to the productive exotic breeds.

Plate Pl



Weaning cage system to save space and building cost

In spite of the fact that there are 5 Departmental Pig Breeding Units in the State producing over one thousand(1,000) breeding stock per year, the great demand for breeding stock by the pig Industry can hardly be satisfied. Hence, a one hundred(100) sow breeding farm at Kg. Kianbalang, Kiansam was proposed and implementation began in mid 1976.

Plate P2

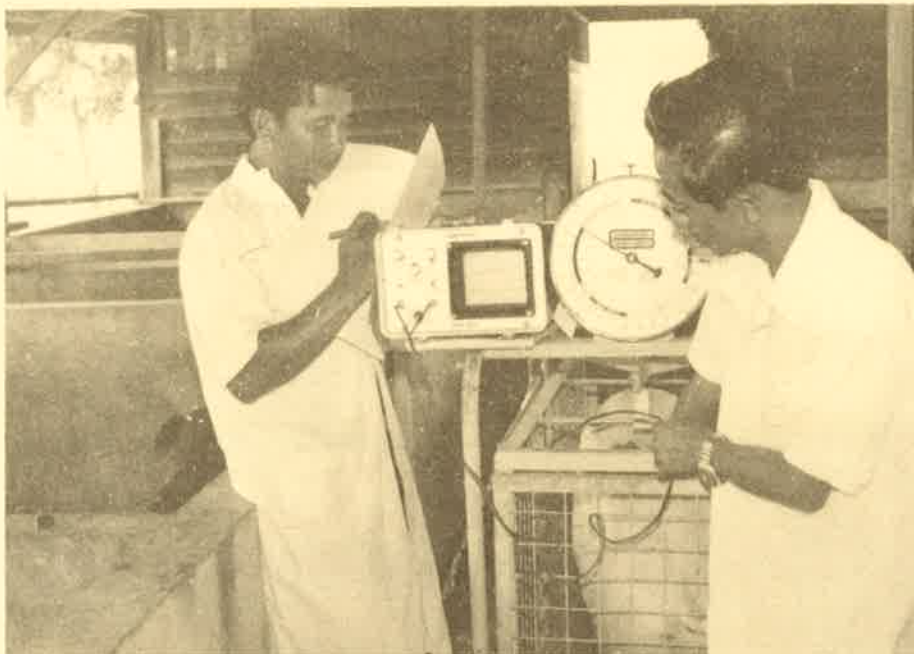


The Sow Stall-dry sows are confined for the ease of management and to save space

(b) The Project

The unit is sited together with the Duck multiplication Unit at Kianbalang, Kiansam, about eight(8) miles from the Inanam Town. It is envisaged that when this project is fully developed it will be producing two thousand(2,000) quality breeding stock per year for the pig industry in Sabah.

Plate P3



Boar selection-using ultrasonic wave back-fat tester to measure the thickness of back fat of 6-month old boar

5.10 Poultry Multiplication Unit

(a) Background

One of the factors contributing to the expensive poultry meat and eggs in Sabah is the lack of locally produced quality day-old chicks. Sabah has to rely heavily on imported chicks of over two million head a year. The lack of chicks and feed supply particularly to the rural area have somewhat hampered the development of the Industry in these areas. The Poultry Unit at Likas was set up with an aim to produce chicks to fulfil the need in particular, of the rural sectors.

(b) Project

The Unit was built in 1967/1968 and maintained with limited fund. Hence, little progress was made. By 1975, it was producing six thousand(6,000) - seven thousand(7,000) chicks per month. It was then proposed that the farm should be extended to produce thirty five thousand(35,000) chicks per month during the Third Malaysia Plan and the target set for 1976 was

one hundred thousand(100,000) but it has exceeded this and had produced one hundred and fourteen thousand and thirty six(114,036) day-old chicks during the year.

In the mid 1976, reclamation of three(3) acres of mangrove swamp was carried out. The building programme including the construction of one Hatchery, two breeding sheds and four units of labour quarters was handled by Public Works Department.

(c) Facilities

(1) The Farm Building

The new hatchery comprising an office, an egg storage, egg setting, incubating, hatching and packing sections, has a capacity to produce one hundred thousand(100,000) chicks per month. The two breeder sheds installed with ventilation fan and automatic mechanical feeders will be able to house an additional four thousand(4,000) breeders.

(ii) Quarters

There are one existing Div. II quarters and two labour quarters. With the additional four units of labour line, more Hatchery operators and farm workers can be accomodated.

(iii) Standby Generator

A 30 KVA standby power generating unit has been installed adjacent to the Hatchery. The Unit is also equipped with automatic charge over power supply and will take over the supply automatically when Sabah Electricity Board power supply fails and switch when the latter resumes.

(d) Problems

The Unit is now being surrounded by a low cost housing scheme. There is a high disease risk because of increased amount of traffic. Also, a road cutting through the middle of the Unit has been proposed in the "Greater Kinabalu Scheme," when it is implemented, the breeding stock will suffer from disturbance from traffic and greater disease risks.

Farm hands and staff come from Kampong where they also rear chicken. Hence, it is difficult to maintain farm disease free.

#### 5.11 Duck Multiplication Unit

##### (a) Background

Annually, Sabah imports over \$1.0 million worth of salted duck eggs and day-old ducklings. As both can easily be produced locally, duck projects with an aim of stimulating the growth of a local duck industry was proposed and implemented in mid 1976.

Plate D1



The Peckin Breeder ducks  
(meat type) at Kiansam Duck  
Unit

(b) Project

- (1) The development of a duck breeding unit at Kg. Kianbalang, Kiansam.
- (2) The establishment of a duck hatchery at Likas.
- (3) Providing ducklings to rural farmers at Likas and extension services on duck husbandry and method on duck eggs salting.

(c) Site For Parent Stock Farm

(i) Land

Due to the difficulties in locating a suitable site which has to be isolated and with plentiful supply of water, this project originally proposed to be sited else where is now sited together with the Pig Multiplication Unit at Kg. Kianbalang. The original acquired site is a 6.4 acre plot. Due to limited land for development of both pigs and ducks, another eight(8) acres involving three(3) land titles adjoining to this Unit has been acquired recently.



(ii) Farm Building and Equipments

So far three(3) duck sheds and an office cum Store were built. The three(3) sheds each with a pond in front can house two thousand(2,000) breeding stocks. In addition of four(4) duck sheds and ponds for one thousand five hundred(1,500) breeders will be built for family selection of breeding stock on a newly reclaimed site. Also, one Div. II quarters and six(6) labour units will be built on the hill slope for staff of both Pig and Duck Units. It is expected that building programme will be completed at the end of 1978.

As power is not available, a 30 KVA generating set has been purchased and is to be installed to provide power for farm buildings and staff quarters.

Due to the lack of electricity supply at Kg. Kianbalang, the duck hatchery is temporarily set up at Likas Poultry Unit, in

a renovated poultry shed. A set of setter and a hatcher, capacity twenty three thousand (23,000) eggs are now in operation. This hatchery is currently producing two thousand (2,000) ducklings per month.

(d) Development of Duck Rearing Districts

The district selected for the promotion and development of the duck industry is Tambunan at this initial stage. Later it may be extended to other potential duck producing districts such as padi growing districts at Keningau and Papar, and the coastal areas where fish are abundantly available.

To date, over 3,000 ducklings have been sold to Tambunan area and the ducks appear to do well in the padi field with limited supplementary feeding and care. Method of salting duck eggs developed at Poultry Unit and keen interest was shown by the participants. It is hoped that some salted duck eggs can be produced locally to partially and replace the imports. One of the difficulties of

duckling rearing is that the kampong people do not think brooding is required for ducklings as for chicks. They even put the ducklings to swim at 2-3 days of age. As a result, many ducklings were chilled to death.

(e) Problem

(1) As the duck farm is located  $\frac{3}{4}$  miles away from the road, the road access is difficult. Jabatan Kerja Raya has been approached to improve the road, but to date, no action has been taken.

(2) As the farm is located along a river which swills up during heavy rain storm, flooding of the farm presents a problem. Diversion of the river is required at a later stage.

6. MAINTENANCE AND DEVELOPMENT OF PILOT LIVESTOCK PROJECTS

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Background

Kampong livestock projects were established in First and Second Malaysia Plan, to develop, cattle and goats within the remote kampongs to uplift the standard of living of the rakyat and to improve the supply of meat at the grass root level.

Progress in such projects can only be described as fair. One or two progressed very satisfactorily, whilst others, due to lack of interest, laziness or neglect by the participants have fallen by the wayside.

Plate PL1



Cattle at Pilot Livestock Project Iburu, Ulu Padas

Project

The project is to revive these projects with adequate financing and supervision so that the original purpose can be achieved. A stockman is appointed in each project to ensure the correct management and running of the project, provision is also made for the maintenance of the pasture and fencing and for drugs and medicines etc needed for livestock health.

7. IMPROVEMENT OF GRAZING RESERVES

Background

By the year 1975 there are a total of thirty five thousand nine hundred and seventy nine (35,979) acres of Grazing Reserve in the State, Sabah. The largest reserve is situated in Beaufort district and it is twelve thousand two hundred and two (12,202) acres in size. The next largest reserve is in Ranau district and it is eleven thousand five hundred and eighty (11,580) acres in size. The break down in each District is as follow:-

	<u>District</u>	<u>Acreage</u>
(1)	Kota Kinabalu	1,594
(2)	Papar	3,163
(3)	Kota Belud	2,425
(4)	Keningau	4,131

	<u>District</u>	<u>Acreage</u>
(5)	Tenom	884
(6)	Beaufort	12,202
(7)	Ranau	11,580
	Total	<u>35,979 acres</u> =====

The status of the kampong Grazing Reserve has been developed and improved since the First Malaysia Plan. The initial work was carried out in Keningau District and then development extended to Tambunan, Tenom, Beaufort, Papar, Ranau and Kota Belud Districts. The aim of this project is to develop and improve the grazing ground for the buffalo/cattle of the rakyat so that in the event of double cropping of padi the animals still have areas where they can graze and yet there are adequate feed available for them. Proper disease control measures can be exercised and the animals can be brought under control.

Plate GB 1



Cattle roaming on road-side grazing

Plate GB2



Improved pastures at Kandang Besar  
Grazing Reserve, Keningau

Plate GB3



Buffaloes grazing at newly  
cleared Grazing Reserves

### The Project

The major task in the year 1976 is to improve and to further develop all these existing grazing in addition to new Grazing Reserve being applied for the rakyat.

The development and the improvement of Grazing Reserves in 1976 in the various districts are as follows:-

#### 7.1 Keningau District

During the Second Malaysia Plan, twelve (12) Kampongs Grazing Reserve have been established. There are 22 grazing reserve under application which have been given assistance, maintained and expanded in 1976. Apart from this, thirteen (13) kampongs have been issued each one breeding bull on loan between September and December, 1976.

The allocation of thirty one thousand five hundred ringgit (\$31,500) under rural development have been given to seven (7) grazing land for improvement in the district during the year. They are as follows:-



(a)	Kampong Biah Scheme	\$ 4,500
(b)	Kampong Tulid	\$ 5,000
(c)	Nabawan Scheme	\$ 5,000
(d)	Kampong Sepulot	\$ 5,000
(e)	Kampong Bunang	\$ 5,000
(f)	Kampong Narapok	\$ 5,000
(g)	Kampong Salung	\$ 2,000
		-----
		\$31,500
		=====

As proposed, the work that was carried out in all the grazing reserves in the district are:-

- (a) Slashing
- (b) Construction of cattle yards, crushes and loading chutes
- (c) The maintenance of cattle yards, fencing and crushes
- (d) Construction of Entrance to cattle yards.
- (e) Phase levelling, clearing and expanding operation
- (f) Paddock replanting and new planting
- (g) Barbed wire and fencing posts where required
- (h) Issues of salt as required
- (i) Top-dressing of all renovated paddocks at all reserves

#### 7.2 Ranau District

The people in this district is not very interested in cattle projects. So, with the lack of co-operation from the people in this area, only maintenance work on which work has already been started can be carried out.

The people in this area are mostly farmers. They are solely interested in the planting of agricultural products in particular, vegetables.

#### 7.3 Beaufort District

Only maintenance work have been carried out in this district during the year. It is because of the lack of co-operation and interest from the kampong people in the district.

#### 7.4 Papar District

There are eleven(11) Grazing Reserves in Papar District. Because of the lack of co-operation from the kampong folks, only maintenance work can only be carried out in all the reserves in the district.

#### 7.5 Kota Belud District

In this district, there are thirteen (13) Grazing Reserves and because of the lack of co-operation from the kampong people, no new development work can be carried out during the year.

As proposed, a bull should be lent to the farmer at Rosok Grazing Reserves for breeding purposes.

#### 7.6 Kota Kinabalu District

In Kota Kihabalu, the competition for land utilisation is great. Therefore people in the districts prefer planting agricultural products such as cocoa, rubber and vegetables rather than converting their lands into grazing reserves.

Besides the demand for houses around the capital Kota Kinabalu is so great that many of the Grazing Reserves area are occupied by squatters as kampong reserves where the houses are built and therefore development for grazing purposes is not possible.

7.7 Tenom District

The clearing contract at Kampong Pamilaan, Kampong Tuan and at Kampong Maintailing grazing reserve have been issued.

The fencing has been completed at Maintailing Reserves, at Kampong Pagansangan reserve and at Kampong Napinging Reserve.

The people at Kampong Pamilaan Reserve are not interested in the rearing of cattle. So this reserve is intended strictly for the impoundment of buffaloes only.

At Kampong Baru Jumpa reserve, people are not interested in the free issue of cattle by the Government. They are, in fact, genuinely interested in the purchasing of cattle by monthly instalments. Steps have been taken regarding this matter.

The reserve at Kampong Natadman is subjected to flooding. So only buffaloes are maintained there during the year.

Some ten (10) gallons of 2,4, D herbicide, one hundred and twenty (120) rolls of barbed wire, some quantity of fencing posts, nails, wire strainers have been ordered for the development work at Kampong Tuan grazing reserve during the year.

8. ANIMAL HEALTH

The State of Sabah continued to remain free of Rabies, Foot and Mouth Disease, Rinderpest, Anthrax, Contagious Bovine Pleuroneumonia, Swine fever, Transmissible Gastro-Enteritis and Surra. This is mainly due to strict control by this Department on imports of all livestock and animal products and quarantine of all animals from diseases suspected areas.

The Department is also ever vigilant of all enzootic diseases prevalent in Sabah such as Ranikhet (New Castle Disease), Fowl Pox and Infectious Laryneotracheitis in poultry and Haemorrhagic septicaemia in cattle and buffaloes and carried out routine vaccination free of charge to prevent the spread of these disease.

The Animal Disease Research Centre at Kepayan carries out investigation of the outbreak of any diseases and also provides diagnostic services to the field staff so that proper treatment could be carried out promptly.

Mobile veterinary clinics are held in the kampongs for the treatment of sick animals and routine deworming and deticking are also carried out to improve their health and increase production. Veterinary clinics in major towns have set apart certain hours a day for the treatment of small animals.

The details and figures under animal health services for 1976 are outlined in Tables XI and XXI.

APPENDIX I

MONTHLY RAINFALL RECORD BY DISTRICT, SABAH 1976

(Unit: Inches)

District/Station	January	February	March	April	May	June	July	August	September	October	November	December	Total	Monthly Average
<u>TAMBUNAN</u>														
Batu Bajau Station	4.31	3.52	3.04	4.87	4.72	4.09	2.48	6.01	1.95	5.99	11.32	6.27	58.57	4.88
Sunsuron	10.03	4.23	2.66	4.98	4.63	6.22	4.30	4.22	4.94	8.57	6.89	8.94	70.61	5.88
Kirokot	10.03	1.44	2.58	9.22	4.76	7.43	5.22	9.62	2.34	16.33	2.87	11.29	83.13	6.93
<u>KENINGAU</u>														
Tulid	9.21	1.84	5.69	2.15	2.92	3.78	8.04	4.65	1.34	6.03	6.35	2.53	54.53	4.54
Binaong	7.39	1.05	6.26	6.65	3.00	3.40	3.29	5.87	5.65	8.08	3.61	5.82	60.07	5.01
Pamalan	9.03	2.41	3.73	4.00	3.96	2.73	7.34	5.40	0.44	5.55	7.25	3.02	54.86	4.57
Bish	6.50	1.88	2.16	1.39	3.17	3.15	4.00	3.25	0.60	5.11	6.20	2.92	40.33	3.36
Apin-Apin	7.07	4.81	6.54	3.30	3.53	2.75	9.10	5.33	3.12	11.56	7.46	4.58	69.15	5.76
<u>SIFITANG</u>														
LABUAN	9.72	1.83	2.55	3.26	3.99	3.95	4.74	4.97	3.35	6.50	11.66	3.87	60.39	5.03
<u>PAPAR</u>														
Papar Hospital	23.95	14.83	8.47	5.87	8.98	6.72	6.37	13.29	3.14	14.71	12.94	24.13	142.80	11.90
Ulu Bongawan Station	18.93	7.95	0.24	0.94	5.03	8.03	3.45	13.56	0.58	19.50	16.58	10.01	104.80	8.73
<u>PENAMPANG</u>														
Penampang District Office	4.96	3.16	0.69	0.05	10.80	9.00	9.99	0.44	4.35	4.59	9.04	4.96	62.03	5.17
Babagon	13.83	8.57	6.46	10.63	11.23	14.08	10.12	14.37	5.94	12.74	21.48	10.82	140.27	11.69
<u>KOTA KINABALU</u>														
<u>KUDAI/BANGSI</u>														
Bangi	30.54	8.75	N11	8.86	17.04	12.66	21.22	20.59	9.87	28.50	26.82	N.A.	-	-
(Lambuk Darat)	10.25	11.12	5.31	7.79	11.22	13.46	9.06	9.72	8.25	14.64	12.06	14.73	127.61	10.63
Pinawantai	9.06	1.63	0.52	1.23	9.07	10.72	7.57	14.89	7.65	8.44	10.56	11.11	92.45	7.70
<u>KOTA MARUDU</u>														
Damai Agricultural Station	7.85	10.02	2.60	3.96	4.12	4.50	12.55	11.04	10.22	10.65	19.32	16.35	113.18	9.43
<u>KOTA BELUD</u>														
Timbang M. ggaris	48.25	6.10	13.45	0.40	10.10	6.05	7.24	6.76	4.55	9.92	3.90	33.80	150.52	12.54
<u>TUARAN</u>														
<u>KUNDASANG</u>														
Damai Agricultural Station	25.02	10.79	4.95	5.49	4.95	1.48	4.63	4.64	30.70	12.79	7.65	14.15	99.61	8.30
<u>KOTA BELUD</u>														
Timbang M. ggaris	14.58	5.39	5.07	13.31	8.65	6.77	6.70	9.90	5.73	10.11	4.67	9.79	100.67	8.39
<u>SANDAKAN</u>														
Agricultural Research Station	9.10	2.88	0.45	1.92	7.59	6.17	5.21	8.25	6.44	11.03	8.59	5.00	72.63	6.05
<u>SANDAKAN</u>														
Oil Palm Research Station, Sandakan	11.11	3.80	2.90	2.81	8.98	2.69	7.71	7.30	3.87	9.35	8.82	5.37	74.71	6.23
Sandakan Airport	23.12	6.93	1.98	2.97	13.56	9.45	7.30	12.44	4.76	9.06	12.40	11.10	115.07	9.59
Tomangong Estate	23.28	13.46	7.71	2.03	9.92	6.65	6.00	10.94	4.98	6.32	12.60	16.96	120.96	10.08
Beluran	39.39	5.49	4.67	5.16	13.51	11.28	5.86	7.08	3.92	10.99	12.23	15.01	134.59	11.22
	16.31	6.51	11.43	0.77	8.03	10.11	8.49	15.54	6.46	9.62	18.30	19.26	130.83	10.90

## NUMBER OF LIVESTOCK SLAUGHTERED BY DISTRICT 1976

(Unit: No.)

Animals District/Residency	Buffaloes Slaughtered	Cattle Slaughtered	Pigs Slaughtered
Tawau	3	813	12,023
Semporna	-	-	-
Lahad Datu	46	274	3,315
Tawau Residency	49	1,087	15,338
Sandakan	1,095	370	24,989
Kinabatangan	-	-	-
Labuk	-	-	-
Sandakan Residency	1,095	370	24,989
Kudat	87	143	2,596
Kota Marudu	1	103	-
Kota Belud	75	120	-
Ranau	58	42	-
Tuaran	526	74	2,543
Kota Kinabalu	2,656	318	18,757
Penampang	53	-	1,602
Papar	408	-	2,258
West Coast Residency	3,864	800	27,756
Beaufort	307	-	946
Membakut	64	-	183
Kuala Penyu	12	1	-
Sipitang	23	28	-
Tenom	119	15	1,041
Keningau	198	133	1,569
Tambunan	16	4	46
Pensiangan	-	-	-
Interior Residency	739	181	3,785
Labuan	335	39	1,800
Sabah	6,082	2,477	73,668

(a) The figures relate to slaughter in Government slaughter house only.

Source: Department of Veterinary Services and Animal Industry



Appendix III

NUMBER OF LIVESTOCK SLAUGHTERED (a) BY RESIDENCY 1972 - 1976

Types Year	Buffaloes Slaughtered				Cattle Slaughtered				Pigs Slaughtered			
	West Coast	(b) Interior	East(c) Coast	Total	West Coast	(b) Interior	East (c) Coast	Total	West Coast	(b) Interior	East (c) Coast	Total
1972	4,611	955	1,469	7,035	434	395	640	1,469	25,609	5,221	38,184	69,014
1973	3,944	1,205	1,360	6,509	737	243	1,018	1,998	23,976	6,846	31,506	62,328
1974	3,910	1,143	1,151	6,204	474	148	961	1,583	28,810	6,101	34,802	69,713
1975	4,105	1,034	1,082	6,221	578	144	1,029	1,751	28,987	5,004	34,949	68,940
1976	3,864	1,074	1,144	6,082	800	220	1,457	2,477	27,756	5,585	40,327	73,668

(a) The figures relate to slaughter in Government slaughter house only.

(b) Includes Labuan District.

(c) East Coast comprises Sandakan Residency and Tawau Residency.

Source: Department of Veterinary Services and Animal Industry.

(Unit: No.)

IMPORTS OF MUTTON BY COUNTRY OF ORIGIN 1972 - 1976

Country of Origin	Australia		Denmark		New Zealand		United Kingdom		Netherlands		U.S.A.		Others		Total	
	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$
1972	50.43	122,704	0.16	569	18.57	53,651	0.09	233	0.01	64	0.18	654	0.54	608	69.98	178,483
1973	13.32	54,638	0.21	1,248	17.03	73,299	-	22	-	-	-	-	0.01	70	30.57	129,277
1974	12.62	53,199	-	-	21.04	92,278	-	57	-	-	-	-	0.03	210	33.69	145,744
1975	14.66	54,591	0.12	951	25.28	62,609	0.01	24	-	-	-	28	0.59	285	40.66	118,488
1976	15.23	60,635	0.03	195	24.73	65,280	0.24	1,570	-	-	0.01	87	-	-	40.24	127,767

Source: Department of Statistics

. Negligible

APPENDIX V

Country of Origin	Australia		Denmark		New Zealand		United Kingdom		Nether-lands		U.S.A.		Others		Total	
	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$
Year																
1972	3.67	8,946	10.64	42,460	1.66	6,622	0.23	1,115	0.02	53	0.07	256	28.33	89,102	44.62	148,554
1973	7.01	27,776	7.41	35,245	0.40	1,741	0.03	108	0.20	1,062	-	-	3.33	10,828	18.38	76,760
1974	7.09	35,682	13.25	74,905	0.33	1,541	0.01	142	-	-	0.04	307	0.31	1,778	21.03	114,355
1975	5.44	14,400	16.71	61,765	0.04	402	0.71	5,061	0.29	249	0.44	1,039	0.53	2,141	24.16	85,057
1976	9.40	37,875	19.88	87,568	0.42	3,137	0.65	6,275	0.85	5,051	0.18	1,553	0.94	5,678	32.02	147,137

Source: Department of Statistics

APPENDIX VI

IMPORTS OF EGGS 1972 - 1976

Items	Hen eggs for consumption		Duck eggs for consumption		Bird Eggs for hatching		Other eggs for consumption		Total	
	100	\$	100	\$	100	\$	100	\$	100	\$
1972	35,045	416,115	37,193	374,115	4,508	127,107	114	1,085	76,860	918,422
1973	4,788	70,672	35,503	490,551	4,265	97,109	30	317	44,586	658,649
1974	6,905	106,219	36,497	541,678	5,313	179,042	-	-	48,715	826,939
1975	7,186	104,395	30,369	508,553	5,819	200,680	506	9,045	43,980	822,673
1976	12,947	198,452	37,904	694,246	4,297	150,078	-	-	55,148	1,042,776

Source: Department of Statistics.

APPENDIX VII

IMPORTS OF POULTRY AND PRODUCTS 1972 - 1976

Types Year	Other Poultry		Fowls Domestic Live		Day Old Chicks and Ducklings		Poultry products Chilled, frozen etc.	
	No.	\$	No.	\$	No.	\$	Cwt.	\$
1972	3,603	11,676	98	1,665	1,468,766	786,366	5,327.93	687,862
1973	1,774	9,636	280	4,340	1,458,464	871,757	3,834.30	614,764
1974	1,138	4,472	6	600	1,858,361	1,161,325	5,196.89	967,947
1975	742	2,476	20	2,036	2,051,476	1,920,796	6,058.58	1,113,584
1976	2,273	4,663	4	250	2,493,620	2,225,305	6,929.73	1,448,746

Source: Department of Statistics.

IMPORTS OF LIVESTOCK AND POULTRY 1972 - 1976

Types	Buffaloes		Cattle		Swine		Other Animals		Poultry Live *	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
Year										
1972	-	-	-	-	13	6,661	1,832	12,929	1,472,467	799,707
1973	-	-	908	1,098,244	400	40,000	10,359	19,065	1,460,518	885,733
1974	353	389,312	336	336,000	-	-	645	15,284	1,859,505	1,166,397
1975	-	-	3	1,541	8	13,652	3,856	32,510	2,052,238	1,925,308
1976	-	-	359	346,784	13	9,192	4,873	21,810	2,494,897	2,230,218

Source: Department of Statistics

\*Including Day Old Chicks and Ducklings

Appendix IX

IMPORTS OF FROZEN BEEF BY COUNTRY OF ORIGIN 1972 - 1976

Country of Origin	Australia		Denmark		New Zealand		United Kingdom		Netherlands		U.S.A.		Others		Total	
	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$	Ton	\$
1972	122.73	408,122	4.29	6,322	26.41	182,463	0.31	2,282	0.01	115	1.61	8,573	1.96	7,390	157.32	615,267
1973	80.13	459,021	3.18	3,518	18.33	150,462	0.28	1,849	0.18	611	1.90	7,109	0.24	545	104.24	623,115
1974	78.65	513,629	0.96	6,036	26.64	202,800	0.33	1,606	0.02	109	2.68	31,302	0.62	9,898	109.90	765,380
1975	73.45	371,365	0.67	4,264	25.56	106,867	0.55	1,393	-	-	3.33	25,472	0.73	13,626	104.29	522,987
1976	101.13	543,367	1.71	8,845	30.43	183,176	1.25	7,175	0.10	820	0.69	3,791	1.23	13,813	136.54	760,987

Source: Department of Statistics

## IMPORT OF DAIRY PRODUCTS

## APPENDIX X

Description	Code	Unit	Quantity	Value C.I.F. (\$)
1. Milk condensed sweetened in or semi solid	02210100	100 lb.	96211.46	7935334
2. Milk condensed unsweetened in liquid or semi solid	02210200	100 lb.	1.20	118
3. Other preserved milk N.E.S.	02210300	100 lb.	2386.92	132862
4. Cream preserved concentrated or sweetened in liquid or semi solid	02210400	100 lb.	136.86	23491
5. Full cream milk in packings of over 10 lbs. solid	02220200	100 lb.	700.31	94949
6. Full cream milk in packing under 10 lbs. solid	02220200	100 lb.	7698.49	1447183
7. Full cream milk for infant feeding solid	02220300	lb.	2340207.34	5950041
8. Milk skimmed for human consumption over 10 lbs. packings	02220400	100 lb.	101.00	1134
9. Milk skimmed for human consumption under 10 lbs. packings	02220500	100 lb		
10. Milk skimmed for animal consumption	02220600	100 lb.	670.42	34343
11. Milk fresh frozen not concentrated or sweetened	02230100	100 lb.	279.75	16038
12. Milk fresh liquid not concentrated or sweetened	02230200	100 lb.	505.11	34626
13. Milk fresh sterilized not concentrated or sweetened	02230300	100 lb.	1953.57	168838
14. Other fresh milk not concentrated or sweetened	02230400	100 lb.	1386.44	68821
15. Cream fresh frozen not concentrated or sweetened	02230700	100 lb	15.36	6713
16. Cream fresh liquid not concentrated or sweetened	02230800	Gal.		

2....



## APPENDIX X

Description	Code	Unit	Quantity	Value C.I.F. (\$)
17. Cream fresh not concentrated or sweetened excl. frozen or liquid	02230900	Gal.	31.30	895
18. Butter in airtight containers	02300100	cwt.	1279.51	322047
19. Butter not in airtight containers	02300200	cwt.	1210.16	276091
20. Ghee	02300300	cwt.	344.19	87823
21. Anhydrous butterfat	02300400	cwt.	.89	270
22. Other anhydrous butterfat N.E.S.	02300500	cwt.	244.24	54499
23. Cheese	02400100	cwt.	584.23	168653
24. Curd	02400200	lb.	34230.52	41087

Source: Department of Statistic

## Import Of Animal Feeding Stuffs

APPENDIX XI

Description	Code	Unit	Quantity	Value C.I.F. (\$)
1. Rice broken excl.for animal feed	04229000	Ton.		
2. Maize unmilled	04400000	Ton	3170.05	1324269
3. Cereal straw and husks unprepared or chopped	08111000	Ton	0.43	833
4. Fodder roots hay and similar forage products	08112000	Ton	72.74	28750
5. Maize ears of grain and maize leaves	08119100	Ton	249.91	103121
6. Maize for animal feeding	04811600	Ton	6194.31	2692489
7. Other vegetables products for animal feed N.E.S.	08119900	Ton	5671.08	2668626
8. Rice bran	08120100	Ton	868.84	271813
9. Other brans sharps etc. of sifting milling or legumes	08120900	Ton	1205.36	609962
10. Oil cake of coconuts	08130100	Ton	32.08	12098
11. Oil cake of groundnuts	08130200	Ton	14.67	9873
12. Oil cake of soya beans	08130300	Ton	50.80	39936
13. Oil cake and other residues or vegetables oil excl.drugs	08130900	Ton	28.92	13064
14. Prawn dust	08140100	Ton	11.36	5620
15. Fish meal	08140200	Ton	71.98	75866
16. Meat meal	08140300	Ton	30.82	26623
17. Greaves	08140400	Ton		
18. Flour meals of meat and offals	08140800	Ton	.45	988
19. Flour meals of fish crustacea etc.	08140900	Ton	.03	59
20. Tapioca refuse	08193100	Ton	1.24	283
21. Sago refuse	08193200	Ton	1.19	90
22. Other beet pulp bagasse dregs and waste residues	08193900	Ton	1.26	704
23. Sweetened forage and other preps for animal feed	08199000	Ton	39266.21	21399391

Source: Department of Statistics

APPENDIX XII

EXPORTS OF LIVESTOCK AND POULTRY 1972 - 1976

Types	Buffalo		Cattle		Goats		Other Animals		Poultry Live	
	No.	\$	No	\$	No	\$	No	\$	No	\$
1972	662	442,700	3	1,200	129	3,085	1,750	45,015	11	180
1973	1,416	720,080	25	11,400	108	3,431	1,184	63,730	9,303	8,285
1974	-	-	-	-	-	-	752	13,330	7,783	6,155
1975	50	23,000	-	-	22	1,600	154	4,960	4,911	5,612
1976	263	171,400	-	-	-	-	327	10,904	11,609	9,840

Source: Department of Statistics

EXPORTS OF ANIMAL HIDES 1972 - 1976

Types Year	Buffalo hides undressed		Cattle hides undressed		Other hides and skins incl. crocodiles skins	
	Cwt.	\$	Cwt.	\$	Cwt.	\$
1972	2,303.15	98,932	167.40	4,442	28.72	19,772
1973	2,167.49	103,282	21.73	948	36.40	52,388
1974	1,376.96	98,014	229.58	11,952	28.55	40,022
1975	1,578.11	95,216	-	-	31.29	20,240
1976	1,522.03	80,585	10.00	710	31.15	28,751

Source: Department of Statistics.

## AVERAGE RETAIL PRICES OF SELECTED AGRICULTURAL COMMODITIES FOR 1976

Commodities	Unit	Reporting Centres													Kunak	
		Kota Kinabalu	Penampand	Papay	Iuaran	Kota Belud	Ranau	Kudat	Labuan	Beaufort	Keningau	Tenom	Sandakan	Tawau		Lahad Datu
<b>Meat, Poultry &amp; Egg</b>																
1. Beef (Sepi)	\$/kty	\$5.37	-	-	\$4.80	\$5.85	\$3.72	\$5.48	\$5.64	\$5.00	\$3.58	\$4.00	\$5.00	\$6.00	\$4.19	\$4.50
2. Beef (Kerbau)	\$/kty	\$5.33	\$4.50	\$4.20	\$4.85	\$4.93	\$3.70	\$5.05	\$5.03	\$3.90	\$3.57	\$4.00	\$5.00	\$6.00	\$4.24	-
3. Pork I	\$/kty	\$5.19	\$5.00	\$5.12	\$4.69	-	\$3.19	\$4.65	\$8.05	\$4.09	\$4.14	\$4.00	\$5.27	\$4.50	\$5.25	\$4.66
4. Pork II	\$/kty	\$4.60	\$3.35	\$3.37	\$4.09	-	\$3.60	\$4.12	\$4.90	-	\$3.83	\$3.73	-	\$3.70	\$4.40	\$4.08
5. Hen	\$/kty	\$3.20	\$3.03	\$2.62	\$3.10	\$2.94	\$3.48	\$2.88	\$2.88	\$3.47	\$3.68	\$3.60	\$3.27	\$2.80	\$3.45	\$2.90
6. Cock	\$/kty	\$2.93	\$2.48	\$2.40	\$2.87	\$2.80	\$3.48	\$2.70	\$2.72	\$2.99	\$3.49	\$3.07	\$2.70	\$2.54	\$3.20	\$2.74
7. Kg. Poultry	\$/kty	\$2.99	\$2.95	\$2.92	\$2.92	\$2.88	\$3.49	\$2.60	\$2.75	\$3.30	\$3.20	\$2.98	\$3.13	-	-	\$2.80
8. Egg	\$/each	\$0.26	\$0.26	\$0.27	\$0.26	\$0.30	\$0.29	\$0.28	\$0.25	\$0.27	\$0.35	\$0.28	\$0.28	\$0.28	\$0.28	\$0.35
<b>Fish</b>																
9. Fish I	\$/kty	\$2.75	\$2.88	\$2.33	\$2.55	\$1.92	\$2.54	\$2.28	\$2.50	\$1.99	\$2.40	\$2.70	\$2.58	\$2.40	\$1.79	\$1.16
10. Fish II	\$/kty	\$2.37	\$1.60	\$1.37	\$2.08	\$1.22	\$1.80	\$1.58	\$1.92	-	\$1.73	\$1.80	-	\$1.70	\$1.35	\$0.90
<b>Leafy Vegetable</b>																
11. Green Vegetable	\$/kty	\$1.25	\$0.89	\$0.83	\$1.10	\$0.74	\$0.89	\$0.87	\$1.35	\$1.10	\$0.84	\$0.66	\$0.98	\$0.99	\$0.97	\$1.30
12. Kang Kong	\$/kty	\$0.65	\$0.40	\$0.49	\$0.56	\$0.39	\$0.47	\$0.49	\$0.43	\$0.44	\$0.50	\$0.43	\$0.73	\$0.60	\$0.50	\$0.50
13. Bayam	\$/kty	\$0.64	\$0.53	\$0.47	\$0.55	\$0.40	\$0.50	\$0.47	\$0.43	\$0.48	\$0.50	\$0.40	\$0.70	\$0.59	\$0.48	\$0.54
14. Chinese Cabbage	\$/kty	\$1.06	\$0.92	\$1.10	\$0.95	\$0.83	\$0.73	\$1.02	\$1.64	\$1.20	\$1.20	\$1.12	\$1.06	\$1.75	\$2.10	\$2.13
15. Cabbage	\$/kty	\$0.80	\$0.88	\$0.75	\$0.69	\$0.70	\$0.64	\$0.70	\$1.14	\$0.92	\$0.75	\$0.72	\$0.76	\$1.40	\$1.53	\$2.04
<b>Non-Leafy Vegetable</b>																
16. Lobak Puteh	\$/kty	\$1.20	\$0.62	\$0.73	\$0.92	\$0.64	\$0.49	\$0.90	\$1.35	\$0.77	\$0.66	\$0.40	\$0.83	\$1.04	\$1.43	\$1.28
17. Lobak Merah	\$/kty	\$1.30	\$1.55	-	\$1.30	\$0.50	\$1.00	\$1.48	\$2.30	\$1.70	-	-	\$1.98	\$2.79	\$1.89	\$1.20
18. Sayor Manis	\$/kty	\$0.69	\$0.40	\$0.49	\$0.63	\$0.39	\$0.65	\$0.50	\$0.52	\$0.45	\$0.67	\$0.47	\$0.98	\$0.58	\$0.52	\$0.50
19. Bitter Gourd	\$/kty	\$1.40	\$1.30	\$0.98	\$1.15	\$0.93	\$1.52	\$1.10	\$1.35	\$1.28	\$1.36	\$0.97	\$1.15	\$1.43	\$1.58	\$1.20
20. Green Capsicum	\$/kty	\$1.76	\$1.25	\$1.37	\$1.58	\$1.00	\$1.08	\$1.53	\$2.23	\$1.30	\$0.64	\$0.75	\$1.63	\$2.92	\$2.35	-
21. Red Capsicum	\$/kty	\$1.30	-	\$1.80	\$0.65	-	-	\$1.25	\$0.59	\$1.33	\$0.65	\$0.98	\$2.50	\$1.00	\$1.82	-
22. Tomato (big)	\$/kty	\$1.13	\$0.89	\$1.20	\$1.03	\$1.05	\$0.83	\$1.08	\$2.10	\$1.39	\$0.82	\$0.76	\$1.50	\$2.92	\$2.18	\$1.44
23. Tomato (small)	\$/kty	\$0.90	\$1.00	\$1.04	\$0.77	\$0.75	-	\$1.03	\$1.29	\$1.10	\$0.60	\$0.58	\$1.40	\$1.00	\$1.80	\$1.40

(Cont'd)

## AVERAGE RETAIL PRICES OF SELECTED AGRICULTURAL COMMODITIES FOR 1976

Commodities	Unit	Reporting Centres										Lahad Datu	Kunak			
		Kota Kinabalu	Penampang	Papar	Tuaran	Kota Belud	Ranau	Kudat	Labuan	Beaufort	Keningau			Tenom	Sandakan	Tawau
24. Cucumber	\$/kty	\$0.67	\$0.80	\$0.70	\$0.54	\$1.00	\$0.74	\$0.74	\$0.98	\$0.56	\$0.89	\$0.38	\$0.48	\$0.58	\$0.82	\$1.00
25. Long Bean	\$/kty	\$1.27	\$1.09	\$1.04	\$1.15	\$0.57	\$0.65	\$0.65	\$1.15	\$0.80	\$0.97	\$0.50	\$0.80	\$0.20/B	\$1.08	\$0.30/B
26. French Bean	\$/kty	\$0.92	\$1.12	\$1.22	\$0.78	\$1.03	\$0.94	\$1.10	\$1.74	\$0.90	\$0.60	\$0.68	\$1.03	\$0.20/B	\$1.20	\$0.30/B
27. Brinjal	\$/kty	\$0.78	\$0.65	\$0.74	\$0.72	\$0.50	\$0.50	\$0.60	\$1.05	\$0.52	\$0.60	\$0.28	\$0.60	\$0.30/B	\$0.40	\$0.20/B
28. Groundnut (unshelled)	\$/kty	\$1.39	\$1.40	\$1.10	\$1.39	\$0.23	\$1.60	\$0.80	\$1.07	\$1.30	\$0.53	-	\$1.03	\$1.54	\$1.02	\$1.00
29. Yam	\$/kty	\$0.74	\$0.50	\$0.85	\$0.62	\$0.50	\$0.37	\$0.76	\$1.16	\$0.73	\$0.65	\$0.53	\$0.93	\$1.50	\$0.94	\$0.90
30. Sweet Potato	\$/kty	\$0.70	\$0.60	\$0.43	\$0.63	\$0.50	\$0.37	\$0.85	\$0.74	\$0.68	\$0.53	\$0.25	\$0.40	\$0.50	\$0.50	\$0.30
31. Potato	\$/kty	\$1.00	\$1.00	\$0.95	\$0.94	\$1.14	\$1.14	\$1.10	\$0.80	\$1.12	\$1.00	\$1.00	\$0.96	\$1.00	\$1.10	\$1.63
32. Onion	\$/kty	\$1.34	\$1.05	\$0.94	\$1.23	\$1.40	\$1.42	\$1.45	\$1.13	\$1.20	\$1.18	\$1.00	\$1.10	\$1.28	\$1.09	\$1.54
33. Small Onion	\$/kty	\$1.85	\$1.26	\$1.57	\$1.85	\$2.37	\$1.49	\$2.05	\$1.50	\$1.43	\$1.38	\$1.45	\$1.34	\$1.80	\$1.30	\$1.66
Fruits & Others																
34. Jagong (Fresh)	\$/Pcs.	\$1.00/7	\$1.00/8	\$1.00/12	\$1.00/7	\$1.00/10	\$1.00/9	\$1.20/12	-	\$1.00/5	\$0.28	-	\$1.00/10	\$1.00/12	\$1.00/5	\$1.00/9
35. Tapioca	\$/kty	\$0.60	\$0.50	\$0.29	\$0.56	\$0.50	\$0.36	\$0.37	\$0.37	\$0.84	\$0.45	-	\$0.29	\$0.20	\$0.40	\$0.30
36. Papaya	\$/kty	\$0.57	\$0.38	\$0.49	\$0.50	\$0.50	\$0.40	\$0.75	\$0.65	\$0.52	\$0.43	\$0.26	\$1.34	\$0.30	\$0.95	\$1.00/1
37. Pineapple	\$/kty	\$0.54	\$0.50	\$0.40	\$0.44	\$0.94	\$0.40	\$0.63	\$0.52	\$0.46	\$0.70	\$0.29	\$1.60	\$0.47	\$1.20	\$1.00/1
38. Banana	\$/kty	\$0.20/4	\$0.20/5	\$0.20/4	\$0.20/5	\$0.68	\$0.20/4	\$0.20/5	\$0.47	\$0.10/4	\$0.10/5	\$0.10/4	\$0.10/2	\$0.10/4	\$0.10/3	\$0.10/3
39. Sweet Orange	\$/kty	\$1.79	\$1.65	\$1.52	\$1.57	\$0.20/1	\$1.00/8	\$1.65	\$1.50	\$1.34	\$0.20/1	\$1.07	\$1.90	\$0.77/1	\$0.73/1	\$1.58
40. Local Rice	\$/Gtg.	\$4.00	\$3.85	\$3.80	\$3.90	\$3.87	\$4.68	\$3.77	-	\$4.03	\$3.60	\$3.93	\$4.74	-	-	\$4.93

Source: Department of Agriculture

## APPENDIX XV

QUARANTINE OF ANIMALS AT ANIMAL  
QUARANTINE STATION LIKAS

Species	No	Country of origin	Date admitted	Date discharged
Cat	1	Hongkong	24. 8.75	19. 2.76
Dogs	2	Hongkong	29.10.75	5. 3.76
Dog	1	Kuala Lumpur	18.11.75	4. 6.76
Pigs	5	Australia	19. 2.76	21. 4.76
Pigs	6	Australia	13. 3.76	21. 4. 76
Dogs	2	Singapore	22. 3.76	22. 9.76
Cats	2	Hongkong	17.7.76	2.10.76
Dogs	1	Kuala Lumpur	20.7.76	20.1. 77
Pigs	7	United Kingdom	1. 8.76	20.11.76
Dogs	2	Kuala Lumpur	14. 9.76	14.3. 77
Dogs	2	Singapore	25.10.76	24.4. 77

Total: Pigs - 18  
Dogs - 10  
Cats - 3

Source: Department of Veterinary Services and Animal Industry

## VACCINATIONS

SPECIES DISTRICTS	POULTRY			HAEMORRHAGIC SEPTICAEMIA			PIG	DOG	CAT	
	'F' STRAIN RANIKHET	'S' STRAIN RANIKHET	FOWL POX	BUFFALO	CATTLE	GOAT				PIG SWINE FEVER
BEAUFORT	8,879	21,612	5,448	1,031	-	-	-	-	-	
SIPITANG	1,760	4,391	1,620	312	126	-	-	-	-	
KUALA PENYU	100	245	-	861	-	-	-	-	-	
TAMAU	135,430	379,820	420,587	-	-	-	-	-	-	
SEMPORNA	-	5,259	6,456	-	-	-	-	-	-	
LAHAD DATU	56,276	72,002	95,923	-	-	-	-	-	-	
SANDAKAN	148,654	152,819	282,219	181	-	-	-	21	-	
KUDAT	5,445	13,325	-	598	-	-	-	-	-	
KOTA BELUD	1,050	4,274	2,114	5,537	6	-	-	-	-	
RANAU	859	20,111	3,615	1,936	237	93	468	-	-	
TAMBUNAN	-	12,106	1,382	2,934	-	-	-	-	-	
KENINGAU	6,868	19,747	12,698	2,263	-	-	-	-	-	
TENOM	-	16,208	5,296	848	216	-	-	-	-	
PAPAR	149,960	47,885	24,439	6,118	-	-	-	-	-	
KOTA KINABALU	366,688	413,467	240,027	1,014	-	-	173	340	4	
PENAMPANG	3,508	18,411	9,506	763	-	-	-	-	-	
TUARAN	64,019	54,164	79,473	2,957	-	-	-	-	-	
LABUAN	6,440	56,116	30,428	-	-	-	-	-	-	
TOTAL	9,545,067	1,311,962	1,221,231	27,353	585	93	468	173	361	4

Source: Department of Veterinary Services and Animal Industry



## CLINICAL CASES

DISTRICTS	SPECIES	PONY	BUFFALO	CATTLE	PIG	GOAT	DOG	CAT	POULTRY	OTHERS
BEAUFORT		5	220	94	305	96	118	1	10,796	-
SIPITANG		-	89	105	53	18	-	-	5,191	-
KUALA PENYU		-	49	-	345	7	1	-	859	-
TAWAU		2	6	169	628	88	448	41	18,276	-
SEMPORNA		-	5	75	33	17	12	2	476	-
LAHAD DATU		-	14	72	37	21	103	2	5,983	-
SANDAKAN		-	24	47	297	162	361	33	183	6
KUDAT		1	218	169	953	59	77	3	14,849	-
KOTA BELUD		407	847	213	124	150	74	-	23,204	-
RANAU		2	358	69	103	13	9	-	24,923	6
TAMBUNAN		-	58	-	-	-	1	3	719	1
KENINGAU		9	166	41	247	10	72	1	11,159	-
TENOM		-	148	153	601	24	33	-	2,567	-
PAPAR		-	155	5	1,854	20	93	13	7,698	-
KOTA KINABALU		15	257	-	117	8	1955	228	70,834	450
PENAMPANG		3	352	-	1,172	22	36	3	3,606	3
TUARAN		5	182	8	3,262	51	13	13	16,025	-
LABUAN		-	73	9	365	19	272	30	2,295	7
TOTAL		449	3221	1229	10,496	785	3677	372	219,643	473

Source: Department of Veterinary Services and Animal Industry

## APPENDIX XVIII

## ANIMALS TREATED FOR EXTERNAL PARASITES

SPECIES DISTRICTS	PONY	BUFFALO	CATTLE	PIG	GOAT	DOG	CAT	POULTRY	OTHERS
BEAUFORT		122	72	18	15	56	-	54	-
SIPITANG		64	72	3	1	-	-	50	-
KUALA PENYU		2	-	-	-	-	-	-	-
TAWAU		7	260	220	19	169	4	-	-
SEMPORNA		-	143	5	-	13	-	-	-
LAHAD DATU		2	262	-	-	36	-	501	-
SANDAKAN		19	70	-	33	109	-	-	-
KUDAT		40	17	5	3	34	-	53	-
KOTA BELUD	507	1347	96	30	-	8	-	-	-
RANAU		574	241	25	-	13	-	2,597	-
TAMBUNAN		605	-	17	-	3	3	25	-
KENINGAU	14	241	509	29	4	540	1	1,046	2
TENOM	-	50	127	164	1	68	-	1,525	-
PAPAR	1	139	16	345	20	63	5	582	-
KOTA KINABALU	1	39	21	8	-	690	5	-	-
PENAMPANG	1	66	-	48	-	35	-	14	-
TUARAN	-	-	-	-	-	-	-	-	-
LABUAN	-	1	-	-	-	113	1	5	-
TOTAL	524	3,318	1,906	917	96	2,046	19	6,452	2

Source: Department of Veterinary Services and Animal Industry

## APPENDIX XIX

## DEWORMING

Species Districts	Pony	Buffalo	Cattle	Pig	Goat	Dog	Cat	Poultry	Others
Beaufort	21	380	352	794	408	27	-	4,487	-
Sipitang	-	104	150	313	44	-	-	3,105	-
Kuala Penyu	-	212	-	1,769	7	-	-	268	-
Tawau	-	2	303	333	40	176	7	5,296	-
Semporna	-	2	60	4	11	7	-	100	-
Lahad Datu	-	5	74	60	13	43	-	1,713	-
Sandakan	-	46	117	-	554	96	3	400	6
Kudat	-	230	357	1,862	50	49	-	800	-
Kota Belud	253	1,499	146	603	33	14	-	10,884	-
Ranau	-	755	266	502	163	7	-	8,924	99
Tambunan	-	580	4	230	9	8	-	598	-
Keningau	27	236	158	358	33	52	-	4,142	2
Tenom	-	171	253	838	12	6	-	979	180
Papar	1	457	21	1,524	76	18	1	2,245	-
Kota Kinabalu	32	1,065	-	178	-	518	16	590	1
Penampang	-	223	-	2,154	8	9	1	508	-
Tuaran	1	590	12	1,389	93	57	-	6,416	-
Labuan	-	106	49	952	442	34	4	-	-
<b>TOTAL</b>	<b>334</b>	<b>6,663</b>	<b>2,322</b>	<b>13,863</b>	<b>1,996</b>	<b>1,121</b>	<b>32</b>	<b>51,455</b>	<b>287</b>

Source: Department of Veterinary Services and Animal Industry

Laboratory Report - I  
(Parasitology)

Appendix XX

Parasites Species	Pony	Buff	Cattle	Pig	Goat	Sheep	Dog	Cat	Poultry
Demodex canis							23		
Fungus							30	3	
Fleas							2	4	
Ancylostoma caninum							67	1	
Toxocara canis							14		
Trichuris vulpis							2		
Toxascaris leonina							1		
Isospora spp.							2		
Dirofilaria immitis							6		
Dipylidium caninum							4		
Coccidia occysts			9	5	1				16
Capillaria spp.									5
Tetrameres spp.									3
Mite ova				17					1
Ascaridia galli									6
Heterakis gallinarum									3
Acuaria hamulosa									1
Oxyspirura mansoni									1
Raillietina spp.									2
Moniezia spp.			8		1	2			
Hydatid cyst			3						
Cooperia pectinate			13						
Haemonchus contortus			24		5	4			
Dictyocaulus viviparus			5						
Trichuris ovis		2	18		1				
Strongyloides spp.	5	2	23	3	3	1			
Paramphistomum		1							
Neoscaris vitulorum		1	1						
Trichuris suis				3					
Asearops strongylina				2					
Oesophagostomum spp.			7	2	1				
Phyocephalus spp.				1					

Appendix XX

Parasites	Species	Pony	Buff	Cattle	Pig	Goat	Sheep	Dog	Cat	Poultry
	<i>Haematopinus suis</i>				1					
	<i>Parascaris equorum</i>	1								
	<i>Anoplocephala perfoliata</i>	1								
	<i>Triodontophorus</i> spp.	1								
	<i>Trichonema</i> spp.	2								
	<i>Strongylus vulgaris</i>	10								
	<i>Bunostomum</i> spp.			3		1				
	Negative findings	2	4	160	7	2	1	11	5	17
	<b>Total</b>	<b>22</b>	<b>10</b>	<b>274</b>	<b>41</b>	<b>15</b>	<b>10</b>	<b>162</b>	<b>13</b>	<b>55</b>

Source: Department of Veterinary Services and Animal Industry



## SURGICAL CASES

SPECIES DISTRICTS	PONY	BUFFALO	CATTLE	PIG	GOAT	DOG	CAT	POULTRY	OTHERS
BEAUFORT	-	2	7	4	1	1	-	-	-
SIPITANG	-	-	1	-	-	-	-	-	-
KUALA PENYU	-	-	-	-	-	-	-	-	-
TAWAU	-	-	5	5	-	16	2	-	-
SEMPORNA	-	-	-	-	-	-	-	-	-
LAHAD DATU	-	-	-	-	-	1	-	-	-
SANDAKAN	-	26	53	3	7	164	8	2	1
KUDAT	-	37	87	8	19	-	-	3	-
KOTA BELUD	-	-	-	-	-	-	-	-	-
RANAU	-	49	-	46	-	4	1	3	-
TAMBUNAN	-	140	10	21	3	-	-	-	-
KENINGAU	4	35	49	1	7	30	3	7	1
TENOM	-	1	2	3	-	2	-	-	-
PAPAR	-	2	-	-	-	-	-	-	-
KOTA KINABALU	-	7	2	5	-	87	9	-	3
PENAMPANG	-	8	-	3	-	-	-	1	-
TUARAN	-	46	-	82	2	6	-	-	-
LABUAN	-	4	-	7	3	3	4	1	-
<b>TOTAL</b>	<b>4</b>	<b>357</b>	<b>216</b>	<b>188</b>	<b>42</b>	<b>314</b>	<b>27</b>	<b>17</b>	<b>5</b>

Source: Department of Veterinary Services and Animal Industry

## CASTRATION

DISTRICTS	SPECIES							
	BUFFALO	CATTLE	PIG	GOAT	DOG	CAT	POULTRY	OTHERS
BEAUFORT	-	2	39	2	2	1	-	-
KUALA PENYU	-	-	2	-	3	-	-	-
SIPITANG	-	-	-	-	-	-	-	-
TAWAU	-	-	13	-	8	5	-	-
SEMPORNA	-	-	-	-	-	-	-	-
LAHAD DATU	-	-	4	1	4	1	-	-
SANDAKAN	4	6	5	1	18	13	-	1
KUDAT	-	-	-	-	-	-	-	-
KOTA BELUD	-	-	-	-	-	-	-	-
RANAU	-	-	40	-	4	1	-	-
TAMBUNAN	-	-	20	-	1	-	-	-
KENINGAU	-	-	65	-	-	-	-	-
TENOM	1	5	16	3	5	1	-	-
PAPAR	64	-	196	3	2	2	-	-
KOTA KINABALU	-	-	38	-	37	41	-	-
PENAMPANG	1	-	61	-	2	-	208	-
TUARAN	-	-	106	-	1	2	-	-
LABUAN	-	-	87	-	13	3	-	-
TOTAL	70	13	692	10	100	70	208	1

Source: Department of Veterinary Services and Animal Industry



## SPAYING

SPECIES DISTRICTS	PIG	GOAT	DOG	CAT	OTHERS
BEAUFORT	3				
KUALA PENYU					
SIPI TANG					
TAWAU			4	5	
SEMPORNA					
LAHAD DATU			4	1	
SANDAKAN			21	13	
KUDAT	3				
KOTA BELUD	-	-	-	-	-
RANAU	6				
TAMBUNAN	8				
KENINGAU	31	2			
TENOM	18				
PAPAR	15		1		
KOTA KINABALU	19		39	41	
PENAMPANG	10				
TUARAN					
LABUAN			5	5	
TOTAL	113	2	74	65	NIL

Source: Department of Veterinary Services and Animal Industry

REVENUE RETURN FOR 1976

DISTRICT	VET FEES S00 0113 0102	SALE OF LIVESTOCK S00 0110 0106	TOTAL
Papar	\$ 1,178.80	\$ 2,093.30	\$ 3,272.10
Beaufort	1,077.65	5,605.85	6,683.50
Kuala Penyu	51.00	84.78	135.78
Tuaran	1,512.80	58,372.70	59,885.50
Labuan	4,057.40	-	4,057.40
Keningau	2,455.80	26,586.85	29,042.65
Tenom	1,296.65	8,223.80	9,520.45
Tambunan	95.20	464.00	559.20
Kepayan	97,824.78	3,498.05	101,322.83
Kudat	1,232.87	14,773.83	16,006.70
Kota Marudu	53.15	4,752.80	4,805.95
Tawau	65,582.07	35,574.15	101,156.22
Sandakan	39,112.35	76.00	39,188.35
Likas	-	52,301.85	52,301.85
Semporna	1,535.00	31.00	1,566.00
Lahad Datu	5,076.80	4,331.60	9,408.40
Ranau	174.65	4,777.00	4,951.65
<b>TOTAL</b>	<b>\$222,316.97</b>	<b>\$221,547.56</b>	<b>\$433,864.53</b>

Source: Department of Veterinary Services and Animal Industry

APPENDIX SUMMARY OF GRAZING RECORD FOR 1976 at SEBRANG

Pkt	Acreage	Pasture	Nitro		Compound		GRRP		OCH		Total Cows day	Cow/acre	Remark
			Rate	Total	Rate	Total	Rate	Total	Rate	Total			
1	50	Brachiaria									-	-	No Record
2A	6.4	Maize			204	1305					-	-	Plough up in March
2A2	0.8	Guinea									-	-	No record
2A1A	1.7	Sugarcane									-	-	No record
2A1B	1.6	Napier/Splendida									-	-	Nursery
2B	10.8	Stylo/rough			754	3619			880	9504	-	-	Plough up in March
3	4.8	Napier									-	-	Plough up in March
4	4.2	Napier									-	-	No record
5	-	-									-	-	Holding paddock
6	3.9	Brachiaria									-	-	No record
7	15.5	Stylo/lalang									1700	0.65	No grazing after July
8A1	6.3	Brachiaria									2022	1.77	No grazing before May
8A2	10.8	Setaria/Stylo									4493	1.13	
8A3	5.0	Brachiaria									473	1.04	No grazing after June
8B1	7.0	Maize			1254	8778					-	-	Plough up in February
8B2A	7.1	Brachiaria/Stylo									266	1.42	
8B2B	7.0	Guinea/Stylo									197	2.49	
9	4.7	Brachiaria									69	374	
10	3.7	Maize	176	651			424	3010			266	1.42	Plough up in February
11	4.3	Brachiaria									133	841	
12	4.7	Napier	528	2481	330	1551					-	-	
13	5.4	Napier	1018	5497							-	-	
14	6.8	Brachiaria									167	2822	
15	4.7	Brachiaria									-	-	
16	5.8	Maize									492	-	
17	7.2	Maize			1254	7273	528	3901			-	-	Plough up in February
17A	2.0	Sugarcane									-	-	Plough up in March
19A	10.5	Setaria/Stylo					352	3696	220	2310	311	2019	No grazing
19B	7.4	Setaria/Stylo					176	1302	110	814	144	962	
19C	7.4	Setaria/Stylo							220	1628	244	3900	
19D	10.5	Setaria/Stylo							110	1155	355	3824	
21A	9.0	Brachiaria/Stylo							220	1980	269	2510	
21B	9.0	Setaria/Stylo					528	4224	110	890	-	319	Plough up
21C	7.0	Setaria/Stylo									366	3102	
21D	15.0	Stylo/rough					160	2400	176	2640	263	1257	
21E	7.0	Plicatulum/Stylo							220	1540	303	3067	
22	8.1	Brachiaria									147	688	
23A	10.6	Setaria/Stylo							440	4664	261	5492	No grazing after June
23B	8.9	Setaria/Stylo							440	3916			
24A	16.0	Stylo/lalang					176	2816			350	4401	
24B	18.0	Stylo/Lalang					176	3168	264	4752	168	1472	

## ANNUAL REPORT ROSOK 1976

With the completion of the development in the Second Malaysia Plan, Rosok farm lost its individuality, and was combined with Timbang Manggaris, as Block II. At the start of the Third Malaysia Plan funds were extremely limited and this was a check on the development.

There was a turn over of staff, and change of Manager in the middle of the year.

Although the total rainfall was lower than the average, there was no serious drought situation.

### Rainfall

Rainfall figures for the year, were as follows:

TABLE I

	<u>Inches</u>	<u>Wet Days</u>	<u>Rain Factor</u>
January	8.98	18	42
February	4.08	11	25
March	3.65	8	21
April	7.08	10	32
May	8.52	11	38
June	5.97	12	37
July	7.70	9	33
August	9.68	14	38
September	5.88	12	35
October	12.85	19	61
November	11.40	13	51
December	6.93	15	40
Total	<u>92.72</u>	<u>152</u>	<u>        </u>

Rainfall figures since records began are as follows:-

TABLE II

	<u>Total Rainfall</u>	<u>Wet Days</u>
1972	84.49	133
1973	128.73	164
1974	158.38	197
1975	157.06	164
1976	<u>92.72</u>	<u>152</u>
Mean	<u>124.28</u>	<u>162</u>

#### CATTLE

The effect of the introduction of breeding season in 1974/1975 was apparent from the calving figures for 1976. Although there was an increase in the breeding herd of 22, over 1975, there was a drop in calvings of 8. The calving pattern however was changed as shown by the figures in Table III.

TABLE III

Monthly Calving

	<u>1975</u>	<u>1976</u>			Total	Live Calves
		Male	Female	Dystokia/ Died		
January	17	-	-	-	-	-
February	18	-	2	-	2	2
March	18	11	13	4	28	24
April	16	24	15	1	40	39
May	15	2	3	-	5	5
June	11	-	1	-	1	1
July	15	-	-	-	-	-
August	6	10	12	-	22	22
September	9	12	21	1	34	33
October	10	3	6	-	9	9
November	10	4	5	1	10	9
December	8	-	-	-	-	-
<b>Total</b>	<b>153</b>	<b>66</b>	<b>78</b>	<b>7</b>	<b>151</b>	<b>144</b>

There were a few 'wild' matings outside the breeding seasons, (Nov-Feb and May-July) when bulls broke through the fences.



## BIRTHS AND BREEDING

There was a total of 144 calves born alive on the farm in 1976, 66 male and 78 female. There were 6 cases of dystokia, where the calf dies, 3 in the cows, and 3 in the heifers. One calf was born alive, but died shortly after birth. No animals calved twice during the year.

The pure bred Brahman bulls imported from USA in November, 1971 had been used on the farm as stud bulls since that date. Problems of breeding these bulls to their offspring could arise. To avoid this, and also to introduce new genetic stock, the stud bulls were exchanged with the American Brahman bulls from Sebrang, before the May breeding season, and the pure Santa bull from Sebrang was also brought into the herd at the same time.

The breeding performance of the herd is shown in Table V.



TABLE V

	No.	Live Calves	Calving %	Male	Female	Dead/ Dystokia	Total Pregnant	Pregnancy %	Barren	Calves Weaned	Weaning %	Calving Interval			
												n	x̄	sd	
<b>Cows</b>															
Angus	12	6	50.0	-	6		6	50.0	6	4	33.3	6	525.0	205.5	
3/4 AA	15	13	86.7	8	5	1	14	93.3	1	13	86.7	14	437.4	86.3	
Cross AA	40	34	85.0	17	17	-	34	85.0	6	33	82.5	34	408.5	75.7	
Local	18	14	77.8	4	10	-	14	77.8	4	14	77.8	14	388.2	47.5	
Brahman	34	21	61.8	8	13	2	23	67.6	11	19	55.9	23	420.7	77.8	
1/2 Brahman	6	2	33.3	1	1	-	2	33.3	4	2	33.3	2	393.0	40.0	
S. Gertrudis	15	12	80.0	8	4	-	12	80.0	3	11	73.3	12	471.9	78.6	
1/2 S. Gertrudis	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
Br/Shorthorn	20	13	65.0	7	6	-	13	65.0	7	11	55.0	13	448.9	67.7	
<b>Total</b>	<b>161</b>	<b>115</b>	<b>63.5</b>	<b>53</b>	<b>62</b>	<b>3</b>	<b>118</b>	<b>73.3</b>	<b>43</b>	<b>107</b>	<b>66.5</b>	<b>118</b>	<b>428.5</b>	<b>91.4</b>	
<b>Heifers</b>															
F1 Angus	6	3	50.0	-	3	1	4	66.7	3	3	50.0				
Cross AA	1	1	100.0	1	-	1	7	100.0	-	1	100.0				
Brahman	15	10	66.7	4	6	1	11	73.3	4	9	60.0				
1/2 Brahman	16	4	25.0	2	2	1	5	31.3	11	4	25.0				
Santa G.	6	3	50.0	-	3	-	3	50.0	3	3	50.0				
1/2 Santa	8	6	75.0	4	2	1	7	87.5	1	5	62.5				
Br/Shorthorn	3	2	66.7	1	1	-	2	66.7	1	2	66.7				
<b>Total</b>	<b>55</b>	<b>29</b>	<b>52.7</b>	<b>12</b>	<b>17</b>	<b>4</b>	<b>33</b>	<b>60.0</b>	<b>22</b>	<b>27</b>	<b>49.1</b>				
<b>Grand Total</b>	<b>216</b>	<b>144</b>	<b>66.7</b>	<b>65</b>	<b>79</b>	<b>7</b>	<b>151</b>	<b>69.0</b>	<b>65</b>	<b>134</b>	<b>62.0</b>				

The breeding performance, with a pregnancy percentage of 69.9%, is poor and considerably lower than 1975 (91-54%). However the introduction of the restricted breeding season is largely responsible for this. There were 9 neonatal deaths, mainly due to malnutrition and poor mothering, 4 female and 5 male calves. It is noted that these were all contained a high proportion of imported blood, 2 were pure Brahman, 1 pure Santa, 2 from Brahman/Shorthorn, 2 from pure Angus, and the other 2 cross Santa, and 3/4 respectively. This shows the value of the indigenous blood content, in giving calf resistance to challenge by environmental and tick factors.

The weaning percentage at 62.0% was low, compared to 1975(72.2%) although calf mortality was lower.

#### MORTALITY

There was a total mortality of 26 head, which from a total population of 509, gives a figure of 5.14%. The majority of the deaths were in the old cows, and 9 of the pure bred Angus, originally imported in 1964/65, died. The distribution of the mortality is shown in Table VI.

TABLE VI

	0 - 6m		6m - 1y		1y - 2½y		Adult		Total
	M	F	M	F	M	F	M	F	
Accident	-	-	1	-	2	-	-	3	6
Malnutrition	5	4	-	-	-	-	-	-	9
Found Dead	-	-	-	-	-	1	-	-	1
Old Age	-	-	-	-	-	-	-	10	10
Total	5	4	1	-	2	1	-	13	26

Of the accidental deaths, 3 died from getting their heads stuck in the gate, 2 from falling into the river, and the last one from eating fertiliser having broken into the store.

#### GROWTH RATES

In previous years it had been noted that there was a marked drop in the growth rate following weaning, which had been carried out at 6 months of age. To try and prevent this check in the growth rate, to produce a more vigorous calf at weaning, which could better survive, the weaning was carried out at 9 months of age. This change in age of weaning, produced higher weights at 9 months of age, but the check in growth rate was still seen, but now appeared later in the life of the calf.

Due to pressure on the available grazing, the crossbred bulls, spent the greater part of the time on the lalang area, which is reflected in their growth rates, although the pure bred bulls, both Brahman and Santa Gertrudis, were on good grazing. Some supplementation was given to these, but there were problems with the supply of feed from the feed mill.

The weights for the whole herd, and within breeds, for calves born in the year 1973-76 are shown in Tables VII and VIII.

TABLE VII  
BULLS - WHOLE HERD

		BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973	$\bar{x}$	57.7	191.7	331.8	376.5	425.5	492.7	560.2	638.1	703.3
	n	58	53	51	51	49	48	47	44	39
	sd	9.6	31.8	52.4	50.3	46.5	51.7	62.4	70.4	76.1
1974	$\bar{x}$	59.8	198.9	345.5	385.6	424.6	498.3	573.8	649.9	699.7
	n	55	51	50	49	47	44	42	39	39
	sd	8.2	33.3	51.6	53.4	60.5	60.9	72.2	72.3	75.7
1975	$\bar{x}$	60.0	183.5	310.7	370.5	395.3	435.5	492.3	558.4	626.7
	n	89	78	78	78	74	63	53	46	41
	sd	8.4	27.7	48.2	59.0	62.5	64.0	71.4	77.7	89.1
1976	$\bar{x}$	65.0	179.5	304.4	403.6	411.4	446.6	492.8	563.8	680.2
	n	65	61	60	60	58	49	37	20	6
	sd	7.9	31.6	47.8	66.1	61.4	58.2	69.5	92.6	42.7

Brahman

1973	$\bar{x}$	63.1	198.9	346.2	381.9	415.4	483.9	567.5	666.7	746.4
	n	14	13	13	13	13	13	12	12	11
	sd	5.9	20.9	31.0	40.9	40.2	50.6	65.9	78.1	79.3
1974	$\bar{x}$	61.7	206.3	351.7	391.4	442.1	522.5	606.8	688.9	734.6
	n	17	15	15	14	14	14	14	14	14
	sd	6.4	22.8	38.5	45.7	47.8	47.1	56.4	65.2	65.9
1975	$\bar{x}$	58.7	203.8	341.3	397.9	437.1	497.9	574.6	647.1	737.1
	n	17	12	12	12	12	12	12	12	12
	sd	7.1	16.8	27.0	50.9	42.5	30.1	38.4	48.9	49.4
1976	$\bar{x}$	61.2	191.0	335.6	432.8	446.7	496.1	554.4	671.0	710.0
	n	12	10	9	9	9	9	9	5	2
	sd	9.9	35.1	29.0	50.4	61.8	59.9	66.8	60.9	50.0

SANTA GERTRUDIS

		BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973	$\bar{x}$	62.2	194.2	351.7	415.0	459.2	501.7	579.2	679.0	749.0
	n	6	6	6	6	6	6	6	5	5
	sd	4.6	32.1	61.5	37.0	32.7	37.0	46.9	58.7	62.2
1974	$\bar{x}$	67.6	219.2	374.2	430.8	479.2	563.3	680.0	709.2	765.8
	n	7	6	6	6	6	6	6	6	6
	sd	9.1	30.6	51.1	53.6	68.5	72.9	72.9	63.8	78.2
1975	$\bar{x}$	65.3	176.7	310.8	359.2	391.7	453.3	524.0	591.0	630.0
	n	6	6	6	6	6	6	5	5	5
	sd	6.7	28.8	40.7	34.3	40.0	31.3	39.3	54.2	52.2
1976	$\bar{x}$	64.8	170.6	300.6	411.9	427.1	458.0	510.0	543.0	705.0
	n	8	8	8	8	7	5	3	3	1
	sd	8.9	28.7	40.1	54.4	61.4	65.0	54.9	75.5	-

½ Brahman

1973	$\bar{x}$	56.8	189.4	322.2	369.2	421.5	488.8	545.8	616.3	677.1
	n	30	27	24	24	24	24	24	22	19
	sd	10.2	30.5	46.7	46.9	48.6	51.3	64.3	65.5	62.8
1974	$\bar{x}$	54.9	193.5	339.4	377.5	406.4	470.3	534.2	606.9	660.6
	n	25	24	24	24	22	20	19	16	16
	sd	7.4	38.4	57.4	51.7	52.4	46.7	56.6	40.0	43.8
1975	$\bar{x}$	58.3	177.1	297.1	363.4	384.9	413.1	469.7	528.9	590.8
	n	41	38	38	38	34	24	17	14	12
	sd	7.6	24.7	44.8	62.7	64.4	63.5	63.6	39.2	55.2
1976	$\bar{x}$	58.6	171.4	282.2	372.8	400.2	448.7	493.0	530.0	700.0
	n	25	25	25	25	24	20	15	9	1
	sd	7.3	30.7	51.0	75.0	65.7	45.4	42.0	41.6	-

½ Santa

		BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973	$\bar{x}$	53.8	222.5	390.0	413.8	447.5	505.0	591.3	630.0	682.5
	n	4	4	4	4	4	4	4	4	2
	sd	6.8	22.8	29.8	27.2	40.1	56.8	40.7	25.5	2.5
1974	$\bar{x}$	55.6	185.0	322.0	354.0	402.0	461.3	538.3	578.3	613.3
	n	5	5	5	5	5	4	3	3	3
	sd	7.5	19.0	38.2	44.4	42.0	37.3	48.4	48.4	41.1
1975	$\bar{x}$	63.5	182.3	314.3	363.0	385.0	416.5	451.5	485.5	544.3
	n	17	17	15	15	15	13	12	10	7
	sd	7.0	31.3	59.9	59.1	60.4	49.9	44.7	47.8	43.1
1976	$\bar{x}$	63.8	188.6	324.6	440.5	414.6	413.9	430.9		
	n	13	11	11	11	11	9	6		
	sd	6.6	32.1	41.4	34.9	38.1	43.2	47.2		

½ Brahman

1975	$\bar{x}$	58.8	191.4	324.3	387.9	399.3	408.6	443.3	523.8	560.0
	n	8	7	7	7	7	7	6	4	4
	sd	12.9	30.3	42.9	49.6	70.7	69.7	60.4	53.1	41.4
1976	$\bar{x}$	52.0	189.0	316.0	404.0	382.0	394.0	433.8	473.3	640.0
	n	5	5	5	5	5	5	4	3	2
	sd	6.3	20.1	34.8	47.3	54.5	47.6	66.6	84.9	-

TABLE VIII

		BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973	$\bar{x}$	53.7	176.2	306.6	359.5	403.7	473.2	549.1	630.6	709.4
	n	58	51	53	53	53	52	51	47	46
	sd	7.9	32.5	50.9	49.6	47.6	51.4	55.9	60.1	64.0
1974	$\bar{x}$	53.7	181.8	308.0	353.5	392.9	444.7	504.3	586.7	654.6
	n	48	47	47	47	47	45	42	36	35
	sd	6.8	25.9	49.3	57.2	63.2	68.6	74.6	78.9	90.1
1975	$\bar{x}$	57.4	175.8	291.1	344.1	360.1	399.3	461.6	537.3	601.4
	n	65	62	62	61	61	61	55	48	46
	sd	8.8	27.1	43.4	51.9	56.9	59.2	65.6	68.9	62.3
1976	$\bar{x}$	54.4	175.7	288.8	376.6	392.0	411.2	467.4	542.2	618.6
	n	79	75	74	74	74	71	58	25	11
	sd	8.1	28.0	46.8	64.7	61.2	55.3	64.4	88.6	63.0

## Brahman

1973	$\bar{x}$	55.9	202.9	347.0	384.7	424.3	493.6	567.9	634.6	715.8
	n	15	14	15	15	15	14	14	13	13
	sd	8.6	27.7	31.6	31.6	31.7	36.0	41.7	45.2	54.9
1974	$\bar{x}$	55.8	188.2	313.2	355.0	375.5	419.6	470.9	544.1	601.4
	n	11	11	11	11	11	11	11	11	11
	sd	6.0	30.4	74.9	81.8	78.6	88.3	99.4	83.3	99.9
1975	$\bar{x}$	57.6	185.0	311.3	361.8	371.1	406.1	467.5	532.9	608.9
	n	155	15	15	14	14	14	14	14	14
	sd	8.1	26.1	37.5	48.6	66.2	69.9	67.1	71.0	65.8
1976	$\bar{x}$	56.4	185.8	305.3	402.9	411.1	426.1	481.8	594.3	712.5
	n	19	19	19	19	19	19	14	7	2
	sd	6.0	24.3	44.6	71.6	65.5	53.3	67.0	80.2	52.5



Santa Gertrudis

	BW	3m	6m	9m	1y	1½	1¾	1 3/4	2y
1973 $\bar{x}$	55.4	172.1	304.3	382.1	422.1	492.9	577.1	677.1	757.9
n	7	7	7	7	7	7	7	7	7
sd	10.3	33.9	44.3	31.6	26.8	40.5	49.2	38.5	53.4
1974 $\bar{x}$	49.5	175.0	302.5	355.0	367.5	392.5	432.5	545.0	555.0
n	2	2	2	2	2	2	2	2	2
sd	8.5	10.0	27.5	65.0	47.5	32.5	47.5	50.0	40.0
1975 $\bar{x}$	64.1	166.9	279.4	333.8	341.9	361.9	416.3	485.0	548.8
n	8	8	8	8	8	8	8	8	8
sd	8.3	29.6	47.6	56.2	62.5	58.9	69.9	75.4	64.0
1976 $\bar{x}$	53.4	182.5	298.3	410.8	415.0	399.2	439.0	495.0	607.5
n	7	6	6	6	6	6	5	3	2
sd	3.2	24.3	31.4	45.0	51.6	65.8	83.3	90.1	72.5

½ Brahman

1973 $\bar{x}$	51.2	163.4	186.7	345.0	394.1	464.1	538.6	620.3	695.8
n	28	22	23	23	23	23	22	19	19
sd	6.6	21.0	39.0	48.0	46.0	49.9	55.3	62.1	69.0
1974 $\bar{x}$	53.0	178.7	306.2	353.6	397.3	459.8	534.3	620.0	699.7
n	27	26	26	26	26	25	22	17	16
sd	7.3	24.9	41.7	49.5	60.7	58.3	56.4	64.4	62.1
1975 $\bar{x}$	54.1	172.3	284.4	327.9	344.4	391.4	457.1	546.0	610.0
n	27	26	26	26	26	26	21	15	14
sd	7.5	36.5	41.6	40.9	38.0	41.5	54.3	42.9	29.7
1976 $\bar{x}$	53.0	162.4	263.3	333.1	357.6	391.8	453.6	517.1	604.0
n	31	29	29	29	29	28	21	7	5
sd	9.5	29.0	49.2	58.8	51.2	52.6	63.6	67.7	28.9

½ Santa

		BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973	$\bar{x}$	57.9	171.4	295.0	337.9	382.9	459.3	535.7	625.0	702.9
	n	7	7	7	7	7	7	7	7	7
	sd	4.8	38.8	68.3	67.1	67.3	59.2	51.6	54.1	42.0
1974	$\bar{x}$	51.9	180.6	295.6	355.6	408.8	439.4	482.9	590.7	665.0
	n	8	8	8	8	8	8	7	7	6
	sd	4.4	16.5	50.9	25.9	38.9	49.2	27.6	57.8	64.7
1975	$\bar{x}$	59.6	178.3	288.9	351.7	381.7	416.1	485.6	571.4	632.5
	n	10	9	9	9	9	9	8	7	6
	sd	8.5	26.6	43.8	52.6	51.5	50.7	61.0	62.3	60.7
1976	$\bar{x}$	53.1	175.4	300.8	402.7	406.9	416.8	465.5	528.0	572.5
	n	14	13	13	13	13	11	11	5	2
	sd	7.8	24.0	30.6	43.5	45.6	42.5	43.6	36.6	12.5

¾ Brahman

1975	$\bar{x}$	56.7	178.3	293.3	408.3	433.3	486.7	526.7	603.3	631.7
	n	3	3	3	3	3	3	3	3	3
	sd	9.6	24.6	45.9	64.9	63.4	59.1	52.0	61.8	66.1
1976	$\bar{x}$	61.7	202.5	323.3	424.2	438.3	458.3	532.0	575.0	
	n	6	6	6	6	6	6	5	1	
	sd	4.7	6.9	19.3	42.5	53.6	41.6	20.4	-	

TABLE IX - BULLS

	BW <sub>1</sub>	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973									
Whole Herd	57.7	191.7	331.8	376.5	425.5	492.7	560.2	638.1	703.3
Brahman	63.1	198.9	346.2	381.9	415.4	483.9	567.5	666.7	746.4
Santa	62.2	194.2	351.7	415.0	459.2	501.7	579.2	679.0	749.0
½ Brahman	56.8	189.4	322.3	369.2	421.5	488.8	545.8	614.3	677.1
½ Santa	53.8	222.5	390.0	413.8	447.5	505.0	591.3	630.0	682.5
1974									
Whole Herd	59.8	198.9	345.5	385.6	424.6	498.3	573.8	649.9	699.7
Brahman	61.7	206.2	351.7	391.4	442.1	522.5	606.8	688.9	734.6
Santa	67.6	219.2	374.2	430.8	479.2	563.3	680.0	709.2	705.8
½ Brahman	54.9	193.5	339.4	377.5	406.4	470.3	534.2	606.9	660.6
½ Santa	55.6	185.0	322.0	354.0	402.0	461.3	538.3	578.3	613.3
1975									
Whole Herd	60.0	183.5	310.7	370.5	395.3	435.5	492.3	558.4	626.7
Brahman	58.7	203.8	341.3	397.9	437.1	497.9	574.6	647.1	737.1
Santa	65.3	176.7	310.8	359.2	391.7	453.3	524.0	591.0	630.0
½ Brahman	58.3	177.1	297.1	363.4	384.9	413.1	469.7	528.9	590.8
½ Santa	63.5	182.3	314.3	363.1	385.0	416.5	451.3	485.5	544.3
3/4 Brahman	58.8	191.4	324.3	387.9	399.2	408.6	443.3	523.8	560.0
1976									
Whole Herd	65.0	179.5	304.4	403.6	411.4	446.6	492.8	563.8	680.2
Brahman	61.2	191.0	335.6	432.8	446.7	496.1	554.4	671.0	710.0
Santa	64.8	170.6	300.6	411.9	427.1	458.0	510.0	543.0	705.0
½ Brahman	58.6	171.4	282.2	372.8	400.2	448.7	493.0	530.0	700.0
½ Santa	63.8	188.6	324.6	440.5	414.6	413.9	430.8	-	-
3/4 Brahman	52.0	189.0	316.0	404.0	382.0	394.0	433.8	473.3	640.0

TABLE X HEIFERS

	BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1973									
Whole Herd	53.7	176.2	306.6	359.5	403.7	473.2	549.1	630.6	709.4
Brahman	55.9	202.9	347.0	384.7	424.3	493.6	567.9	634.6	715.8
Santa	55.4	172.1	304.3	382.1	422.1	492.9	577.1	677.7	757.9
½ Brahman	51.2	163.4	286.7	345.0	394.1	464.1	538.6	620.3	695.8
½ Santa	57.9	171.4	295.0	337.9	382.9	459.3	535.7	625.0	702.9
1974									
Whole Herd	53.7	181.8	308.0	353.5	392.9	444.7	504.3	586.7	654.6
Brahman	55.8	188.2	313.2	355.0	375.5	419.6	470.9	544.1	601.4
Santa	49.5	175.0	302.5	355.0	367.5	392.5	432.5	545.0	555.0
½ Brahman	53.0	178.7	306.2	353.6	397.3	459.8	534.3	620.0	699.7
½ Santa	51.9	180.6	295.6	355.6	408.8	439.4	482.9	590.7	665.0
1975									
Whole Herd	57.4	175.8	291.1	344.1	360.1	399.3	461.6	537.3	601.4
Brahman	57.6	185.0	311.3	361.8	371.1	406.1	467.5	532.9	608.9
Santa	64.1	166.9	279.4	333.8	341.9	361.9	416.3	485.0	548.8
½ Brahman	54.1	172.3	284.4	327.9	344.4	391.4	457.1	546.0	610.0
½ Santa	59.6	178.3	288.9	351.1	381.7	416.1	485.6	571.4	632.5
¾ Brahman	56.7	178.3	293.3	408.3	433.3	486.7	526.7	603.3	631.7
1976									
Whole Herd	54.4	175.7	288.8	376.6	392.0	411.2	467.4	542.2	618.6
Brahman	56.4	185.8	305.3	402.9	411.1	426.1	481.8	594.3	712.5
Santa	53.4	182.5	298.3	410.8	415.0	399.2	439.0	495.0	607.5
½ Brahman	53.0	162.4	263.3	333.1	357.6	391.8	453.6	517.1	604.0
½ Santa	53.1	175.4	300.8	402.7	406.9	416.8	465.5	528.0	572.5
¾ Brahman	61.7	202.5	323.3	424.2	438.3	458.3	532.0	575.0	-

Stock Reconciliation

	As at 1.1.76	Born	Transfer in	Total	Died	Transfer out	Slaughter	Breeding	Loan/ Distribution	Total	As at 31.12.76
Cows	173	-	-	173	13	-	1	-	-	14	174
Breeding Heifer	61	-	-	61	-	3	-	-	-	3	53
Heifer	17	-	-	17	1	-	-	20	1	22	33
Heifer Calves	72	79	-	151	4	-	-	-	-	4	91
Stud Bulls	8	-	4	12	-	4	1	-	-	5	6
Bulls	64	-	-	64	3	-	26	8	5	42	71
Bull Calves	77	65	-	142	5	-	-	-	-	5	81
<b>Total</b>	<b>472</b>	<b>144</b>	<b>4</b>	<b>620</b>	<b>26</b>	<b>7</b>	<b>28</b>	<b>28</b>	<b>6</b>	<b>95</b>	<b>509</b>

27 bulls weighing a total of 13,243 lbs were sold for slaughter.

8 bulls were sold for breeding to cattle farmers, to upgrade the standard of their herds, and 4 bulls were issued on loan to the kampongs for upgrading of the cattle. One pure Brahman was issued on loan to a farmer in Kota Marudu.

3  $\frac{1}{2}$  Brahman heifers were transferred to the Sebrang farm for A.I.

20 heifers were sold to smallholders and farmers, and 1 was issued to the kampong Wokop Cattle Project.

#### DISEASE

Tick infestation was still the major problem on the farm, particularly when there was shortage of spray. Wounds infection by screw worm is the other major problem.

TB testing was carried out, and no positive infection was demonstrated.

An outbreak of an 'Ephemeral fever' like condition, was seen in June, but there were no deaths or serious effects.

#### PASTURE

The pasture availability through the year was not good. Whilst planting of TM Block II had been completed in 1975, pasture production was not good. The soils in the Timbang Block II area are poor, erosion is considerable, and establishment of good pasture is difficult. Much of

the pasture sowed in 1973/74 is overgrown with invasion of Centipede grass. There are considerable areas in Block II, where due to the rocky nature of the soil, pasture cannot be planted and there are large areas of lalang. Replanting of some of the old Rosok paddocks was carried out, and paddocks 5<sup>A</sup>, 7/8, 10. 18 and 19 were planted to Setaria Kazungula/Stylo, and paddock 13 to Star grass. Fertiliser application was provided late in the year, but on the whole the lack of funds for the maintenance of the pastures has been a problem. The provision of a new Ford Tractor, and a Vicon Broadcaster, has helped in the efficient working of the land.

#### SUMMARY

1976 was a drier year, and this affected pasture growth and feed availability. There is considerable grazing pressure on the available pasture and weed encroachment, particularly of Centipede grass and lalang on the TM Block II areas has reduced feed availability. The lalang areas in paddock 25 have had to be used for the bulls.

Due to the reduced feed available, growth rates have not been good. The effect of the implementation of breeding seasons in 1975 can be seen by the pattern of monthly calvings, and there was a drop in the calving percentage, due to the introduction of the breeding season. Breeding stock is available from the farm and a considerable number were provided to the farmers and at the kampong level.

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The major factor affecting the station during 1976 was water. Constant breakdown of the old pump and engine, meant only an intermittent supply to the paddocks and cattle. This in turn meant only certain paddocks could be used during periods of water lack, because of their natural source of water, and this led to upsets in the management and rotation of pastures. Deterioration in the fencing and animals breaking through in search of water was a considerable problem, and also upset the breeding programme.

On top of the breakdown in the pumps, rainfall was poor and there were two periods of drought. Due to overgrazing in paddocks containing water, there was deterioration, a drop in feed availability and condition of the cattle.

There was considerable change in staff at the Farm, with a change in Manager in the middle of the year, and a change in organisation and responsibilities.

Following the visit of the Chief Minister in September the policy and direction of the farm was changed. It was decided that the farm should mainly be a supplier of breeding stock at the kampong level. The carrying capacity of the farm was to be increased by planting of a considerable acreage of fodder grass and using this for 'cut and feed'. Replacement heifers were to be imported from Australia, and the offspring from these would be suitable for supply to the ra'akyat as breeders. The production of crossbred dairy animals was to be increased, and all AI was to be carried out with dairy semen, on as many animals as possible.

Work continued during the year on the milking trial, and a small milking machine was purchased, and some milk production figures obtained.



In conjunction with the Buffalo Project, Sook, pregnant buffaloes were purchased throughout the West Coast, and Interior. Many of these were sent to Sebrang, and held until ready for transportation to Sook. These buffaloes, also caused some problems, and disruption of the normal management of the farm.

Rainfall

Rainfall figures were as follows:-

TABLE I

	<u>Inches</u>	<u>Wet Days</u>	<u>Factor</u>	Mean <u>1966-76</u>	Evapo-transpiration <u>1976</u>	Mean 1966-76 <u>Mean 1966-76</u>
January	5.58	11	28	4.30	4.12	4.23
February	1.69	2	8	4.12	4.57	4.52
March	6.08	10	30	5.53	5.10	4.79
April	2.62	9	20	4.20	4.94	5.36
May	4.50	11	27	6.69	4.81	5.28
June	2.33	6	13	4.59	4.94	5.10
July	5.18	9	30	3.83	4.95	4.86
August	5.81	11	34	4.97	4.62	4.94
September	0.88	3	6	5.93	4.89	4.91
October	6.56	13	38	4.76	5.73	4.76
November	5.06	9	31	5.81	4.86	4.69
December	5.57	8	24	5.62	4.06	4.32
Total	<u>52.76</u>	<u>102</u>		<u>60.35</u>	<u>57.59</u>	<u>57.56</u>

It was a dry year, with a rainfall below the mean for the last 10 years. Dry conditions were found in February, April, May, June and September, in which moisture deficient conditions were apparent. This combined with the failure of the water supply had a profound effect both on cattle and pasture. The wet season occurred at the end of the year, October- December, when pasture planting was carried out.

The rainfall compared with the previous 6 years, shows it was the dryest year for some time.

TABLE II

	<u>Inches</u>	<u>Wet Days</u>
1970	86.73	197
1971	60.39	175
1972	53.41	97
1973	60.39	112
1974	77.46	155
1975	72.51	124
1976	52.76	102

Cattle Breeding and Performance

The breeding seasons continued, and were as before May to July, and November to February. However due to the lack of water supply and poor fencing, many bulls broke through, and there was considerable 'wild mating' outside the breeding season.

For the first breeding season, the breeding policy continued, with the use of the Brahman bulls on the F1  $\frac{1}{2}$  Angus cows. The original American Brahman bulls were exchanged with those from Rosok to give a change of blood lines, and the American Santa Gertrudis bull was also sent to Rosok. The use of the F2  $\frac{1}{2}$  Brahman/ $\frac{1}{4}$  Angus bull on the unrelated F2  $\frac{1}{2}$  Brahman/Angus cows/heifers continued, and the other  $\frac{1}{2}$  Brahman females were also put to the Brahman bulls, to produce a  $\frac{3}{4}$  Brahman suitable for A.I. The use of A.I., still mainly using beef breeds, was continued. However a group of 17 Kelantan cross heifers from Timbang Manggaris were sent in March, and 13 in October for AI with Jersey semen, and 3  $\frac{1}{2}$  Brahman heifers from Rosok were sent in May for A.I.

In the second breeding season, the aim was to attempt as many inseminations with dairy semen as possible. This was a difficult management procedure. The original A.I. herd was kept for insemination in the normal manner. The other breeding herds were treated with prostoglandins to induce oestrus, and insemination with Friesian semen carried out at the planned oestrus. These animals were then put to their normal bulls.

A total of 75 animals were treated with prostoglandin, and then inseminated 72 hours following the second injection. There were only 16 calves born to this A.I. a conception of only 21.3%. This is disappointing. The use of prostoglandins, to give a planned oestrus, at which A.I. can be carried out is a very useful tool for an A.I. programme at the smallholder level, where normal detection of oestrus is a problem. The results from this trial are not encouraging, but later uses of prostoglandins have been more successful.

A number of reasons have been suggested for the poor result.

1. It is a new technique, with which the operations are not skilled.
2. The prostoglandin had deteriorated in quality, due to poor storage. The use of the same batch in Tawau at the smallholder level produced nil results. Later use of a fresh batch, was successful. It seems possible that deterioration had occurred.
3. Only one insemination was carried out at 72 hours, and the second A.I. at 96 hours was not done, mainly due to the management factor, and other herds requiring this 1st A.I. The inseminator reported that in cases A.I. was difficult, and the cervix was not open- ie. full oestrus had not been achieved at 72 hours. Also there were a considerable number of heifers amongst the animals inseminated, and these were particularly difficult to inseminate.

Calving

The monthly calvings are listed in Table III

TABLE III

	Live Calves		<u>Total</u>	<u>Dead/Dystokia</u>	<u>Total Calvings</u>
	<u>Male</u>	<u>Female</u>			
January	2	-	2	-	2
February	2	6	8	1	9
March	29	31	60	-	60
April	20	14	34	3	37
May	6	9	15	1	16
June	3	11	14	-	14
July	4	2	6	1	7
August	15	11	26	2	28
September	18	19	37	1	38
October	9	11	20	1	21
November	8	7	15	1	16
December	1	3	4	-	4
	<u>117</u>	<u>124</u>	<u>241</u>	<u>11</u>	<u>252</u>

The influence of the introduction of the breeding season can be seen from these, the main calvings being in March/April and August/October.

The reproductive performance, by breed, is shown in Table IV.

TABLE IV

	No.	Live Calves	Calving %	Male	Female	Dead/Dystokia	Total Pregnant	Pregnancy %	Barren	Calve Weaned	Meaning %	Calving Interval			
												n	x̄	sd	
Cows.															
Local	49	25	57.0	11	14	1	26	53.1	23	24	49.0	29	570.0	219.1	
½ Angus	81	73	90.1	36	37	3	76	93.8	5	61	75.3	74	388.0	71.0	
¼ Angus	31	21	67.7	12	9	2	23	74.2	8	18	58.1	24	419.7	115.2	
X Angus	7	6	85.7	2	4	-	6	85.7	1	6	85.7	6	434.8	84.9	
½ Brahman	30	29	96.7	11	18	1	30	100.0	-	27	90.0	29	400.5	67.5	
Brahman	16	12	75.0	6	6	2	14	87.5	2	8	50.0	14	469.9	95.2	
X Friesian	9	7	77.8	4	3	-	7	77.8	2	4	44.4	8	414.1	38.1	
½ Charolais	12	9	75.0	7	2	-	9	75.0	3	9	75.0	9	396.7	46.8	
Br/Hereford	7	5	71.4	1	4	-	5	71.4	2	5	71.4	5	437.4	62.6	
¾ Brahman	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	243	187	76.95	90	97	9	196	80.7	47	162	66.7	198	430.2	127.1	
Heifers															
Local/Kel.	6	3	50.0	2	1	-	3	50.0	3	3	50.0				
½ Angus	3	3	100.0	-	3	-	3	100.0	-	3	100.0				
X Angus	5	4	80.0	3	1	-	4	80.0	1	4	80.0				
½ Brahman	49	31	63.3	15	16	5	36	73.5	14	26	53.1				
Brahman	4	2	50.0	2	-	-	2	50.0	2	2	50.0				
X Friesian	5	4	80.0	2	2	-	4	80.0	1	3	60.0				
½ Charolais	7	4	57.1	2	2	-	4	57.1	3	4	57.1				
X Brahman	3	2	66.7	1	1	-	2	66.7	1	1	33.3				
½ SG	3	1	33.3	-	1	-	1	33.3	2	1	33.3				
¾ Brahman	2	-	-	-	-	-	-	-	2	-	-				
Total	87	54	62.1	27	27	5	58	66.7	29	47	54.0				
Grand Total	330	241	73.1	117	124	14	254	77.0	76	209	63.3				

The actual calving % is given in column 3, but the pregnancy %, will give the reproductive performance of the animal, the ability to get in calf. There was a considerable amount of calf mortality before weaning, mainly due to an accident where the calves died following drinking dip, and this shows in the weaning %, the main economic indicator of breeding performance.

Amongst the cows the local cows had a poor breeding record, with a calving % of only 51%. However these were mainly bred to A.I. and the A.I. programme was limited. Of the others the  $\frac{1}{2}$  Angus,  $\frac{1}{2}$  Brahman were the best, with a high calving % and a reasonable calving interval. That of the Friesian crosses and  $\frac{1}{2}$  Charolais was also adequate, but some of the others were poor. The imported Brahman and Hereford crosses, had only a moderate calving %, and a long calving interval.

Amongst the heifers, the  $\frac{1}{2}$  Angus and Friesian had an adequate breeding record, but some of the others are poor.

It should be noted that the  $\frac{3}{4}$  Brahman failed to calve during the year.

There were 4 cases of dystokia giving the death of the calf, and in two of these cases the cows died also, and these were both pure bred Imported Brahmans. 6 other calves were stillborn or died shortly after birth. 4 animals slipped their calf, having been found pregnant, and there was no subsequent calf born.

There were problems with the A I. herd and a constant nuisance of bulls breaking in. A.I. was carried out as normal during the May/July breeding season, but as explained above, at the start of the November breeding season, the use of prostoglandin to synchronise heat, was used to enable a larger number of animals to be inseminated with Friesian semen.

The figures for normal A.I. carried out were as in Table V.

TABLE V

	Animals	Artificial Insemination	Pregnancies	Conceived To 1st A.I.	2nd A.I.	Non Pregnant
Simmental	3	3	1 33.3%	1 33.3%	-	2
Angus	1	1	1 100.0%	1 100.0%	-	-
Marchigiana	2	3	-	-	-	2
Jersey	13	16	6 46.2%	4 30.8%	2	7
Friesian	26	34	14 53.8%	13 56.0%	1	12
Total	45	57	22 48.9%	19 42.2%	3	23

Mortality

There were a total of 57 deaths in the year, as listed in Table VI. 18 calves, 12 male and 6 females, died after drinking 'Bovinox' dip, and one other calf was killed by a dog. One heifer was found shot, and 3 bulls, broke limbs or fell into the ditch.

Notable was the high mortality amongst the pure Brahman stock. Apart from 3 imported cows, 2 of which died from dystokia. 2 heifers and 2 calves died, which is about 12% mortality.

TABLE VI

	0 - 6m	6m - 1y	1y - 2½y	Adult	Total
	M F	M F	M F	M F	
Dystokia	- -	- -	- -	- 2	2
Accident	13 6	- -	2 1	1 -	23
Sickness	- -	- 1	- 1	- 1	3
Found Dead	- -	1 2	2 1	1 2	9
Destroyed/ lost	- 2	- -	2 -	- 1	5
	16 15	1 5	7 5	2 6	57

The total of 57 deaths, out of the total population of 810 gives a figure of 6.57%. However discounting the 18 calves killed by drinking tickicide gives a mortality of 5.6%. This is still rather high.

Stock Reconciliation

TABLE VII

	As at 1.1.76	Born	Transfer In	Total	Died	Transfer Out	Sold		Free/ Loan	Total	As at 31.12.76
							Slaugh- ter	Breed- ing			
Cows	252	-	-	252	6	-	10	-	-	16	294
Breeding Heifer	102	-	-	102	5	-	-	-	2	7	104
Heifer	74	-	33	107	5	-	1	12	5	23	107
Heifer Calves	63	124	-	187	15	-	-	-	-	15	84
Stud Bulls	12	-	4	16	-	4	-	-	-	4	13
Bulls	160	-	-	160	10	-	50	7	21	88	147
Bull Calves	37	117	-	154	16	-	-	-	-	16	61
Total	699	241	37	978	57	4	61	19	28	169	810



4 bulls and 7 heifers were issued free to cattle projects, which completed the free issue to such Projects. A further 16 bulls were issued on loan to kampongs/grazing reserves, and one to a private farmer. A total of 12 heifers were sold for breeding, 7 of which went to kampong projects, and were paid for from the Rural Development vote held by the District Officer.

50 bulls and 1 heifer, totalling 29,000 lbs were sold for slaughter as well as 10 cull cows.

#### Milk Production

The milking trial continued during the year. A total of 8 cows/heifer were milked, and some milk production figures were obtained. Hand milking, with individual recording of yield was practiced until the end of October, when the milking machine was brought into operation. This milked two cows at once and individual recording was not possible.

Production and recording were rather erratic and husbandry and management was far from ideal. A maximum production of 6.5 kg/day was attained.

Approximate production figures for the 8 cows in milk during the year, from the date of starting milking, to the end of October when individual recording ceased are in Table VIII.

TABLE VIII

Cow	Breed	Calf	Production	Days	Average/Day
C953	$\frac{1}{2}$ Friesian	Third	1446 lbs	306	4.73 lbs
C959	$\frac{1}{2}$ Friesian	Third	2630 lbs	247	10.65 lbs
C604	$\frac{1}{2}$ Friesian	Fifth	1109 lbs	118	9.40 lbs
Y116	$\frac{3}{4}$ Friesian	First	2052 lbs	194	10.58 lbs
Y17	$\frac{1}{2}$ Angus	Second	1248 lbs	102	12.24 lbs
C1036	$\frac{1}{2}$ Friesian	Third	1407 lbs	136	10.35 lbs
Y271	$\frac{1}{2}$ Friesian	First	685 lbs	90	7.61 lbs
C1031	$\frac{1}{2}$ Friesian	Third	395 lbs	53	7.45 lbs

One of the major problems associated with the introduction of milking was the management of the calves. No facilities were available for these, and an adequate supplementary feed, in the form of milk substitute, was not available. They were fed whole milk, but there was lack of stockmanship in the feeding of this and the calves suffered.

From these figures, despite the rather poor conditions under which the milking and feeding was carried out, and the lack of adequate 'know how' in dairying technique which would give the lower yields, similar production figures to those achieved in Peninsular Malaysia, of 1-1 $\frac{1}{2}$  gallon/day for the dairy crossbreds are possible in Sabah.

#### Growth Rates

The mean quarterly weights of calves born in 1974-76 are shown in tables IX to XII. Tables IX and X show the details by breed and sex giving the mean weights, the number of animals and the standard deviation. In Tables XI and XII there is the annual comparison between breeds, to show the contemporary comparison, under similar conditions.

The weights given reflect the weather pattern, and feed availability.

Also shown is the difference given by change in management. For a long period there has been a marked loss in the rate of growth, and even a gross loss of weight, following weaning, which had been at 6 months of age. Despite efforts to elucidate the cause of this, and to correct it by feeding, as reported in the Annual Report 1975, few results were apparent. From March 1976, weaning was carried out at 9 months of age instead of 6, in the hope that the calf would be stronger and better adapted to pasture, and be able to withstand the stress of weaning. As can be seen from the tables, for 1976, the growth rate to 9 months of age has improved, but the check in growth rate is now seen from 9 months -  $1\frac{1}{4}$  years, showing that the problem has not been elucidated, but only postponed.

Looking at the breed differences, there seems to be little significance in the various F1 crosses. The performance of the  $\frac{3}{4}$  Brahman is disappointing although there is a wide variance amongst individuals, indicating the necessity of a strong culling pressure to select the best animals for breeding. Amongst the Friesian calves, the effect of the initiation of milking is apparent. With the dam being milked, the nutritional level of the calf is reduced, and this is reflected in the growth rate.

The performance of the Santa Gertrudis crosses is still a subject for discussion. From these figures from Sebrang, and also those at Rosok, growth rates of the Santa crosses are poor compared with the rest of the herd. However at Tawau, nutritional levels and soil are better, the Santa crosses have an outstanding growth rate. Further some of the Santa cross heifers, which have been culled to the kampongs have developed outstandingly. The breeding of further Santa crosses have been stopped, in view of these growth figures, but appraisal of performance of the Santa cross heifers, in all situations is needed, before it is finally abandoned.

TABLE IX  
BULLS  
WHOLE HERD

	BW	3m	6m	9m	1y	1½	1½	1¾	2y
1974 $\bar{x}$	62.5	180.0	314.3	350.0	378.4	427.5	503.3	587.3	645.5
n	83	73	73	73	73	70	63	59	59
sd	10.4	36.6	58.7	55.0	57.4	65.6	72.8	79.4	84.6
1975 $\bar{x}$	68.4	211.0	335.8	376.6	405.1	453.3	523.4	595.8	655.5
n	105	100	99	98	96	93	79	67	49
sd	9.1	36.1	63.1	65.1	61.4	57.9	55.7	59.5	67.0
1976 $\bar{x}$	68.5	188.0	308.3	382.5	400.6	429.3	504.9	533.8	566.9
n	115	97	95	95	90	81	72	37	21
sd	8.7	32.8	56.2	70.1	51.6	63.8	88.8	88.7	66.3

½ Brahman

1974 $\bar{x}$	65.3	187.6	319.6	356.2	381.0	422.1	494.9	582.8	636.0
n	47	42	42	42	41	39	34	32	30
sd	10.4	37.1	56.3	58.2	59.5	60.2	56.9	71.9	74.3
1975 $\bar{x}$	67.3	208.1	328.8	371.7	405.3	440.1	526.2	600.7	680.0
n	64	62	62	61	60	60	48	36	22
sd	8.4	35.8	62.1	66.2	67.7	67.6	60.6	56.7	58.2
1976 $\bar{x}$	69.1	199.9	323.1	403.7	415.3	441.4	514.3	541.9	586.3
n	54	42	42	41	39	36	34	24	12
sd	8.3	29.8	58.3	70.2	62.3	67.2	87.1	81.2	56.8

Brahman

	BW	3m	6m	9m	1y	1½	1¾	1¾	2y
1974 $\bar{x}$	65.7	178.8	335.0	353.8	417.5	527.5	640.0	708.8	771.3
n	6	4	4	4	4	4	4	4	4
sd	9.3	36.5	65.9	56.3	80.4	88.5	126.9	139.3	149.7
1975 $\bar{x}$	66.0	228.3	378.3	395.0	376.7	456.7	521.7	588.3	636.7
n	5	3	3	3	3	3	3	3	3
sd	8.0	8.5	13.1	38.9	29.0	36.8	23.2	10.3	12.5
1976 $\bar{x}$	73.8	180.8	316.0	401.0	399.0	411.0	423.0		
n	8	6	5	5	5	5	5		
sd	7.0	48.4	51.6	58.9	67.4	53.9	38.3		

$\frac{3}{4}$  Brahman

1974 $\bar{x}$	58.0	230.0	300.0	295.0	315.0	330.0	450.0	490.0	550.0
n	1	1	1	1	1	1	1	1	1
sd	-	-	-	-	-	-	-	-	-
1975 $\bar{x}$	76.5	231.3	386.4	391.4	407.3	469.5	540.0	614.4	677.9
n	12	12	11	11	11	10	9	9	7
sd	10.2	34.0	71.7	74.1	63.0	54.2	57.4	71.1	78.6
1976 $\bar{x}$	70.6	182.2	309.0	363.3	384.3	414.0	440.6	490.8	580.0
n	18	16	15	15	14	10	8	6	3
sd	8.5	30.8	50.6	72.7	68.6	60.0	104.0	45.2	40.0

$\frac{1}{2}$  Angus

	BW	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y
1974 $\bar{x}$	53.3	160.0	291.7	340.8	385.0	434.2	495.0	576.7	640.0
n	8	6	6	6	6	6	6	6	6
sd	5.4	19.8	35.0	15.4	26.5	40.0	40.3	34.8	52.3
1975 $\bar{x}$	60.0	203.8	310.0	365.0	418.8	462.5	546.7	601.7	673.3
n	4	4	4	4	4	4	3	3	3
sd	7.1	34.2	25.5	28.5	20.1	22.5	29.0	49.0	41.1
1976 $\bar{x}$	65.0	140.0	277.5	367.5	395.0	432.5	475.0	580.0	620.0
n	2	2	2	2	2	2	2	2	1
sd	5.0	20.0	7.5	22.5	2.5	7.5	5.0	30.0	-

X Friesian

1974 $\bar{x}$	57.6	169.0	289.0	324.5	372.0	440.6	525.0	596.9	652.5
n	10	10	10	10	10	9	8	8	8
sd	6.0	27.8	52.8	55.2	51.2	53.4	37.7	53.0	68.6
1975 $\bar{x}$	70.5	180.0	293.8	337.5	362.5	433.7	525.0	626.7	627.5
n	4	4	4	4	4	4	3	3	2
sd	71	29.9	54.9	82.2	41.9	88.3	35.6	19.3	27.5
1976 $\bar{x}$	66.0	151.3	223.8	286.3	360.0	380.0			
n	5	4	4	4	4	3			
sd	12.0	26.1	22.5	18.9	40.2	22.9			

$\frac{1}{2}$  x  $\frac{1}{2}$  Brahman

	BW	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y
1976 $\bar{x}$	68.3	195.0	311.7	394.2	427.5	450.8	581.0		
n	6	6	6	6	6	6	5		
sd	3.7	24.8	33.4	44.5	37.2	48.1	60.1		

$\frac{1}{2}$  Santa

1975 $\bar{x}$	68.6	215.0	339.2	403.1	425.4	462.5	496.8	560.0	589.5
n	14	13	13	13	12	12	11	11	10
sd	8.3	36.6	52.0	48.4	30.7	23.9	42.2	54.9	50.2
1976 $\bar{x}$	65.8	188.6	309.1	364.1	380.0	391.7	512.1		
n	12	11	11	11	9	9	7		
sd	7.6	18.5	39.9	37.5	38.9	37.2	80.5		

TABLE X

HEIFERS

WHOLE HERD

1974 $\bar{x}$	57.6	170.5	291.0	329.4	372.8	435.2	506.6	594.1	660.7
n	71	67	66	64	63	61	61	59	56
sd	8.7	30.4	54.5	51.4	53.9	58.5	63.8	83.7	82.7
1975 $\bar{x}$	65.4	197.8	313.7	359.8	372.3	413.0	467.4	534.8	604.7
n	117	115	115	114	110	107	98	75	63
sd	8.5	31.0	49.0	64.2	61.9	55.4	60.8	70.6	72.0
1976 $\bar{x}$	65.7	183.3	287.9	363.1	374.7	409.1	454.9	532.8	581.3
n	126	110	110	109	104	93	55	23	12
sd	9.3	28.3	48.0	64.7	60.3	57.3	63.5	67.7	74.2

$\frac{1}{2}$  Brahman

	BW	3m	6m	9m	1y	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2y
1974 $\bar{x}$	58.7	172.2	300.5	333.0	377.0	446.4	517.8	620.8	680.1
n	41	38	38	38	38	36	36	36	35
sd	8.9	29.6	49.1	53.2	50.4	59.0	67.9	84.0	85.4
1975 $\bar{x}$	64.8	199.7	315.0	361.1	375.7	418.7	474.7	552.4	620.8
n	61	60	60	60	59	57	52	38	33
sd	8.7	32.3	55.5	69.4	64.0	53.8	60.0	65.8	65.5
1976 $\bar{x}$	65.8	190.3	302.4	375.6	381.7	424.6	483.0	539.6	610.0
n	51	44	44	43	43	36	22	12	5
sd	10.1	29.5	52.5	67.6	68.9	66.4	64.7	74.8	84.9

Brahman

1974 $\bar{x}$	57.5	195.0	330.0	336.0	363.8	431.3	526.3	566.3	670.0
n	6	6	6	5	4	4	4	4	3
sd	5.6	11.5	22.1	25.6	28.6	27.7	23.8	14.7	4.1
1975 $\bar{x}$	64.4	198.3	318.9	352.2	359.4	400.0	445.0	500.0	580.0
n	9	9	9	9	8	7	6	6	6
sd	5.3	25.2	37.3	43.6	55.2	42.3	41.8	48.4	54.2
1976 $\bar{x}$	76.7	206.0	307.0	378.0	376.6	403.3	432.5		
n	6	5	5	5	3	3	2		
sd	4.7	18.3	38.2	44.1	18.9	27.5	47.5		



$\frac{3}{4}$  Brahman

		BW	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y
1974	$\bar{x}$	60.0	177.5	305.0	305.0	335.0	375.0	505.0	512.5	615.0
	n	2	2	2	2	2	2	2	2	2
	sd	-	17.5	15.0	15.0	25.0	35.0	25.0	27.5	75.0
1975	$\bar{x}$	64.1	199.2	321.7	355.8	357.1	404.4	453.4	537.3	610.0
	n	18	18	18	18	17	17	16	11	9
	sd	10.0	30.5	47.7	71.5	68.7	67.5	67.4	64.9	65.0
1976	$\bar{x}$	65.0	178.8	285.5	361.7	363.7	405.3	446.4		
	n	24	21	21	21	19	17	7		
	sd	9.1	21.8	39.1	57.1	48.0	42.8	63.4		

$\frac{1}{2}$  Angus

1974	$\bar{x}$	50.0	133.3	231.7	300.0	333.3	381.7	466.7	533.3	623.3
	n	5	3	3	3	3	3	3	3	3
	sd	6.3	23.0	52.0	40.8	45.5	27.2	55.1	58.1	77.6
1975	$\bar{x}$	65.0	170.0	285.0	365.0	417.5	457.5	532.5	590.0	652.5
	n	2	2	2	2	2	2	2	2	2
	sd	5.0	30.0	35.0	40.0	62.5	47.5	47.5	80.0	72.5
1976	$\bar{x}$	70.0	200.0	322.5	430.0	430.0	432.5	455.0	525.0	
	n	2	2	2	2	2	2	2	1	
	sd	-	30.0	37.5	85.0	60.0	67.5	45.0	-	

X Friesian

		BW	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y
1974	$\bar{x}$	58.9	171.9	289.4	346.3	403.8	442.5	490.6	551.3	614.4
	n	9	8	8	8	8	8	8	8	8
	sd	8.4	26.6	39.1	47.2	47.7	40.9	45.7	56.4	57.0
1975	$\bar{x}$	62.5	156.3	258.8	320.0	345.0	366.7	410.0	441.7	495.0
	n	4	4	4	4	3	3	3	3	3
	sd	8.3	20.4	25.6	22.6	18.7	23.6	10.8	27.2	17.8
1976	$\bar{x}$	57.5	145.0	230.0	320.0	370.0	385.0	445.0		
	n	2	1	1	1	1	1	1		
	sd	12.5	-	-	-	-	-	-		

$\frac{1}{2}$  Santa

1974	$\bar{x}$	60.0	125.0	215.0	285.0	380.0	375.0	435.0	430.0	495.0
	n	1	1	1	1	1	1	1	1	1
	sd	-	-	-	-	-	-	-	-	-
1975	$\bar{x}$	68.5	194.4	321.9	381.3	379.0	401.3	452.1	496.1	550.0
	n	17	16	16	15	15	15	14	9	6
	sd	8.0	56.2	35.3	54.8	54.9	39.6	47.6	72.5	68.1
1976	$\bar{x}$	65.6	163.3	271.1	346.1	356.7	386.1	432.0	507.5	522.5
	n	9	9	9	9	9	9	5	2	2
	sd	10.7	30.0	44.6	55.0	59.7	49.3	50.7	7.5	12.5

$\frac{1}{2}$  Marchigiana

	Bw	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y	
1975	$\bar{x}$	70.0	186.7	305.0	355.0	590.0	475.0	530.0	621.7	671.7
	n	3	3	3	3	3	3	3	3	3
	sd	-	14.3	14.7	28.6	49.0	67.9	65.3	68.8	53.3

$\frac{1}{2}$  Simmental

1976	$\bar{x}$	66.7	156.7	232.5	292.5	341.7	395.0	440.0	511.3	530.0
	n	6	6	6	6	6	6	6	4	3
	sd	4.7	24.3	32.9	41.5	38.4	32.9	52.3	63.3	40.0

$\frac{1}{2} \times \frac{1}{2}$  Brahman

1976	$\bar{x}$	67.1	174.3	271.4	345.7	370.0	393.3	426.0
	n	7	7	7	7	6	6	5
	sd	4.5	20.1	38.7	74.2	71.7	72.1	86.1

TABLE XI

BULLS

	BW	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y
1974									
Whole Herd	62.5	180.0	314.3	350.0	378.4	427.5	503.3	587.3	645.5
$\frac{1}{2}$ Brahman	65.3	187.6	319.6	356.2	381.0	422.1	494.9	582.8	636.0
Brahman	65.7	178.8	335.0	353.8	417.5	527.5	640.0	708.8	771.3
$\frac{3}{4}$ Brahman	58.0	230.0	300.0	295.0	315.0	330.0	450.0	490.0	550.0
$\frac{1}{2}$ Angus	53.3	160.0	291.7	340.8	385.0	434.2	495.0	576.7	640.0
X Friesian	57.6	169.0	289.0	324.5	372.0	440.6	525.0	596.9	652.5
$\frac{1}{2}$ Charolais	68.0	195.0	346.0	379.0	380.0	422.0	517.5	590.0	651.5
1975									
Whole Herd	68.4	211.0	335.8	376.6	405.1	453.3	523.4	595.8	655.5
$\frac{1}{2}$ Brahman	67.3	208.1	328.8	371.7	405.3	440.1	526.2	600.7	680.0
Brahman	66.0	228.3	378.3	395.0	376.7	456.7	521.7	588.3	636.7
$\frac{3}{4}$ Brahman	76.5	231.3	386.4	391.4	407.3	409.5	540.0	614.4	677.9
$\frac{1}{2}$ Angus	60.0	203.8	310.0	365.0	418.8	462.5	546.7	601.7	673.3
X Friesian	70.5	180.0	293.8	337.5	362.5	433.7	525.0	626.7	627.5
$\frac{1}{2}$ Santa	68.6	215.0	339.2	403.1	425.4	462.5	496.8	560.0	589.5
$\frac{1}{2}$ Marchigiana	72.0	202.5	312.5	345.0	367.5	412.5	495.0	567.5	667.5
1976									
Whole Herd	68.5	188.0	308.3	382.5	400.6	429.3	504.9	533.8	566.9
$\frac{1}{2}$ Brahman	69.1	199.8	323.1	403.7	415.3	441.4	514.3	541.9	586.3
Brahman	73.8	180.8	316.0	401.0	399.0	411.0	423.0	-	-
$\frac{3}{4}$ Brahman	70.6	182.2	309.0	363.3	384.3	414.0	440.6	490.8	580.0
$\frac{1}{2}$ Angus	65.0	140.0	277.5	367.5	395.0	432.5	475.0	580.0	620.0
X Friesian	66.0	151.3	223.8	286.3	360.0	380.0	-	-	-
$\frac{1}{2}$ Santa	65.8	188.6	309.1	364.1	380.0	391.7	512.1	-	-
$\frac{1}{2}$ x $\frac{1}{2}$ Brahman	68.3	195.0	311.7	394.2	427.5	450.8	581.0	-	-

TABLE XII

HEIFERS

	BW	3m	6m	9m	1y	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2y
1974									
Whole Herd	57.6	170.5	291.0	329.4	372.8	435.2	506.6	594.1	660.7
$\frac{1}{2}$ Brahman	58.7	172.2	300.5	333.0	377.0	446.4	517.8	620.8	680.1
Brahman	57.5	195.0	330.0	336.0	363.8	431.3	526.3	566.3	670.0
$\frac{3}{4}$ Brahman	60.0	177.5	305.0	305.0	335.0	375.0	505.0	512.5	615.0
$\frac{1}{2}$ Angus	50.0	133.3	231.3	300.0	333.3	381.7	466.7	533.3	623.3
X Friesian	58.9	171.9	289.4	346.3	403.8	442.5	490.6	551.3	614.4
Charolais	56.8	165.0	283.8	327.5	356.3	457.5	518.8	615.0	680.0
1975									
Whole Herd	65.4	197.8	313.7	359.8	372.3	413.0	467.4	534.8	604.7
$\frac{1}{2}$ Brahman	64.8	199.7	315.0	361.1	375.7	418.7	474.7	552.4	620.8
Brahman	64.4	198.3	318.9	352.2	359.4	400.0	445.0	500.0	580.0
$\frac{3}{4}$ Brahman	64.1	199.2	321.7	355.8	357.1	404.4	453.4	537.3	610.0
$\frac{1}{2}$ Angus	65.0	170.0	285.0	365.0	417.5	457.5	532.5	590.0	652.5
X Friesian	62.5	156.3	258.8	320.0	345.0	366.7	410.0	441.7	495.0
$\frac{1}{2}$ Santa	68.5	194.4	321.9	381.3	379.0	401.3	452.1	496.1	550.8
$\frac{1}{2}$ Marchigiana	70.0	186.7	305.0	355.0	390.0	475.0	530.0	621.7	671.7
1976									
Whole Herd	65.7	183.3	287.9	363.1	374.7	409.1	454.9	532.8	581.3
$\frac{1}{2}$ Brahman	65.8	190.3	302.4	375.6	381.7	424.6	483.0	539.6	610.0
Brahman	76.7	206.0	307.0	378.0	376.7	403.3	432.5	-	-
$\frac{3}{4}$ Brahman	65.0	178.8	285.5	361.7	363.7	405.3	446.4	-	-
$\frac{1}{2}$ Angus	70.0	200.0	322.5	430.0	430.0	432.5	455.0	525.0	r
X Friesian	57.5	145.0	230.0	320.0	370.0	385.0	445.0	-	-
$\frac{1}{2}$ Santa	65.6	163.3	271.1	346.1	356.7	386.1	432.0	507.5	522.5
$\frac{1}{2} \times \frac{1}{2}$ Brahman	67.1	174.3	271.4	345.7	370.0	393.3	426.0	-	-
$\frac{1}{2}$ Simmental	66.7	156.7	232.5	292.5	341.7	395.0	440.0	511.3	530.0

### Disease

The major health problems were still fly strike, tick infestation and internal parasites. The tick burden on the animals is becoming excessive, although resistance to 'Bovinox' does not seem to have been established, the heavy stocking of the pastures maintain a high population of ticks, and it is impossible to get the animals onto a 'clean' paddock after spraying. This is true also for internal parasites, and there is a rapid build up of helminths on the paddocks, particularly in the wet weather which is usually associated with weaning and despite routine dosing with anthelmintics the worm burden is high, and probably is responsible for a considerable amount of the loss in growth rate at weaning.

There is still a considerable loss of calves in the neonatal period. It does not however seem to be due to a calf scour conditions, but lack of milk, and poor mothering by the dam.

### Pasture

The total cattle population of the farm has reached 810 head which were grazing on 800 acres of improved or semi-improved pastures. In view of the increase of grazing pressure, how to produce enough to feed the growing population has been the main theme of discussion for future development of this farm.

Since this is a breeding farm, it would seem unlikely to reduce large number of stock without detailed evaluation of their performance in order to maintain an adequate grazing pressure on the farm pastures. Land available for pasture expansion is also be very limited. Although the farm is gazetted as 1,700 acres, 2/5 of the acres is on the edge of deep gullies or otherwise on very poor podzolic soils which could not be utilised for cultivation. It is apparent that the only solution is to raise the herbage production on a per acre basis which involve more labour, more machinery and higher level of managerial skills. It was decided to develop 200 acres of fodder grasses for cut and carry system.

Several fodder crops and grasses are under observation and evaluation at Sebrang. Maize has been successfully grown for silage and was the first crop for feed lotting. Small observation plots for other crops such as sugarcane and tapioca were also established. Poor soil fertility together with high price of fertiliser would seem to limit the use of these crops extensively. Fodder grasses particularly the Napier grass, guinea grass and Setaria Splendida may be the alternative choice and a cutting trial was laid down to find out their management techniques. One of the major reasons favourable to the use of fodder grass has been the difference of life span between these two fodders. Maize, sugarcane and tapioca could only be cut 1-3 times per cultivation whereas 18 cuts or more fodder grasses are possible. In contrast to this intensive farming system, the traditional open ranch grazing would still be maintained so that all the breeding animals are on continuous/rotational grazing on improved pasture.

A long term grazing trial on setaria/stylo pasture has been planned and initial preparation work as planting, fencing, water supply etc is in progress. It is expected that the trial could be commenced in 1977.

It has been a dry year and annual rainfall was recorded as 52.92 inches in comparison with the average, 60.35 inches for the past 10 years. A dry spell prevailed in February, April, May, June and September in which moisture deficits were apparent. The wet season started in October and continued till December, suggesting a reliable period for pasture planting.

The maize crop planted in August suffered from severe moisture stress in September and reseeding was necessary in late September.

#### Improved pastures

##### a) Total acreage under improved pastures

	<u>1975</u>	<u>1976</u>	
Stylo	226.2	180.3	(1)
Stylo/lalang	106.3	189.9	(2)
Brachiaria	133.0	112.0	(3)
Brachiaria/Stylo	7.1	28.1	
Setaria, Setaria/Stylo	183.8	287.9	(4)
Guinea, Guinea/Stylo	30.9	27.8	(5)
Plicatulum, Plicatulum/Stylo	35.4	35.4	(6)
Napier grass	14.3	20.7	(7)
Maize	43.0	30.1	(8)
Others	<u>14.4</u>	<u>4.0</u>	
Total	<u>790.0</u>	<u>844.2</u>	

- Légand (1) paddocks 24B, 33, 35, 36, 42, 48, 49  
 (2) paddocks 2B, 7, 21D, 24A, 25A, 25JKL, 28, 29B, 34, 37AB, 40, 46.  
 (3) paddocks 1, 6, 8A1, 8A3, 9, 14, 15, 22, 25B, 25C, 25D, 32, 47  
 (4) paddocks 29A, 41, 8A2, 19ABCD, 21B, 21C, 23AB, 24C, 25EFG, 30, 38A, 39, 44, 50, 51, 52.  
 (5) paddocks 2A2, B2B, 24D  
 (6) paddocks 38B, 21E, 45  
 (7) paddocks 3, 4, 2A1B, 12, 13  
 (8) paddocks 2A, 8B1, 10, 16, 17

Total acreage of improved pastures was 844 after the addition of the new plantings of setaria/stylo pastures for the grazing trial. From the figures in the above Table, grass/legume pastures constituted nearly 45% of the total pastures and these contributed more feed to the farm animals than the pure stands of stylo and Brachiaria. The latter pasture types would also be slowly converted into grass/legume mixed pastures.



Regarding to the maize crops and fodders, they have not yet been widely extended due to the limitations or shortage of planting stocks, harvesting facilities and definite, farming policy for the future.

b) New Planting and Re-planting 1976

A total of 152.8 acres of pastures and crops were established

(i) Improved pastures - new planting

Paddocks	50	16.0 acres	Setaria/Stylo
	51	22.5	Setaria/Stylo
	52	27.0	Setaria/Stylo
	Nursery	0.5	Splendida

(ii) Improved pastures - Re-planting

Paddocks	17	7.2	Setaria/Stylo (not successful)
	21B	8.0	Setaria/Stylo
	21C	7.0	Setaria/Stylo
	23AB	19.5	Setaria/Stylo
	45	11.4	Plicatum/Stylo

c) Estimation of the cost of grazing on grass/legume pastures.

(i) Cost of establishment per acre

Land preparation	\$51.06
Basal dressing	62.59
Seeding	54.03
Brush harrow and rolling	12.09
Total	179.77

Assuming longevity of grass/legume pasture - 8 years

. Annual cost of establishment = \$22.47 per acre

- (ii) Annual cost of fertiliser maintenance - 100.00 per acre
- (iii) Total annual cost of grazing - (i) + (ii) - \$122.47 per acre
- (iv) Annual herbage yield of grass/legume pasture
  - 12,000 lbs dry matter per acre
- (v) Cost per lbs of material
  - $\frac{\text{Annual cost of grazing per acre}}{\text{Annual dry matter yield per acre}}$
  - \$122.47
  - 12000 lbs
  - 1.0 cents per lb dry matter

### Crops and Fodders

#### a) Workshop on the development of Sebrang Farm

This was held in the Veterinary Office on 3rd November, 1976. As a result of the decision to boost up the breeding cows to 400 head and to implement the goat and dairy project within the farm, it was proposed to plant 200 acres of fodder grasses to cope with the feeding problem.

From the results of a cutting trials, it was recommended that the use of Ipoh and Bona Napier grass for the initial planting stage, which should be gradually replaced by Setaria Splendida. These two fodders have to be multiplied by cuttings and rate of implementing the project would be restricted by availability of planting material. The giant guinea, is a grazing/fodder type.

The majority of the fodder would be fed green direct to the animals. However, a reserve of silage would be established in the period of maximum growth during the rains, to tide over during the drier season.

#### b) Replanting of crops and fodder 1976

Maize paddock	2A	6.4 acres
	10	3.7
	16	5.8
	8B1	10.0
Tapioca Nursery		1.5
Sugarcane pdk	17a	2.0
Napier grass pdk.	3	4.8 acres
Splendida Nursery		0.5

There was only one crop of maize during the year. The adverse dry spell in April, May, June and September together with the shortage of quality seed supply had restricted the second planting.

The tapioca and sugarcane are energy-rich crops which form parts of the feeding materials for a trial. Because of problems on harvesting methods and techniques, this trial was delayed further.

The Napier grass planted in previous years was of local or uncertified strains. This local Napier grass tends to flower at the early stage and leaf blades are slender. Improved type of Napier grass - Ipoh and Bona, have been multiplied during the year and form the nursery to develop 80-100 acres of Napier grass in 1977.

c) Silage

Maize silage has been prepared from paddock 2A and 10 in trench silo. The AI and sick herd broke into paddock 16 and 8b1 at about 4-5 weeks before harvesting that most maize plants were destroyed.

A bunker silo was also constructed at paddock 31 and Setaria/ Stylo silage were prepared.

d) Estimation of the cost of lot-feeding Napier grass

(i) Cost of establishment per acre

Land preparation	-	\$ 51.06
Basal dressing	-	104.03
Planting	-	111.22
Total	-	266.31
Assuming longevity of Napier grass	-	2 years
.*. Cost per acre per year	-	\$133.15

(ii) Cost of fertiliser maintenance per acre

Fertiliser	-	\$944.64
Operation	-	53.39
.*. Cost per acre per year	-	998.03

(iii) Cost of harvesting green chops per acre

Operation and transport per cwt. - \$ 22.10

Assuming 9 cwts (6 weekly interval)  
a year.

∴ Cost per acre per year - \$198.90

(iv) Annual cost of operation and material

= (1) + (11) + (111) + (1V) = \$1,320.08

(V) Yield of Napier grass from small plots (80% utilisation)

has been estimated as 32.6 tons dry matter per acre per year.

(vi) Cost per lbs of green chops.

= Annual cost of material and operation

80% of annual dry matter yield.

=  $\frac{\$1,320.08}{71720 \text{ lbs}}$  = 1.8 cents per lb dry matter.

The above is estimated with the availability of 120 acres Napier grass to keep tractor and harvester to operate 800-1000 hours per year.

e) Grazing Records

The grazing and land maintenance records are compiled (see Appendix) and summarised below:-

Pasture type	Stocking rate		Utilization Days on grazing/365
	Cow/acre(1)	cow/acre(2)	
Stylo	0.81	0.42	195/365 = 0.53
Stylo/lalang	0.74	0.43	213/365 = 0.58
Brachiaria	1.59	0.56	129/365 = 0.35
Brachiaria/Stylo	1.56	1.22	286/363 = 0.78
Setaria	0.97	0.93	351/365 = 0.93
Setaria/Stylo	0.97	0.76	284/365 = 0.78
Guinea/Stylo	1.03	0.78	276/365 = 0.75

- (1) Grazing pressure on average rotational stocking
- (2) Average grazing pressure in 365 days.

There are two ways of presenting the stocking rates (SR) on different pasture type - SR (1) based on the number and length of rotational grazing and SR (2) based on 365 days. On a pasture with good grazing management, SR(1) should be fairly closed to SR(2). If SR(1) is significantly higher than SR(2), this indicate there are overgrazings at particular rotational period during the year or the pastures have not been utilized properly. Apparently this has happened on stylo, stylo/lalang and Brachiaria pastures. They take much longer time to recover after the stress of overgrazing which results in less no. of days for grazing within a year. The grass/legume pastures have been better utilized.

The Farm Manager has outlined the hints for better grazing management of farm pastures:-

1. Avoid heavy grazing on pure stylo during dry spell and concentrate more on grass legume and pure grass pastures.
2. Best pastures(Stylo) for weaners to achieve optimum growth rate:
3. Cows at early pregnancy have lower feed requirement and capable to utilise pure grass pastures.
4. Maximum use of dry pasture should be made with dry cattle prior to the dry period.
5. Deferred grazing of grass/legume pastures during April, May, June to ensure conserved feed during the dry.

#### Fertiliser Use

Total fertiliser for topdressing and basal dressing during the

the year and cost are given below:-

<u>Fertilizer</u>	<u>Amount(tons)</u>	<u>Cost \$M</u>
Nitro	6.15 @ \$636.90	3,916.93
Compound	10.96 @ \$517.50	5,671.80
CIRP	30.77 @ \$390.45	12,014.15
Cover Crop	60.73 @ \$454.25	27,586.48
Total	108.61	49,189.48
Transportation K.K. - Keningau		6,000.00
		<u>55,189.48</u>

In 1976, 108 tons of fertilizers have been used, of which 84% were on pure stylo and green/legume pastures. Most Nitro and Compound fertilizer were applied to fodder grasses and maize crops and negligible amount have been left for pure grasses.

With the exception of CIRP which maintains a stable price, the price of other fertilisers dropped by 20-25%. This has brought down the cost of land maintenance to \$65.39 per acre for the whole farm. The cost of fertilizer for each pasture is tabulated as following:-

<u>Pasture</u>	<u>Topdressing Rate lb/acre</u>			<u>Cost/acre</u>
	<u>CIRP</u>	<u>CCM</u>	<u>Nitro/Compound</u>	
Stylo	180	161	-	64.02
Stylo/lalang	41	14	-	9.98
Brachiaria	-	-	-	-
Brachiaria/Stylo	107	267	-	72.79
Setaria	-	-	188	48.23
Setaria/Stylo	117	271	-	75.35
Guinea/Stylo	148	301	-	86.25

Pasture Research Activities

1976 was the first year of the Third Malaysia Plan in which \$700,000 has been approved to finance the pasture research activities. Scope of work to be carried out at Sebrang farm included grazing trials, cutting trials and pot experiments.

The main objectives of the research activities are:-

1. evaluation and multiplication of introduced species
2. Soil nutrition and fertilizer requirement of improved pasture, and
3. Animal production from various improved pastures.

(a) Species introduction, evaluation and multiplications

No new species has been introduced during the year and only the following observations were made from records of species plots established in 1974.

i) Common guinea from Australia.

It combines excellently well with stylo and centro and withstands grazing under good management. The mixtures are recommended to soils of moderate fertility.

ii) Kikuyu

With input of N fertilizer, it is no longer an aggressive grass and could not compete with the invading local grasses. The grass vanished eventually. Evidently, this grass adapts to soils of good fertility only but not the Sebrang soils.

iii) Carribean Stylo

Since this is a dwarf or prostrate type of Stylo, it would stand heavier grazing pressure than these or Schofield.

The Stylo deteriorates remarkably in a year especially when there is strong competition from other grasses or legumes. The stylo is worthwhile for further investigation.

iv) Digitaria MADI No.1

Aggressiveness of the grass is greatly reduced with no input of N fertilizer. It becomes a dry pasture with plenty of dead material in dry season. It would seem the grass be suitable for wet, fertile soils but not at Sebrang.

v) Setaria Splendida

This would seem to be a potential fodder grass which appears much better than the Napier grasses.

Levels of herbage yield of various pastures and fodders are of interest and become the index of the productivity of this environment. Following figures are being collected at different years. These would be adequate to show the effects of cutting and fertilizer management on herbage production and the species differences.

<u>Species</u>	<u>Annual DM</u>	<u>Remarks</u>
<u>Grazing pasture:</u>		
Pure Stylo	10,087 Kg/ha	Monthly cut
Setaria/Stylo	14,744	4 week-cut
Brachiaria	15,151	100 Kg N,4 w-cut
	22,868	400 Kg N,4 wk-cut
Plicatulum .	15,218	100 Kg N,4 wk-cut
	22,419	400 Kg N,4 wk-cut
<u>Fodder grass</u>		
Napier	14,107 Kg/ha	140 Kg N,4 wk-cut
	21,388	140 Kg N,6 wk-cut
	34,245	700 Kg N,4 wk-cut
	47,739	700 Kg N, 6 wk-cut



Guinea	18,375 Kg/ha	140 Kg N, 4 wk-cut
	23,574	140 Kg N, 6 wk-cut
	40,034	700 Kg N, 4 wk-cut
	58,126	700 Kg N, 6 wk-cut
Splendida	18,177	140 Kg N, 4 wk-cut
	20,278	140 Kg N, 6 wk-cut
	39,250	700 Kg N, 4 wk-cut
	54,043	700 Kg N, 6 wk-cut

b) Fodder grass cutting and fertilizer trial

This was laid down in September 1975 to evaluate the yield potential and quality aspects of fodder grasses.

Treatments:

- Species - 2 Napier grass (Ipoh and Bona), 2 guinea Giant and Hamil), and Setaria Splendida  
 Fertilizer - High rate (700 Kg N/ha) and low rate (140 Kg N/ha).  
 Cutting time - 4 and 6 weekly interval  
 Replications 2

Results

There were 13 samplings for the 4-week cutting treatment and 9 samplings for the 6-week cutting treatment during the year. Details of the seasonal yield are given at the Appendix and annual totals are summarised below (Kg dry matter/ha).

Species	4-week-cut		6 week-cut	
	High Rate	Low Rate	High Rate	Low Rate
Napier Ipoh	36,905	13,567	45,776	22,593
Bona	31,586	14,648	49,702	20,184
Guinea Giant	49,402	20,718	61,359	21,403
Hamil	30,677	16,033	54,893	25,746
Splendida	39,250	18,177	54,043	20,278
	37,562	16,628	53,154	22,040

It is expected that dry matter increases with the increase of cutting intervals and rates of application. The results from the Napier cutting trial (Annual Report 1975) have shown that higher yield of Napier grass at less frequent cutting time associates closely with the stem weight. In other words, stemy grass will produce relatively more than the leafy type with the extension of defoliation period. For example, the stemy Napier grass and Hamil grass appear to perform better at 6-week cut than they are on 4-week cut. These can be explained as due to the elongation of stem and leaf arrangement which result better inception of solar light. However, with the exception on plots of low rate x 6 - week cut, Makueni guinea and setaria splendida are the highest yielders.

The fertilizer effects are in general 100% increase as the rates are increased from 140 to 700 Kg N/ha/annum .

It is interested to note the excellent performance of Giant guinea and Setaria Splendida on plots receiving 140 Kg N/ha/annum when they are cut at 4-weekly interval. The amount can easily be obtainable from legume source and they could be planted as grass/legumes pastures for fodder and grazing.

Data of chemical analysis are not available due to (1) The Tuaran Agriculture Research Centre could not provide the service after we have become an independent department (2) lack of a chemistry laboratory in this department.

c) NPK trial on Brachiaria and Plicatum

Objectives of this trial are to look at the yield and quality aspects of nitrogen-fertilized grasses at Sebrang environment.

Treatments

Nitrogen (50, 100 , 200, 400, 800 Kg N/ ha/year)  
Phosphorus (10, 20, 40, 80, 160 Kg P/ha/year)  
Potassium (20, 40, 80, 160, 320, Kg K/ha/year)

Nutrient other than the treatment elements are assumed non-limiting for growth. Nitrogen was in 4 split application within a year.

### Results

Annual total of dry matter are given below:-

<u>Treatment</u>	<u>Brachiaria</u>	<u>Plicatulum</u>
Nitrogen 50 Kg/ha/yr	14,299	11,917
100	15,151	15,218
200	18,487	18,455
400	22,868	22,419
800	26,439	24,935
Phosphorous 10 Kg/ha/yr	24,592	21,181
20	22,773	20,404
40	24,439	22,377
80	25,441	22,406
160	24,648	20,740
Potassium 20 Kg/ha/yr	19,650	22,964
40	25,883	24,617
80	21,365	22,150
160	24,111	22,112
320	28,192	23,252

There are curvilinear responses from the dressing of nitrogens, but little effects are recorded for phosphorus and potassium. The two grasses, Brachiaria and Plicatulum, give very similar patterns of response to nitrogen fertilizer. If the response is expressed as Kg dry matter increase per Kg of applied nitrogen taking nil rate of applied nitrogen as a base line, the responses are as follows. Dry matter yield at nil rate is estimated as 11,000 Kg dry matter per ha per year.

<u>Treatment</u>		<u>Brachiaria</u>	<u>Plicatulum</u>
Nitrogen 50 Kg/ha/yr		65.9 Kg DM/KgN	18.4 Kg Dm/KgN
10	100	41.5	42.2
	200	37.4	37.3
	400	29.7	28.5
	800	19.3	17.4

Apparently, the responses diminish with increasing rates of fertilizer application. Although the ability of the grass to convert applied nitrogen into dry matter may vary with species, types of fertilizers and rainfall, the figures obtained from this trial are comparable to those published work from Puerto Rico and Northern Australia.

The time period after topdressing has marked effects on the nitrogen responses. Because the nitrogen in the soil reserve tends to reduce as a result of the removal from cutting and leaching, the magnitude of response diminish with time as shown in the table below. This suggest that Brachiaria and Plicatulum should be topdressed at 2-3 months intervals.

Species		Months after topdressing			Annual Total
		1	2	3	
Plicatulum	Dm	1299 Kg/ha	984 Kg/ha	689 Kg/ha	11,917 Kg/ha
	N50	18.4	13.9	8.9	164.9
	N%	1.42	1.41	1.29	1.38
N100	Dm	1609 Kg/ha	1267 Kg/ha	927 Kg/ha	15,218 Kg/ha
	N	23.9	17.8	12.5	217.0
	N%	1.48	1.40	1.35	1.42
N200	DM	2142 Kg/ha	1563 Kg/ha	907 Kg/ha	18,455 Kg/ha
	N	37.9	22.6	12.8	293.5
	N%	1.77	1.44	1.41	1.59

N400	DM	2396 Kg/ha	2009 Kg/ha	1198 Kg/ha	22,419 Kg/ha
	N	50.6	31.5	18.1	400.5
	N%	2.11	1.51	1.51	1.78
N800	DM	2392 Kg/ha	2389 Kg/ha	1451 Kg/ha	24,935 Kg/ha
	N	61.6	43.8	22.4	511.3
	N%	2.57	1.83	1.54	2.05
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Brach- iaria N50	DM	1680 Kg/ha	1108 Kg/ha	784 Kg/ha	14,299 Kg/ha
	N	23.6	15.2	10.0	195.1
	N%	1.40	1.37	1.27	1.36
N100	DM	1866 Kg/ha	1191 Kg/ha	843 Kg/ha	15,151 Kg/ha
	N	26.0	15.8	9.3 204.4	
	N%	1.39	1.32	1.10	1.35
N200	DM	2181 Kg/ha	1541 Kg/ha	898 Kg/ha	18,487 Kg/ha
	N	34.2	22.0	10.4	266.6
	N%	1.57	1.43	1.16	1.44
N400	DM	2467 Kg/ha	1739 Kg/ha	1339 Kg/ha	22,868 Kg/ha
	N	47.4	29.2	16.7	373.6
	N%	1.92	1.68	1.25	1.63
N800	DM	2790 Kg/ha	2046 Kg/ha	1772 Kg/ha	26,439 Kg/ha
	N	77.3	41.1	23.8	569.1
	N%	2.77	2.01	1.34	2.15

There is almost a linear increase of percentage nitrogen and total nitrogen to rate of application, but they also show a similar trend with time period.

From the responded curves, it is possible to estimate uptake of about 125 Kg N by Brachiaria and plicatulum without receiving any fertilizer. On this basis, percentages of nitrogen recovery or an index of the efficiency of fertilizer usage are calculated below:-

<u>Treatment</u>	<u>Brachiaria</u>	<u>Plicatulum</u>
N 50	140.2%	79.8%
100	79.4	92.0
200	70.8	84.2
400	62.1	68.8
800	55.5	48.3

The above informations suggest that Brachiaria and Plicatulum require high rate of fertilizer (200-400 Kg N/ha/yr) to produce bulk with reasonable feeding quality. At low fertilizer rates, both grasses are very efficient extractors of soil nitrogen and produce fair amount of bulk 10,000 - 12,000 Kg DM/ha/year. Because of the dilution effect, protein levels in the herbage are low. This probably explains how Brachiaria and Plicatulum adapt well to soils of poor fertility. The applied fertilizers should be in 4 or more split dressings within a year.

(d) 2<sup>4</sup> PK (Mg, S) Mo factorial on Setaria/stylo pastures

The trial was laid down in July, 1975 on the established pasture at paddock 31. Major objectives are to determine responses of the pasture to fertilizers P, K, Mg, S and Mo.

Treatments

P - 40 Kg/ha applied as triplesuper 200 Kg/ha

K - 50 " " Muriate potash 100 kg/ha

Mg - 17 " ) Applied as Kieserite magnesium 100 Kg/ha

S - 32 " )

Mo - 250 g/ha applied as sodium molydate 625 g/ha

arrangement - 4 factors each 2 levels (2 x 2 x 2 x 2) to give 16 combinations with 2 replications.

### Results

Thirteen samplings were taken between August 1975 and July 1976 and 5 samplings in August-December, 1976. Results of total dry matter and legume yields are summarised below (Kg/ha):

Treatment	August 1975 - July 1976			August-December 1976		
	Total dry matter	Yield ratio	Legume yield	Yield ratio dry matter	Total yield	Yield ratio
P With	14,395	1.00	9619	1.00	5168	3821
Without	14,411		9605		5106	4083
K With	15,045	1.09	10083	1.09	4919	3677
Without	13,772		9247		5353	4393
MgS With	15,522	1.16	10428	1.18	6053	4685
Without	13,291		8838		4220	3302
MO With	14,851	1.05	9992	1.07	5215	4130
Without	14,193		9320		5059	3992

The above data show that there is no response from dressing of phosphate and molybdate, a slight

effect from potash, but a considerable response derived from topdressing of Kieserite magnesium. It is noted that more total dry matter and legume yield are being produced from plots receiving Kieserite magnesium.

The legume % does not seem to be affected by types of fertilizers but increases with time under hand cutting i.e. without the trampling and treading effects. Legume % ranges 66.8 - 67.2% for the average of samplings in August-July and increased up to 73.9-79.2% in August-December, 1976.

Chemical analyses of stylo in mixed pastures

<u>Treatment</u>	<u>N%</u>	<u>P%</u>	<u>K%</u>	<u>Mg%</u>	<u>S%</u>
P with	2.80	0.33	2.06	0.61	0.22
Without	2.82	0.28	2.13	0.60	0.23
K With	2.91	0.30	2.08	0.64	0.25
Without	2.42	0.31	2.12	0.57	0.21
MgS With	2.92	0.31	2.07	0.65	0.25
Without	2.42	0.31	2.12	0.56	0.20
MO With	2.84	0.30	2.12	0.60	0.23
Without	2.80	0.31	2.07	0.61	0.23

Results of chemical analysis are only based on the first six samplings. Generally speaking, 2.8% N, 0.30% P and 2.10% K in the whole plant tops are adequate for normal growth of stylo. At such levels, there seem to be little response from dressing of P and K fertilizers. Stylo may seem to require 0.65% Mg, 0.25% S or higher levels at plant tops to maintain vigorous growth. The results also suggest that while adequate levels of Mg and S are being maintained, higher protein or N% would be expected. It is interesting to note that addition of K has a similar effect as Kieserite which result higher Mg and S content and consequently the N%.



Phosphate & Stocking rate trial on Setaria/Stylo

In continuation with the grazing trial on setaria/Stylo and pure stylo pastures, a long term grazing project is being planned. Major objectives of this study are to evaluate the animal production from a setaria/Stylo pastures with adequate fertilizers and grazing management and economics considerations.

Treatments

Phosphate	- 20 and 40 Kg P/ha
Stocking Rate	- 1.5, 2.0 and 2.5 animals/ha
Arrangement	- 2 x 3 factorial
Replications	- 2

Basal dressings were applied before the planting in October, 1976 and pastures established with good rainfall in November and December.

The perimeter fences have been completed, and work on divisional fencing, water supply, shades and others will be carried out in 1977.

Summary

1976 has been a dry year, but no feed shortage was experienced. This was achieved by extended development of grass/legume pastures together with a strategy of grazing management.

The costs for producing various types of feeding stuff have been estimated:- 2.9 cents per lb. dry matter of maize silage, 1.8 cents per lb. dry matter of grass/legume pastures.

The yield potential for different pastures species and fertilizer requirement have been investigated and data produced. Preparation of a long term grazing trial to evaluate animal production was also in progress.

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A further 100 acres of land were cleared, at the end of the year, although this has not yet been established to pasture.

The total stock at the end of the year was 297, and included a total of 27 crossbred Friesian, the first calves born to dairy AI. The programme of AI with dairy semen continued, and local cows were purchased to increase the number of animals available for AI. To assist in the management of this breeding programme, two breeding seasons were established.

### RAINFALL

Rainfall was adequate and is shown in Table I.

TABLE I

	<u>Inches</u>	<u>Wet Days</u>
January	4.66	9
February	2.91	7
March	1.42	5
April	3.64	9
May	8.70	15
June	6.05	10
July	9.40	9
August	13.25	8
September	7.06	10
October	3.33	7
November	2.59	7
December	<u>7.53</u>	<u>11</u>
Total:	<u>70.54</u>	<u>107</u>

## CATTLE

Cattle breeding and performance was good. A total of 79 calves were born, 44 male and 35 female, and of these 28 (16 male and 12 female) were  $\frac{1}{2}$  Friesian born to AI.

- 2 -

The reproductive performance is in Table II.

	Number	Calved	Barren	Calving %	Live Calves	Dystokia/Dead	Calving Interval		
							n	$\bar{x}$	sd
Cows:	73	53	21	72.6	53	-	64	431	79.5
Heifer:									
Local	5	5	-	100	5	-			
$\frac{1}{2}$ Brahman	22	22	-	100	21	1			
Total Heifer	27	27	-						
Grand Total	100	80	3	80.0	79	1			

There is a drop in breeding performance amongst the cows compared to 1975 (93.8% calving) with a lengthening of the calving interval (372 days) and this is due to the introduction of AI. as well as the restricted breeding seasons.

### 1976 Stock Reconciliation

	As at 31.12.75	Born	Trans- fer	Total	Died	Slaugh- ter	Breed- ing	Total	As at 31.12.76
Cows	77		10	87	5			5	107
Breeding Heifers	26			26					35
Heifers	40		10	50					52
Heifer Calves	27	35	1	63					27
Bulls	2 48			2 48		26	27	35	2 41
Bull Calves	20	44		64	3			3	33
<b>Total:</b>	240	79	21	340	8	26	2	43	297

...3/-

3 cows, 2 heifers and a calf were transferred from the Veterinary station, Lahad Datu, and 7 cows and 8 heifers purchased from Kubota Estate. The increase in breeding stock was to increase the number of animals available for AI.

7 Breeding bulls were sold to farmers registered under the cattle under coconut subsidy scheme, and 2 breeding bulls were distributed for breeding in Semporna. 26 animals were sold for slaughter.

There were only 8 deaths amongst the stock during the year (2.35%) of which 5 were in cows, 3 of which were in accidents, and of the 3 calves, one was killed by a dog.

Growth Performance

Bulls - Whole Herd

		BW	3m	6m	9m	1y	1½	1¾	2y	
1974	n	37	35	36	36	32	27	24	22	20
	$\bar{x}$	57.6	169.9	266.4	340.3	424.1	506.1	597.7	691.6	764.4
	sd	14.5	45.0	74.3	75.2	69.5	60.5	44.2	41.8	47.0
1975	n	31	30	30	30	29	20	17	13	11
	$\bar{x}$	56.1	185.5	297.0	368.7	427.2	518.3	609.4	699.6	766.4
	sd	8.7	25.2	48.8	65.4	53.6	55.9	63.4	65.6	71.6
1976	n	44	42	42	42	41	39	33	29	25
	$\bar{x}$	58.3	191.7	306.8	395.2	441.3	529.6	652.0	722.9	798.4
	sd	8.4	30.3	47.9	59.4	61.0	75.5	70.9	76.4	72.4

½ Friesian

1976	n	16	15	15	15	14	14	14	13	12
	$\bar{x}$	58	189	312.7	407.3	464.3	563.9	686.1	751.5	780.6
	sd	9.5	29.7	37	46.4	56.9	67.7	62.3	69.4	52.2

¾ Brahman

1976	n	6	6	6	6	6	6	5	4	3
	$\bar{x}$	53.2	191.7	317.5	405.8	448.3	525.8	630.0	691.3	771.7
	sd	6.1	14	13.2	29.6	34.0	55.0	56.2	40.1	68.0

½ Brahman

1976	n	19	18	18	18	18	16	11	10	8
	$\bar{x}$	59.7	184.4	291.1	370.8	417.2	495.9	624.1	681	771.3
	sd	6.9	25	56.1	65.2	56.7	71.4	58.1	76.6	78.1

½ Santa

1976	n	3	3	3	3	3	3	3	2	2
	$\bar{x}$	60.3	248.3	350	460	465	556.7	631.7	810	930
	sd	12.4	31.8	58.9	62.7	97.3	119.3	133.3	20	15

Heifers - Whole Herd

		BW	3m	6m	9m	1y	1½	1½	1 3/4	2y
1974	n	32	31	31	31	31	30	30	30	30
	$\bar{x}$	53.9	167.4	266.3	339.8	383.1	439.7	504.5	581.8	149.3
	sd	12.5	37.3	62.0	58.2	62.1	570	56.7	48.5	51.1
1975	n	40	40	40	40	40	40	40	39	39
	$\bar{x}$	53.4	169.3	277.9	341.9	398	480	568.3	645.9	705.8
	sd	8.3	19.2	35.7	47.3	45.6	54.5	64.2	73.4	82.2
1976	n	35	35	35	35	35	35	35	35	35
	$\bar{x}$	55.5	185.4	296.6	378.4	454.7	547.4	628.7	678.7	711.1
	n	8.3	24.2	31.5	38.9	47.6	52.2	59.8	61.5	63.8

½ Friesian

1976	n	12	12	12	12	12	12	12	12	12
	$\bar{x}$	54.9	178.3	299.6	395	457.5	540.8	605.9	667.1	713.3
	sd	5.7	25.8	35.4	37.2	56.9	55.1	62.	74.6	67.1

¾ Br heifer

1976	n	12	12	12	12	12	12	12	12	12
	$\bar{x}$	50.0	186.3	297.5	371.7	497.1	545.4	644.6	688.3	712.5
	sd	7.8	25.6	24.4	29.5	36	49.6	64.9	64.3	74.2

½ Brahman

1976	n	10	10	10	10	10	10	10	10	10
	$\bar{x}$	61.6	190	286.5	361.5	455.5	551.5	629.5	674.5	701.5
	sd	6.4	16.9	29.1	40.4	47.4	50.0	45.5	40.1	49.7

½ Santa

1976	n	1	1	1	1	1	1	1	1	1
	$\bar{x}$	68	215	350	430	505	610	710	745	750

